

Tropical Timber Atlas



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Tropical Timber Atlas

Technological characteristics and uses

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Preface

In the mid 1980s, the International Tropical Timber Organization (ITTO) commissioned the Centre for Tropical Forests (CTFT – CIRAD's former forestry division) to design and develop management software to catalogue the technological characteristics of tropical woods.

The first version of this software was developed using the CTFT's "Tropical Woods" database, a compilation of the results of several decades of research in the field of tropical wood technology. The goal was to provide and make accessible available information about tropical wood species to operators in the wood industry, as well as to help promote and develop the commercialisation and use of tropical wood species, including secondary woods. The tropical wood research team at CTFT-CIRAD made changes to the software later and enriched it in terms of the number of species described and the number of characteristics presented. Towards the mid-1990s, the software was transferred from a DOS to a Windows system and published under the name "Tropix". The tropical wood research team and Bio WooEB unit at CIRAD successively published updated versions of the tool. Version 7.5.1, released in 2015, presents the technological characteristics of 245 species, including 17 temperate species. Today, the software is widely used by wood industry professionals in France and abroad (<http://tropix.cirad.fr/>).

Between 1986 and 1990, three authoritative works on tropical wood species were published using data from Tropix:

- The Tropical Timber Atlas - Volume 1 - Africa (ATIBT, CTFT), published in French and English in 1986;
- The Tropical Timber Atlas - Volume 2 - Asia-Australia-Oceania (ATIBT, CTFT), published in French and English in 1987;
- The Tropical Timber Atlas - Volume 3 - Latin America (ATIBT, ITTO, CTFT), published in French, English and Spanish in 1990.

These three publications, used on a wide scale by professionals in the tropical wood industry, are out of print. Industry professionals require a guide on tropical species which presents updated data and information suited to their needs.

In this context, now is a good time to highlight the value of the data and information in the 7.5.1. version of Tropix and assemble it in a single volume (in paper and electronic format) entitled "The Tropical Timber Atlas", to replace the three documents on wood species found in Africa, Latin America and Asia/Oceania.

As part of its Trade and Market Transparency programme, the International Tropical Timber Organization agreed to provide financial support for the design and production of this new volume via the project: TMT-SPD010/12 Rev.1 (M), entitled: "Preparation of the publication Tropical Timber Atlas - 1st edition: Technological Characteristics and uses of 273 tropical wood species (and 17 temperate species)".

The Tropical Timber Atlas includes additional information and 55 new species not present in the 7.5.1. version of Tropix, for a total of 300 species. The main technological characteristics and actual or potential uses are presented; the lower heating power values and thermal conductivity of the wood has been added; a new description of the drying schedules is provided based on Cathild Industrie programmes; there are illustrations of every species via two photos of backsawn and quartersawn (or half-quarter sawn), two examples of microphotography (enlarged by 20 and 115)

and by a photo of something made using the wood described. The macrophotography shots are enlargements of the surface of the wood. They are taken using a microscope equipped with a camera. They show the surface of the natural wood, which has been sanded and polished beforehand. The $\times 20$ magnification shows a cross section of the plane of the wood, while the $\times 115$ magnification shows the microscopic structure of the wood in greater detail.

This atlas is intended to be a reference tool for all operators in the forestry sector in France and abroad, as well as for research and educational institutions, contractors, architects, builders and, in general, for all professionals who process and use temperate or tropical timber or who plan to do so.

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Contributors to the atlas

The preparation and follow-up of the Tropical Timber Atlas, and later the design, production and publication of this book, would not have been possible without the participation and major involvement of many stakeholders, researchers and operators in the wood sector:

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We wish to express our very sincere thanks to them.

Financial and logistical support

This work is the result of the teamwork of CIRAD staff who, for decades, have studied the characteristics of over 1,200 tropical wood species in their laboratories, carrying out hundreds of thousands of tests. The frequent collection of information in the field has supplemented this data to form a knowledge base which is now available in different forms.

In addition to its role as a collective memory and repository of information to enrich documents and other material for non-specialists on the quality of tropical timber (technical sheets and guides, atlas, software, etc.), this knowledge base is a tool for studying relationships between different timber properties and different uses for forest products. Today, research and studies carried out by CIRAD's Biomass, Wood, Energy, Bioproducts (BioWooEB) Research Unit continue to enrich this knowledge base on the technological properties and potential uses of a growing number of forest species from tropical regions on four continents.

The publication of this Tropical Timber Atlas was made possible by the financial support of the International Tropical Timber Organization (ITTO). This atlas meets the objectives of the International Tropical Timber Agreement of 2006 (ITTA), in particular by promoting and supporting research and development for more efficient uses of wood and to increase the competitive value of wood-based products compared to other materials. In producer member countries, the agreement encourages increased and more advanced processing of tropical timber from sustainable sources, to stimulate industrialisation in these countries and expand job opportunities.

The atlas also satisfies the priorities and operational activities of the ITTO Action Plan, one of the two main objectives of which is to promote the expansion and diversification of international trade in tropical timber from sustainably managed forests and based on legal operations.

This project is supported by Agropolis Fondation under the reference ID 1600-023 through the « Investissements d'avenir » programme (Labex Agro: ANR-10-LABX-0001-01).

The Association technique internationale des bois (ATIBT) also supported the publication of this atlas both logistically and operationally, in particular by providing the *Nomenclature générale des bois tropicaux*, which was updated in 2016. Support for the updating of this nomenclature was provided by the ITTO, the French Facility for Global Environment (FEEM) and the French Ministry of Agriculture, Agri-food and Forestry (MAAF). It is used to update the Harmonized System of the World Customs Organisation. The European Commission mentions the general Nomenclature of the ATIBT as a reference document for the implementation of the European Union Timber Regulation (EUTR).

Organisations which contributed to the Tropical Timber Atlas

CIRAD

CIRAD (French Agricultural Research Center for International Development) is a French research centre that, in association with countries of the South, tackles international issues of agriculture and development. In partnership with these countries, it generates and disseminates new knowledge to support agricultural development and to inform the debate on the major global issues concerning agriculture, food, and rural territories. CIRAD has a global network of partners and regional offices from which it conducts joint operations with stakeholders in more than 90 countries.

The BioWooEB Research Unit (Biomass, wood, energy, bioproducts) aims to develop different types of timber resources in tropical regions, natural forests, plantations, agroforestry, waste from agriculture, agri-food and wood industries, stems of palm trees, bamboo, cane etc. This valorisation is associated with the development of sustainable and thermally efficient home building materials for tropical and Mediterranean climates, carbon materials (activated charcoal) to process waste water, and processes for converting biomass into energy in southern countries.

CIRAD, 42 rue Scheffer, 75116 Paris, France
www.cirad.fr

ITTO

The ITTO (International Tropical Timber Organization) is an intergovernmental organisation that promotes the conservation of tropical forest resources and their sustainable management, harvesting and trade. Its 59 members represent about 80% of the world's tropical forests and 90% of the global tropical timber trade. It is primarily concerned with trade and industry, but pays considerable attention to the sustainable management of natural resources. It manages its own programme of projects and other activities, enabling it to quickly test and operationalise its policy work.

International Organizations Center, Yokohama, 220-0012, Japan
www.itto.int

ATIBT

The ATIBT (Association technique internationale des bois tropicaux) represents the growers, forest industry professionals and all those involved in the tropical wood sector who are committed to accompanying the changes needed in the industry. The association was founded in 1951 at the request of the FAO and the Organisation for Economic Co-operation and Development (OECD). ATIBT initiatives are based on three key areas in the tropical wood industry: markets, transformation, and responsible forest management.

ATIBT, Jardin tropical de Paris, 45 bis avenue de la Belle Gabrielle,
94736 Nogent-sur-Marne Cedex, France
www.atibt.org

User guide: general information

Names and Commercial Restrictions (CITES)

Common names for species

The common names are those referenced in the *Nomenclature Générale des Bois Tropicaux* published by the Association Technique Internationale des Bois Tropicaux (ATIBT) in 2016. This reference guide is internationally recognised, particularly in Europe, with the implementation of the European Union Timber Regulation (EUTR).

For certain species, the common name, which is the term most referred to, is accompanied by a second, frequently used trade name, indicated by an asterisk. For instance, the following species have been identified with two names: Alan / Alan-Batu*; Anzèm / Nténé*; Balau, Yellow / Bangkirai*; Catucaém / Louro Faia*; Coração de negro* / Panacoco; Cryptomeria* / Sugi; Dukali / Amapa*; Fuma / Fromager*; Kurokai / Breu*; Mango / Machang*; Pashaco / Paricá*; Pinus kesiya* / Kesiya Pine; Pinus merkusii* / Merkusii Pine; Pinus patula* / Patula Pine.

Family and botanical names

Like the common names, the family and botanical names listed are also referenced in the *Nomenclature Générale des Bois Tropicaux* (ATIBT, 2016).

The following abbreviations appear after certain botanical names:

- “spp.” (*species pluralis*) and “p.p.” (*pro parte*). In botany, the abbreviation “spp.” means ‘more than one species in the genus’. It can include all species in a given genus, which can be confusing. Different authors use this abbreviation differently, to designate several species within a genus in a non-exhaustive manner, or to designate all species in that genus.
- In this Atlas, the abbreviation “p.p.” is used for types of wood which include several – but not every – species within a genus;
- “subgen.” (subgenus). In a given genus, several significantly similar species can form a subgenus. In a subgenus, a wood type can cover all species, several species, or simply some of these, as per the conditions mentioned above.

CITES (Washington Convention of 2017)

CITES (the Convention on International in Endangered Species of Wild Fauna and Flora, or ‘the Washington Convention’) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. Tropical wood is therefore protected by this convention.

Regulated wood species are classified in one of the convention’s three appendices:

- Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances;
- Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid use incompatible with their survival;
- Appendix III contains species that are protected in at least one country. This country must ask other CITES parties for assistance in controlling the trade. Changes to Appendix III follow a distinct procedure from changes to Appendices I and II, as each party is entitled to make unilateral amendments to it.

The label “no trade restrictions” is applied to species not listed in CITES. For more information, consult the CITES web site: www.cites.org.

Log description

Diameter

The range of mentioned values corresponds to the diameters of the most frequently exploited woods. These values must be weighed against MDCL – minimum-diameter cutting limits – determined by each producer country to ensure acceptable forest sustainability after the rotation period. MDCL values are generally available from the forestry services of these countries.

Thickness of sapwood

The range of mentioned values corresponds to the most frequently encountered thicknesses of sapwood.

Buoyancy

Two classes (floatable and non-floatable woods) were defined according to the average density of green woods (after felling). A third class ('not applicable') was established for species in temperate countries.

Log conservation

Depending on the wood's natural durability, preservation is low (the wood must be treated), moderate (treatment recommended) or good. The concept of preservation only applies to heartwood; sapwood is always considered as non-durable.

Wood description

Colour

Although the colour and appearance of the wood are usually specific to a given species, the colour is not a constant factor from one tree to another or from one piece of wood to another of the same species. It can vary according to different parameters and change over time. Variations in grain gradient (for example, interlocked grain and wavy grain) and moisture content can alter the perception of colour.

Each species is characterised by a reference colour chosen from among 18 predefined colours: white, cream white, pinkish white, light yellow, yellow, orange yellow, light brown, brown, yellow brown, pinkish brown, red brown, dark brown, light red, red, dark red, grey, black and purple.

The description of the wood colour mentioned in the note under "Wood description" emphasises the range of variation found, but does not take into account, for example, the change in the colour of woods exposed to bad weather.

Sapwood

The sapwood can be well-demarcated, poorly demarcated or not demarcated. The rating "n.d." is used in cases where no information is available.

Texture

The texture of a wood corresponds to the visual impression given by the size and the arrangement of the vessels. Three classes of texture are defined: fine, medium and coarse.

Grain and interlocked grain

The grain of the wood is the general alignment of the fibres in relation to the log. The interlocked grain is due to an alternate incline (in relation to the trunk axis) of the successive layers of the wood that form during tree growth.

Physical and mechanical properties

The values of the physical and mechanical properties (mean values) are computed from tests conducted at CIRAD laboratories or obtained from international literature. They must be used with caution due to the highly variable nature of wood properties. This variability is well-known by people working in the wood industry. It depends on numerous external or internal factors: the age of the trees, the position of the wood inside the trunk, wood maturity, and growth conditions (including soil type, rainfall and climate).

Density

The density or relative density of a solid is the ratio of its mass per unit volume over the mass per unit volume of water (pure water at 4 °C at atmospheric pressure, i.e. 1,000 kg/m³). It has no unit.

Indicated density is determined on wood at 12% moisture content. This basic technological characteristic is the first to be determined when qualifying wood. This property is more or less closely related to the wood's main physical and mechanical properties and with certain working characteristics.

Monnin hardness

Monnin hardness (determined on wood at 12% moisture content) is an important property to know when the wood is used for flooring (parquets, decking) or any end-use where the wood will be subject to impacts or punching. It has no unit.

Hardness classification:

- $H \leq 1.5$: very soft;
- $1.5 \leq H \leq 3$: soft;
- $3 \leq H \leq 6$: medium;
- $6 \leq H \leq 9$: hard;
- $H \geq 9$: very hard;

The method of measurement of Monnin hardness is defined by the French NF B 51-013 standard (1985).

Janka hardness is another characteristic, measured in several countries, using another method. Sallenave (1971) suggests the following ratio between Monnin hardness and Janka hardness:

Janka hardness (in pounds) = $300 \times$ Monnin hardness.

Fibre saturation point (FSP, in %)

In green wood, part of the water fills, more or less completely, the cellular and intercellular empty spaces. The draining of this free water occurs without wood shrinkage. Once free water has completely disappeared, the wood only contains bound water impregnating the cell walls. When this bound water evaporates during drying, shrinkage occurs and provokes wood warping.

The fibre saturation point (FSP) corresponds to the moisture content of wood saturated with bound water. Below this threshold, the wood starts to shrink during drying. The FSP usually varies between 20 and 40% according to species, but most often, it is around 30%.

Fibre saturation point classification:

- $FSP \leq 25\%$: low;
- $25\% \leq FSP \leq 35\%$: medium;
- $FSP \geq 35\%$: high.

Coefficient of volumetric shrinkage (Vs, in % by %)

When a piece of wood dries below its fibre saturation point (FSP), its volume decreases. If it reabsorbs moisture, its volume increases up to the FSP. Above that, the volume no longer varies. In order to quantify these volume variations, the coefficient of volumetric shrinkage is used (called Vs) and corresponds to the volumetric shrinkage of a piece of wood when its moisture content has a variation of 1%.

Classification for the coefficient of volumetric shrinkage:

- $V_s \leq 0.35$: small shrinkage;
- $0.35 \leq V_s \leq 0.55$: medium shrinkage;
- $V_s \geq 0.55$: large shrinkage.

Total tangential shrinkage (Ts) (in %) and total radial shrinkage (Rs)

Until the fibre saturation point, the wood does not shrink during drying. Once below this threshold, however, it is subject to dimensional variations when its moisture content varies. Shrinkage under the FSP occurs in the wood's three directions: longitudinal, tangential and radial.

Longitudinal shrinkage is very small compared to the two others, about some tenths of a percent, but it can notably influence the dimensional variations of long wood pieces. Few data are available on this characteristic which is quite difficult to measure in the laboratory.

Total tangential and total radial shrinkages are usually determined to qualify the behaviour of wood during drying or more generally during moisture variations.

Total tangential shrinkage classification (Ts):

- $T_s \leq 6.5\%$: small shrinkage;
- $6.5\% \leq T_s \leq 10\%$: medium shrinkage;
- $T_s \geq 10\%$: large shrinkage.

Total radial shrinkage classification (Rs):

- $R_s \leq 3.8\%$: small shrinkage;
- $3.8\% \leq R_s \leq 6.5\%$: medium shrinkage;
- $R_s \geq 6.5\%$: large shrinkage.

Ts/Rs ratio

The "Total tangential shrinkage" over "Total radial shrinkage" ratio gives an indication of the deformation suffered by a piece of wood subjected to humidity variations.

This parameter is of particular importance for non-directional cuts (half-quartered cuts). A Ts/Rs ratio tending towards a value greater than or equal to 2 indicates that a species is susceptible to deformation. The more this value tends towards 1, the more stable the wood, whatever the type of cut.

Thermal conductivity

The thermal conductivity λ (watt per metre and per Kelvin: $W/m \cdot K$) of a substance is its ability to conduct heat. The more insulating a substance is, the lower the λ .

The λ values specified in this atlas for each wood species are the result of a campaign to measure a broad sample of tropical and temperate woods of a wide range of densities. However this sample does not cover all the species included in the atlas.

Measurements were made in the thermal physics lab of the Heterogeneous Materials Study Group (GEMH) at the European Ceramics Centre in Limoges, France) using the hot disk method regulated by the NF EN ISO 22007-2 standard (October 2015). This measurement campaign revealed that thermal conductivity (λ) is correlated with wood density (D) (Figure 1).

Thermal conductivity λ in relation to density D is therefore expressed in the following equation:
 $\lambda = 0,289 D + 0,030$.

The λ values specified in this atlas were determined using this model, based on the average density of each wood species.

Heating value

The heating value (or calorific value) of a substance is defined as the amount of heat released by its combustion. It is usually measured in kilojoules per kilogram (kJ/kg) or joules per gram (J/g), sometimes in calories per gram (cal/g) or kilocalories per kilogram (kcal/kg). Two types of heating value can be defined:

- The higher heating value (HHV) is the amount of heat released by combustion, at constant volume, of 1 kg of an anhydrous substance. Water produced during combustion is condensed, while the heat released by water condensation (latent heat of vaporisation) is recovered;

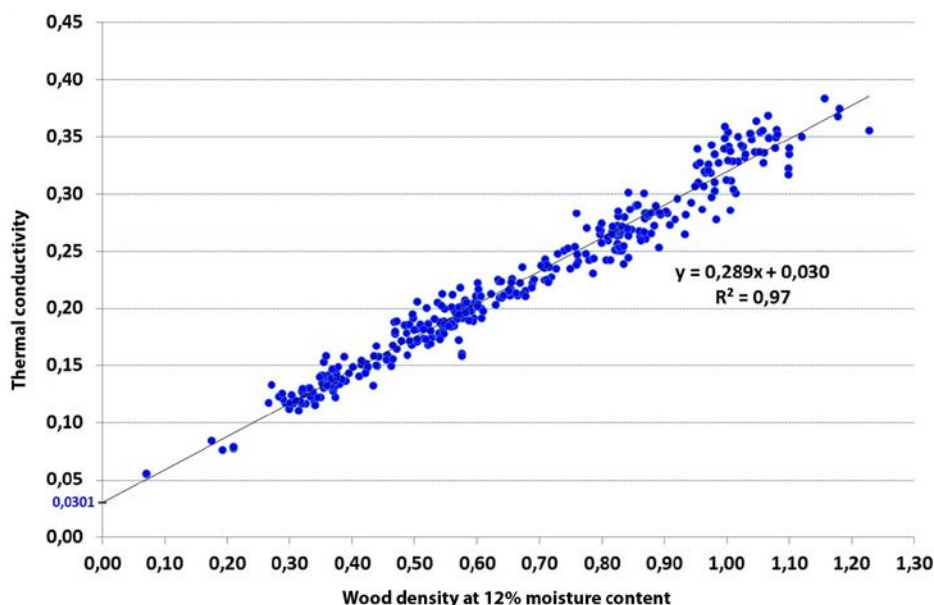


Figure 1. Thermal conductivity in relation to wood density (determined at 12% moisture content).

- The lower heating value (LHV) is the amount of heat released by combustion, at constant pressure, in open air, of 1 kg of an anhydrous substance. Water produced during combustion is not condensed. Therefore, energy produced by condensation is not recovered. LHV is the value most commonly used when calculating combustion. It is measured in kJ/kg of anhydrous wood.

HHV is defined in an experimental (lab) setting using an object called a “bomb calorimeter”. For wood, the lower heating value (LHV, in kJ/kg) is subtracted from the higher heating value (HHV) using the following equation:

- Anhydrous LHV = Anhydrous HHV – (212.2 × H)

where H is the hydrogen content (expressed in % by weight) of a given biomass model regulated by the “Solid biofuels - Determination of calorific value” NF EN 14918 standard (March 2010).

The LHV specified in this atlas were determined using HHV values measured in a laboratory at CIRAD. Hydrogen H content is not determined during the experiment. Therefore, an average H content of 5.85 % was used for the calculation (experience shows that the H value is nearly identical from one species to another).

Crushing strength (in MPa)

This resistance (called C_{12}) is determined on wood at 12% moisture content, according to the procedure stipulated in NF B 51-007 standard (September 1985). It corresponds to the load to be applied parallel to the grain to achieve rupture of a standardized sample.

Crushing strength classification:

- $C_{12} \leq 45$ MPa: low resistance;
- $45 \text{ MPa} \leq C_{12} \leq 75$ MPa: moderate resistance;
- $C_{12} \geq 75$ MPa: high resistance.

Static bending strength (in MPa)

The static bending strength (called B_{12}) is determined on wood at 12% moisture content, according to the procedure stipulated in standard B 51-008 (November 1987). It corresponds to the load to be applied to the middle of a standardized sample placed between two supports to achieve rupture.

Static bending strength classification:

- $F12 \leq 75$ MPa: low resistance;
- $75 \text{ MPa} \leq F12 \leq 125$ MPa: moderate resistance;
- $F12 \geq 125$ MPa: high resistance.

Longitudinal modulus of elasticity (in MPa)

Longitudinal modulus of elasticity (E_L) is determined on woods at 12% moisture content and is a very important property for structural end-uses where pieces of wood usually support static bending forces in their largest direction, parallel to the fibres. This property characterises the relationship between load and deflection. It is an indicator of wood stiffness.

Longitudinal modulus of elasticity classification:

- $EL \leq 12,500$ MPa: low modulus;
- $12,500 \text{ MPa} \leq EL \leq 18,500$ MPa: medium modulus;
- $EL \geq 18,500$ MPa: high modulus.

Natural durability and treatability

Except special note concerning sapwood, durability characteristics refer to the heartwood of mature woods. Sapwood is always considered as non-durable towards biological wood decaying agents. A wood whose in-service moisture content is less than around 20% is not prone to fungal attack. Temperatures below around 5°C prevent any fungal propagation. The same applies for woods under water or placed at high temperatures (around 60°C), that are never attacked by decay, whatever their natural durability.

Resistance to decay

Resistance towards decay is determined on standardized samples in the presence of fungal strains, under controlled ambient conditions. These tests last several months.

The NF EN 350 standard, under review when this atlas was published, defines the classes of natural durability towards wood-decaying fungi:

- Highly durable woods: DC1 (durability class 1, called "class 1");
- Durable woods: DC2, called "class 2";
- Moderately durable woods: DC3, called "class 3";
- Poorly durable woods: DC4, called "class 4";
- Non-durable woods: DC5, called "class 5";

Resistance to dry wood insects (Lyctus, furniture beetle, death watch beetle)

Most commercialised tropical woods are not attacked by dry wood insects, provided that they do not contain sapwood. When the sapwood is not very demarcated, it is advisable to treat the wood against dry wood insects. Some tropical species are completely attacked in every part of the wood and require special attention when dry. Sawn woods or end-products are attacked only when they contain some sapwood and sufficient starch content.

Based on the NF EN 350 standard, a species is classified as sensitive (DC class S, called "class S") if it is attacked during laboratory tests. Otherwise, it is considered as durable (DC class D, called "class D").

Resistance to termites

Resistance to termites is determined in the same manner as for decay. Standardised samples are placed with termites. The intensity of termite attack, and consequently the natural resistance of

the woods, is quantified by assessing the depth of the termites' penetration into the wood. The NF EN 350 standard defines three classes of natural durability against termites:

- Durable woods: DC class D (durability class D), called "class D";
- Moderately durable woods: DC class M, called "class M";
- Sensitive woods: DC class S, called "class S".

Heartwood treatability

Treatability corresponds to a wood's ability to be impregnated by a preservative product. The NF EN 350 standard defines four treatability classes:

- Class 1 – treatable. Sawn wood can be completely and easily impregnated with a treatment under pressure;
- Class 2 – moderately treatable. Complete penetration is usually not possible. However after a treatment under pressure during two or three hours, lateral penetration of more than 6 mm can be achieved for softwoods. For hardwoods, a high proportion of the structure (vessels and rays) can be impregnated;
- Class 3 – poorly treatable. Treatment under pressure for three or four hours cannot achieve a lateral penetration of more than 3-6 mm;
- Class 4 – non-treatable. Very little preservative product is absorbed, even after a treatment under pressure of 3-4 hours. Very little lateral and longitudinal penetration.

Uses class

The uses class corresponds to the degree of exposure to biological decay agents resulting from the service situation of a wooden item or structure. This class may change according to the design or the situation of the structure. It does not systematically define the service life, only the conditions of a potential biological attack. In a use class, the treatment specifications and the choice of the species have a direct effect on service life.

Thus, the service life must be interpreted according to the species and exposure severity. It depends on the wood's natural durability, but also on numerous other factors: design details of the structure (risks of water traps, ventilation of wood, etc.), type of maintenance scheduled, local climate conditions, etc.

The use of a wood whose natural durability is greater than the durability recommended by the NF EN 460 standard (July 1994) for a given use allows the structure's service life to be extended. Conversely, for structural elements with a very short service life (temporary construction), species with a lower natural durability than the durability mentioned in the EN 460 standard can be used.

Note It is important to avoid confusion between the "resistance to decay class" and "uses class", as the classification tables are different.

Service situations are grouped into use classes (see the NF EN 335 standard of May 2013). Each class corresponds to a category of uses associated with the same level of biological decay risks.

Use class categories

Use class	General use
1	Indoors in dry conditions
2	Indoors or under shelter, not exposed to adverse weather. Water condensation possible
3	Outdoors, not in contact with the ground, exposed to adverse weather. Class 3 can be subdivided into two classes: 3.1 Brief exposure to dampening - 3.2 Prolonged exposure to dampening
4	Outdoors, in contact with the ground or freshwater
5	Regularly or permanently submerged in salt water

Specificities of Class 5. For concerned species, class 5 membership is indicated separately. A given species covering class 5 usually also covers class 4, with the exception of a few species

that only cover class 3 or class 2 (Basralocus, Garapa, Iroko, Louro vermelho and Sougué). The European NF EN 460 standard (July 1994) proposes a look-up table between the natural durability solid woods and their possible uses in a given risk class (see table below). This standard predates the replacement of “risk class” by “use class” (NF EN 335 of May 2013). These two concepts are nearly identical.

Natural durability class according to risk class

Risk class covered by natural durability	Natural durability class				
	1	2	3	4	5
1	Yes ⁽¹⁾	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes but	Yes but
3	Yes	Yes	Yes but	Case by case ⁽³⁾	Case by case
4	Yes	Yes but ⁽²⁾	No but ⁽⁴⁾	No ⁽⁵⁾	No
5	Yes	No but	No but	No	No

(1) Yes: natural durability covers the risk class.

(2) Yes but: natural durability normally covers the risk class, but for certain uses, preservation treatment may be recommended.

(3) Case by case: natural durability may be sufficient, but depending on the species of wood, its permeability and end use, preservation treatment may be required.

(4) No but: preservation treatment is normally recommended, but for certain uses, the natural durability may be sufficient to cover the risk class.

(5) No: natural durability does not cover the risk class; preservation treatment is necessary.

For class risk 2 to 5, these correspondences are not clearly defined for certain durability levels. For certain species, use classes are given only as an indication. Corresponding values must be used with caution and professionalism.

Preservation treatment

This section recommends treatments or precautions for use of species where there is a risk of dry wood borer attacks and/or temporary or permanent humidification.

Drying

The general behaviour during kiln drying is described and assessed qualitatively. For certain species, safe practices for ensuring good drying quality are stated.

Risk of deformation

Sawn wood can be subject to 4 types of deformation (figure 2).

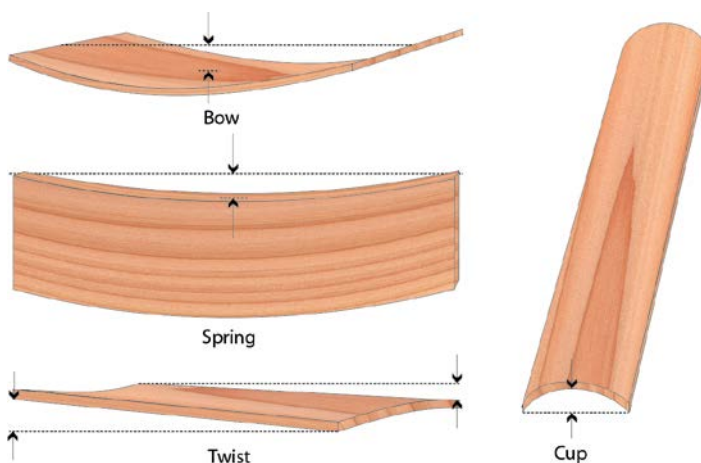


Figure 2. Types of wood deformation.

Risk of casehardening

Casehardening corresponds to a blockage of water transfer from the inside to the outside of a piece of wood due to a change in peripheral wood cell structure. It is often caused by excessively rapid drying which results in overdrying the surface. It may be accompanied by the formation of “water pockets” within the wood.

Risk of checking

Checks can appear on the surface or ends of a piece of wood. They can also form inside sawn wood (internal checks).

Risk of collapse

Collapse is associated with the distortion of wood cells during the first phase of drying. This defect develops before the wood has reached the fibre saturation point (FSP). It appears in the form of rippling on the sawn side of the wood or complete deformation of the wood's surface, with or without internal checking.

Drying schedules

A drying schedule defines the series of climate conditions that must be followed in the kiln. In a wood drying schedule, the transition from one climate to the next is determined by the drop in the wood's moisture content.

For each species, one of the nine drying schedules presented at the end of this section is provided as an indication for use in a conditioned hot air dryer.

Each schedule is composed of five successive phases: two pre-heating phases, drying, conditioning and cooling.

The programmes are defined by five parameters:

- The duration of each phase (in hours);
- The moisture content of the wood (M%), most often measured using electric probes, similar in principle to a pin moisture meter, inserted in several pieces of wood which are distributed in the kiln. The drying process can be controlled using an average of the values recorded by the probes, the highest recorded value, or the lowest value. Probes indicating outliers can be excluded from the calculation;
- The dry temperature, T (°C) required in the kiln. This must be regulated with sufficient accuracy to limit variations in temperature around the set point;
- Relative humidity, RH (%);
- The equilibrium moisture content (EMC) (or UGL in German - “U” for wood moisture, GL for Gleichgewicht) corresponds to the moisture content which a wood tends to have in stable climatic conditions (temperature and relative air moisture).

A wood drying kiln is controlled by determining either the wood's equilibrium moisture content or relative air moisture. Equilibrium moisture content can be deduced from RH and T by using the Hailwood-Horrobin equation ($EMC = f(RH)(T)$). To do so, a calculation program is used, or a chart directly, based on these calculations.

The nine drying schedules provided here were designed with Gérard Gandon (Olergie), using schedules published by Cathild Industrie as reference.

For each species, the drying schedule is given as an indication for woods less than 35 mm thick. These guidelines must be validated through proper implementation. For woods between 35-55 mm thick, relative air moisture should be increased by 5 % for each drying phase: for example, 30% for wood that is 27 mm thick and 35% for wood that is 41 mm thick. The temperature should be lowered by 3 °C for each phase of pre-heating, drying and conditioning.

For wood that is more than 55 mm thick, relative air moisture should be increased by 10% for each drying phase, and the temperature lowered by 5°C for each phase of pre-heating, drying and conditioning.

Drying schedule 1

Phases	Duration (h)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	60	81	14.0
Pre-heating 2	3	> 50	65	76	12.0
Drying		> 50	68	68	10.0
		50 - 40	70	63	9.1
		40 - 35	70	61	8.7
		35 - 30	70	56	7.9
		30 - 27	72	50	7.0
		27 - 24	72	44	6.3
		24 - 21	75	39	5.5
		21 - 18	75	34	4.9
		18 - 15	75	29	4.3
		15 - 12	80	28	3.9
		12 - 09	80	24	3.4
		09 - 06	80	22	3.2
Conditioning	6		73	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) $UGL = \text{final } H\% \times 0.8 \text{ to } 0.9$.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 2

Phases	Duration (h)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	58	84	15.0
Pre-heating 2	3	> 50	63	81	13.5
Drying		> 50	65	72	11.0
		50 - 40	68	68	10.1
		40 - 35	68	62	9.0
		35 - 30	70	60	8.5
		30 - 27	72	54	7.6
		27 - 24	72	50	7.0
		24 - 21	74	43	6.1
		21 - 18	74	36	5.2
		18 - 15	75	31	4.5
		15 - 12	75	28	4.2
		12 - 09	75	25	3.8
		09 - 06	75	24	3.6
Conditioning	6		68	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) $UGL = \text{final } H\% \times 0.8 \text{ to } 0.9$.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 3

Phases	Duration (h)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	55	84	15.5
Pre-heating 2	3	> 50	57	83	15.0
Drying		> 50	60	76	12.5
		50 - 40	60	73	11.6
		40 - 35	60	69	10.7
		35 - 30	60	62	9.5
		30 - 27	63	55	8.2
		27 - 24	64	50	7.5
		24 - 21	65	46	6.9
		21 - 18	65	39	6.0
		18 - 15	68	32	5.0
		15 - 12	70	29	4.5
		12 - 09	70	25	4.0
09 - 06	70	24	3.9		
Conditioning	6		63	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) UGL = final H% × 0.8 to 0.9.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 4

Phases	Duration (h)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	50	86	16.5
Pre-heating 2	3	> 50	52	85	16.0
Drying		> 50	55	82	14.7
		50 – 40	55	80	13.8
		40 – 35	55	75	12.6
		35 – 30	56	73	12.0
		30 - 27	58	67	10.5
		27 - 24	60	58	8.9
		24 - 21	62	50	7.5
		21 - 18	64	45	6.8
		18 - 15	65	37	5.7
		15 - 12	65	34	5.3
		12 - 09	65	28	4.5
09 - 06	65	24	4.0		
Conditioning	6		58	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) UGL = final H% × 0.8 to 0.9.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 5

Phases	Duration (H)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	50	87	17.0
Pre-heating 2	4	> 50	50	86	16.5
Drying		> 50	53	83	15.2
		50 – 40	53	80	14.1
		40 – 35	54	80	13.9
		35 – 30	55	75	12.5
		30 - 27	57	70	11.0
		27 - 24	58	61	9.4
		24 - 21	59	51	7.9
		21 - 18	60	47	7.3
		18 - 15	61	39	6.1
		15 - 12	62	35	5.6
		12 - 09	62	30	5.0
		09 - 06	62	26	4.4
Conditioning	8		55	(3)	(2)
Cooling	(1)		Stop	(3)	(2)

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) $UGL = \text{final } H\% \times 0.8 \text{ to } 0.9$.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 6

Phases	Duration (H)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	50	87	17.0
Pre-heating 2	4	> 50	50	86	16.5
Drying		> 50	53	85	15.7
		50 – 40	53	82	14.6
		40 – 35	54	78	13.4
		35 – 30	55	77	12.9
		30 - 27	57	73	11.9
		27 - 24	58	68	10.7
		24 - 21	60	61	9.3
		21 - 18	62	52	7.9
		18 - 15	64	43	6.6
		15 - 12	65	39	6.0
		12 - 09	65	31	5.0
		09 - 06	65	28	4.5
Conditioning	8		58	(3)	(2)
Cooling	(1)		Stop	(3)	(2)

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) $UGL = \text{final } H\% \times 0.8 \text{ to } 0.9$.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 7

Phases	Duration (H)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	40	86	17.0
Pre-heating 2	4	> 50	43	85	16.5
Drying		> 50	45	83	15.7
		50 – 40	45	80	14.6
		40 – 35	45	77	13.8
		35 – 30	45	74	12.9
		30 - 27	47	69	11.5
		27 - 24	49	61	9.9
		24 - 21	50	52	8.4
		21 - 18	53	48	7.7
		18 - 15	56	41	6.6
		15 - 12	59	36	5.9
		12 - 09	61	30	5.0
09 - 06	65	29	4.7		
Conditioning	8		58	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) UGL = final H% × 0.8 to 0.9.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 8

Phases	Duration (H)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 50	45	86	17.0
Pre-heating 2	4	> 50	45	85	16.5
Drying		> 50	48	84	15.7
		50 – 40	48	80.5	14.6
		40 – 35	49	77	13.4
		35 – 30	50	75	12.9
		30 - 27	51	70	11.5
		27 - 24	53	62	9.9
		24 - 21	54	53	8.4
		21 - 18	55	48.5	7.7
		18 - 15	55	40	6.6
		15 - 12	55	35	5.9
		12 - 09	60	30	5.0
09 - 06	60	28	4.7		
Conditioning	8		58	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30°C.

(2) UGL = final H% × 0.8 to 0.9.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Drying schedule 9

Phases	Duration (H)	Moisture content (%) probes	T (°C)	RH (%)	UGL (%)
Pre-heating 1		> 40	35	87	18.0
Pre-heating 2	6	> 40	38	85	17.0
Drying		> 40	41	82	15.7
		40 – 35	44	81	15.0
		35 – 30	46	80	14.5
		30 - 27	48	77	13.5
		27 - 24	50	72	12.0
		24 - 21	52	63	10.0
		21 - 18	54	54	8.5
		18 - 15	56	47	7.4
		15 - 12	58	41	6.5
		12 - 09	60	34	5.6
Conditioning	8		55	⁽³⁾	⁽²⁾
Cooling	⁽¹⁾		Stop	⁽³⁾	⁽²⁾

(1) Cooling: until the temperature inside the kiln no longer exceeds external temperature by more than 30 °C.

(2) UGL = final H% × 0.8 to 0.9.

(3) Subtract RH from the UGL determined in (2) and temperature, using the Hailwood-Horrobin equation.

Sawing and machining

Blunting effect

This effect is essentially related to the silica content of wood and its hardness; it determines the type of tools to be used for sawing and machining.

Sawteeth

Depending on a wood's blunting effect, ordinary or alloy steel, or stellite-tipped sawteeth should be used.

Machining tools

The choice of tools is defined according to the wood's abrasiveness, i.e. its blunting effect. If there is no problem, normal tools can be used. Otherwise, special tools with high-speed steel (HSS) or tungsten carbide are recommended.

Some species contain chemical substances which can represent varying degrees of toxicity for users during processing operations (sawdust during sawing or machining) and which may cause skin or mucous allergies and in some extreme cases, respiratory disorders. These disorders can be significantly limited and even avoided by using protective equipment (gloves, masks), and by fitting efficient aspiration systems (legal requirements).

Suitability for peeling

Usually, species used for peeling are soft to moderately hard. Logs are well-formed and without defects to achieve a good output. Moreover, the wood must display good behaviour during drying in order to limit the risks of splitting and veneer deformation.

Suitability for slicing

Woods used for slicing must present specific aesthetic qualities such as: colour, figuring, fine texture and a ribbon-like appearance.

Assembling

Nailing and screwing

It is important to know whether it is easy or not to drive a nail or screw without the risk of splitting. Otherwise, pre-boring is recommended.

Moreover, the wood's ability to hold a nail or a screw is mentioned: good or poor.

Gluing

In the wood industry, gluing – of tropical woods in particular – has made the most progress since the 1980s. The appearance on the market of new and increasingly effective adhesives makes it possible to glue any type of wood unconditionally, whatever the characteristics, and meet growing requirements in terms of water resistance and mechanical strength.

These technological advances improve how tropical woods are used by making it possible to glue together cuts obtained from secondary species, crooked or small-diameter logs, wood with significant defects, downgraded wood and sawmill waste.

Products like glue laminated timber are stable and homogenous. The use of gluing techniques to combine very different species offers new prospects for increasing the use of wood in high end projects. Gluing wood to other materials is possible.

However gluing can be made difficult by the characteristics of certain species and the need to respect the code of practice. This applies to the high-density species described in this atlas (wood with an average density of over 0.80).

Studies carried out by CIRAD have shown that gluing wood with significant defects or seemingly unfavourable characteristics can yield satisfactory results. However, recommendations must be followed. The adhesive must be chosen in relation to the end use of the product, the production system, the time needed for assembling and the desired pressing time.

Commercial grading

Sawn timber appearance grading (temperate woods)

Principle

The criteria generally used to grade wood are the presence and extent of defects (knots, splits, resin pockets, grain gradient, waness, biological deterioration, geometric deformations, etc.). All of these defects are likely to affect the aesthetic properties of the woods and to reduce the volume of wood that can actually be used. Some of these defects may be authorised, but will cause a reduction the area or volume of wood used as the basis for calculating the price (boules), or may require a change of category (downgrading) without modifying the area or volume (square-edged timber).

Rules

The aspect grading, described in the NF EN 975-1 standard (April 2009) concerns sawn European Oak and European Beech. The NF EN 975-2 standard (November 2004) concerns sawn poplar.

The NF EN 1611-1 standard (October 1999) concerns sawn Spruce, Fir, Pine and Douglas Fir. The NF EN 1611-1/A1 standard (March 2003) adds European Larch to this list, without altering the grading criteria.

Special case of Western Red Cedar

Published by the Pacific Lumber Inspection Bureau (PLIB, 2003), the *Export R-List Grading and Dressing Rules* presents American grading rules regarding the following species: Douglas Fir, Pacific coast (West coast) Hemlock and true Firs, Sitka Spruce and Red Cedar.

The Canadian grading rules of the NLGA (National Lumber Grades Authority) concern Canadian timber, and in particular Red Cedar (January 2008).

Sawn timber appearance grading (tropical woods)

Principle

For tropical wood, there are two methods of timber appearance grading:

- grading of the considered part according to the number of “standard” defects that it presents, relative to its dimensions (the larger the part’s area, the greater the number of defects tolerated). This is the current grading principle for African square-edged lumber (ATIBT rules, 1999 edition), progressively superseded by SATA (Sciages Avivés Tropicaux Africains) rules.

- clean cut grading. The percentage of rectangular defect-free areas is calculated relative to the area of the part. We thus obtain a percentage of defects, from which the part choice is defined.

For SATA rules, a first choice (i) must present a 90% defect-free area. A second choice (ii) must present a 80% defect-free area and so on and so forth, with a variable number of cuts depending on the area of the part.

This principle is used by the Malaysia Grading Rules (MGR) and the National Hardwood Lumber Association rules (NHLA).

Rules

The SATA grading rules were defined in 1976, under the aegis of the Commission of European Communities, at the instance of the following 5 African states: Cameroon, Congo, Côte d'Ivoire, Gabon and the Democratic Republic of the Congo. The study was entrusted to the Centre Technique Forestier Tropical in Nogent-sur-Marne (CTFT - French: Centre for Tropical Forests, that was merged, along with other institutes, with the CIRAD in 1984). These rules were republished in 1996 in "SATA ("Sciages Avivés Tropicaux Africains"): grading rules".

The NHLA grading rules were originally drawn up for North American hardwood species. The current version (2015) also covers tropical species: "Rules for the Measurement & Inspection of Hardwood & Cypress". It is available from the NHLA website.

The "Bois guyanais classés" rules (graded Guyanese woods) (1990) were defined for wood used and processed in French Guiana. They are mainly used on the Guyanese market or exported to the French West Indies.

The MGR rules were drawn up in 1968, then revised in 1984 and in July 2009. They pertain to Malaysian species, but may be used for wood from other parts of Asia.

Visual structure grading

In this atlas, visual structure grading of tropical woods and hardwoods is based both on French standards (NF B 52-001-1 (August 2011), NF B 52-001-1/A1 (April 2013) and NF B 52-001/A2 (February 2015)) and the European EN 1912 (2012) standard, together with corresponding national standards. In this atlas, 105 of the species listed are graded for mechanical strength using visual grading methods according to rules from one or several of these standards.

Fire safety

Two distinct wood properties characterise its fire behaviour: fire resistance and reaction to fire.

Fire resistance is the time during which a material exposed to fire will continue to provide its initial functions within the structure: mechanical stability for the structure, fire stop or fire break properties of a door, etc.

Reaction to fire characterizes the production of flames, heat, fumes, particles and drops of material exposed to fire. Reaction to fire concerns mainly those materials used for floors, walls and ceilings, that are in contact with individuals.

Information provided in this atlas pertains to reaction to fire.

Conventional French grading

French regulations (conventional grading – Order of 21 November 2002) define six classes of reaction to fire:

- M0 – non-combustible;
- M1 – non-flammable;
- M2 – poorly flammable;
- M3 – moderately flammable;
- M4 – readily flammable;
- M5 – highly flammable;

In general terms, the grading of untreated solid woods is as follows:

Solid hardwoods:

- thicknesses greater than or equal to 14 mm: M3 – moderately flammable;
- thicknesses less than 14 mm: M4 – readily flammable;

Solid softwoods:

- thicknesses greater than or equal to 18 mm: M3 – moderately flammable;
- thicknesses less than 18 mm: M4 – readily flammable;

Euroclass grading

European standardization (Euroclasses of the NF EN 13501-1 + A1 standard, February 2013) introduced a new classification based on different test methods.

- A1, A2, B, C, D, E and F for wall and ceiling coverings;
- A1fl, A2fl, Bfl, Cfl, Dfl, Efl and Ffl for floor coverings.

The information provided in this atlas pertains to wall and ceiling coverings.

Within each class, two additional reaction to fire criteria characterize fume product on the one hand (s0, s1, s2) and the production of incandescent drops and particles on the other hand (d0, d1, d2).

Considering the properties of the wood species most commonly used in Europe (NF EN 14081-1, April 2016), solid wood is, by convention, classed Ds2 d0 for wall and ceiling coverings if its density is greater than 0.35. If a wood's density is less than 0.35, the species is considered ungraded. This applies to the following species: Balsa, Emien, Essessang, Fromager, Pashaco, Sumauma.

Any more favourable grading must be justified by testing the species in this atlas. This applies to Larch and to the following five tropical species found in Latin America and Guyana: Mandioqueira, Pau roxo, Basralocus, Ipê and Louro vermelho.

End uses

A wood's potential uses are directly dependent upon its technological properties. The end uses mentioned in the list are not exhaustive. They cover the most commonly known end uses which must be validated through proper implementation. Certain uses are given as an indication only (traditional, regional or historical uses).

Common names

The principal local/common names used in the producing countries are mentioned, along with the trade names used in the importing countries when they are different from the ATIBT pilot names.

For each species described, the list of 'Common names' is not exhaustive. The result of very thorough compilation, a nearly exhaustive inventory of these common names is available on the website of the Forest Products Laboratory in Madison (United States). www.fpl.fs.fed.us/search/commonname_request.php.

Tropix

Tropix is a software programme developed by the BioWooEB Research Unit (available at tropix.cirad.fr). It provides access to technological information and the characteristics of 245 wood species: 228 tropical species and 17 temperate species.

It is one of the applications in CIRAD's Wood database, which combines the technological characteristics of more than 1,200 species studied over decades at the CTFT and later CIRAD wood research laboratories.

For each of the 245 species listed, Tropix presents the following data and information:

- **Botanical and common names:** origins (illustrated with maps of geographic distribution) and any trade restrictions (classification in a CITES appendix).
- **Log characteristics:** appearance, colours and macroscopic structure (illustrated with photos of the woods and examples of uses).
- **Physical and mechanical properties.**
- **Resistance of woods to biological decay agents** (fungi, termites, dry wood borers): treatability, use classes, any recommended preservation treatments depending on the conditions in which the wood is used.
- **Wood behaviour during drying** (drying schedule given as an indication only).
- **Wood behaviour during sawing and machining**, its suitability for peeling and slicing, effectiveness of assembling.
- **Commercial grading:** sawn timber appearance grading according to current rules and visual structure grading.
- **Principal end uses and potential uses:** reaction to fire (according to French and European standards).
- **Comparative tables summarising the main technological characteristics:** physical and mechanical properties, physical and biological stability parameters.

Tropix can also be used to conduct multi-criteria searches for species based on preselected characteristics or similarities with another species.

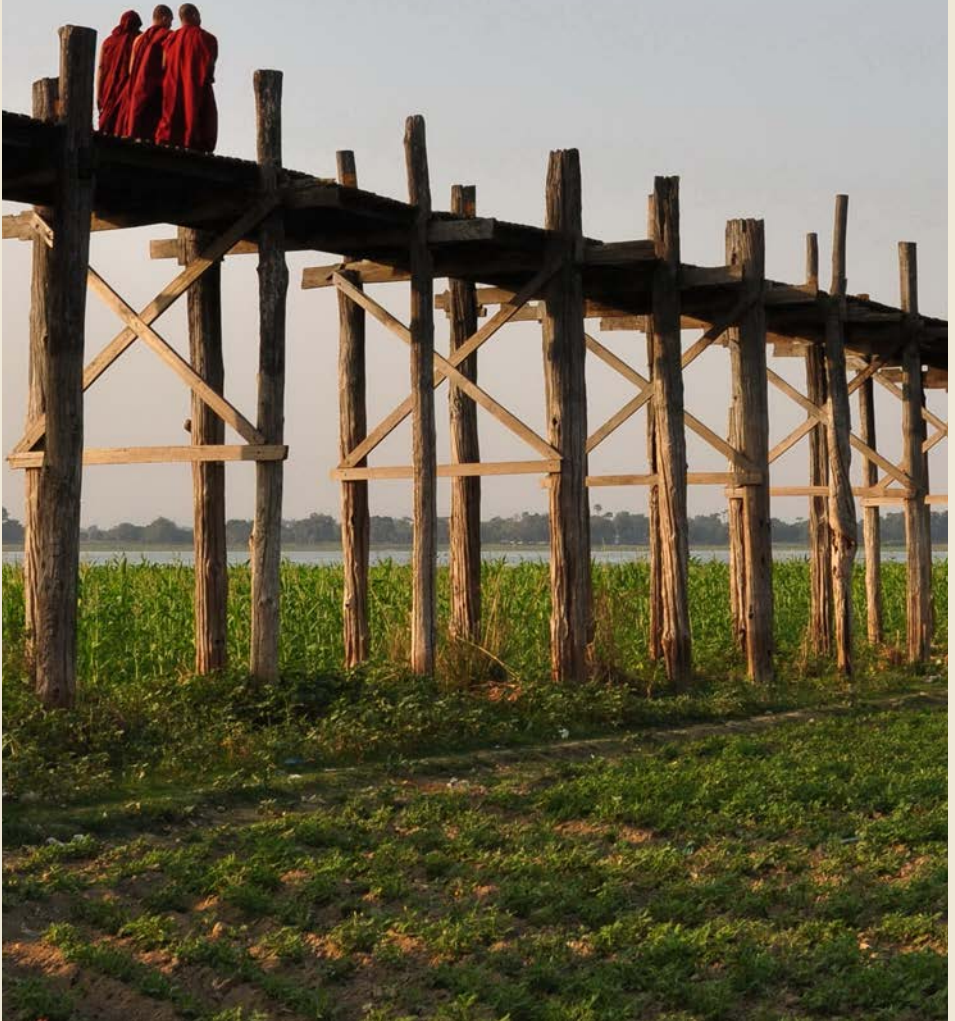
Technical descriptions of species can be printed, along with lists of species that match research criteria selected in a multicriteria search.

The Tropix program is registered with the Agence de protection des programmes (APP) under: IDDN.FR001.070032.002.S.P.2002.000.30165.

Tropix is also identified with a DOI code : [doi:10.18167/74726F706978](https://doi.org/10.18167/74726F706978)

*U Bein Bridge: the longest teakwood bridge in the world.
It is 1.2 km long and was built in 1849 with timber
reclaimed from a former royal palace (Mandalay, Burma).*

Wood species



Abarco

Family Lecythidaceae

Botanical name

Cariniana pyriformis Miers

Continent Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood is pink brown, slightly purplish. Occasional presence of traumatic canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	4.5
Coefficient of volumetric shrinkage	0.49 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	29 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	61 MPa
Static bending strength ⁽¹⁾	113 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,720 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 – moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 – poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Fairly difficult to saw because of its silica content.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Abarco tends to split with nailing.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

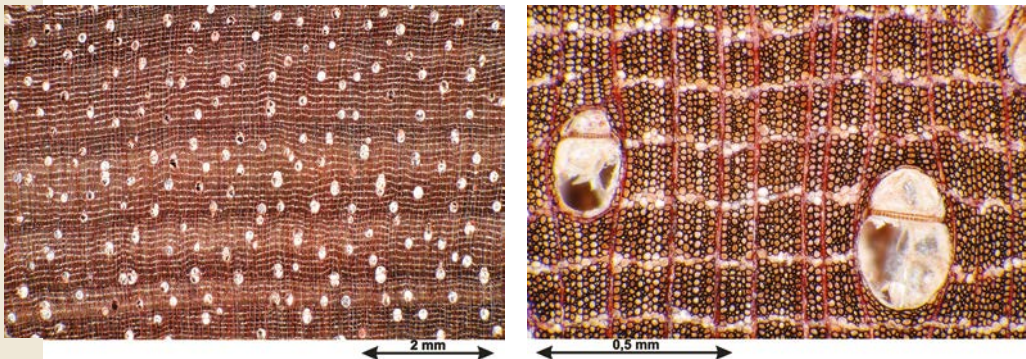
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Cariniana pyriformis*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Notes. Abarco can be a substitute for Mahogany (*Swietenia* p.p.) and African Mahogany (*Khaya* p.p.) Filling is required to obtain a good finish.

Common names

Country	Local name
Colombia	Abarco
Venezuela	Bacu



Flat sawn



Quarter sawn

Abura

Family. Rubiaceae

Botanical names

Fleroya ledermannii Y.F. Deng (Syn. *Hallea ledermannii*)

Fleroya rubrostipulata Y.F. Deng (Syn. *Hallea rubrostipulata*)

Fleroya stipulosa Y.F. Deng (Syn. *Hallea stipulosa*)

Continent Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible presence of brittleheart and coloured veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	2.0
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	8.9 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	2.1
Fibre saturation point	32 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	78 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,020 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Blunting effect is variable. Sawdust occasionally irritant.

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

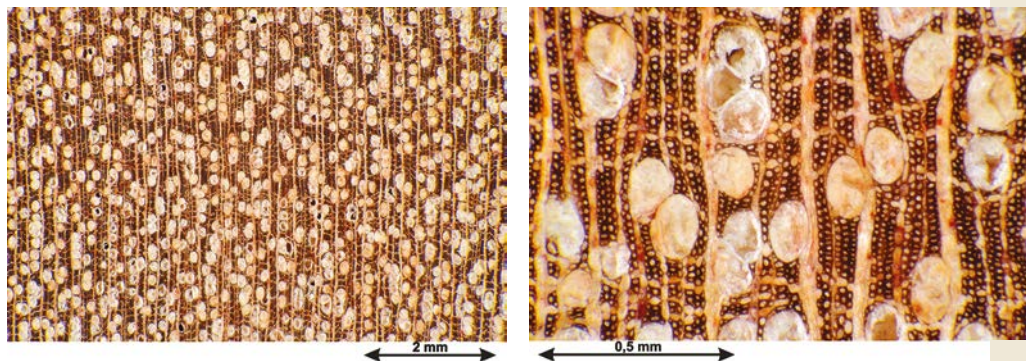
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Fleroya ledermannii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Hand-crafted archways chest – Ateliers d'art, Christine and Fouad Nammour, Fontaine-en-Bray (France).

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer
- Sculpture
- Marquetry

Notes. Resistant to one or several acids

Common names

Country	Local name
Germany	Subaha
Angola	Mivuku, Mivuko
Benin	Agbantın
Cameroon	Elalom, Elolom
Congo	Vuku
Côte d'Ivoire	Bahia
France	Bahia
Gabon	Élélom-n'zam
Ghana	Subaha
Equatorial Guinea	Elelon
Nigeria	Abura
Uganda	Nzingu
Central African Republic	Oro
Democratic Republic of the Congo	Mivuku, Mvuku
Sierra Leone	Mboi
Zambia	Nzingu

Acacia mangium

Family. Leguminosae (Mimosaceae)

Botanical name

Acacia mangium Willd.

Continent Africa, Latin America, Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to South-East Asia and Australia, this fast-growing species has been widely planted throughout the tropical and subtropical world. Woods presently commercialised are almost exclusively from plantations.

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Light brown wood, sometimes with olive brown shades. Heart rot is common among wood of certain origins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	3.1
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	3.1 %
T/R anisotropy ratio	2.3
Fibre saturation point	25 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	18,830 kJ/kg
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. As is frequently observed for many plantation species, physical and mechanical properties of this wood vary greatly and depend on origin and tree age.

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable



Flat sawn



Quarter sawn

Resistance to dry wood borers. Class S susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 – poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Planed surfaces are glossy.

Assembling

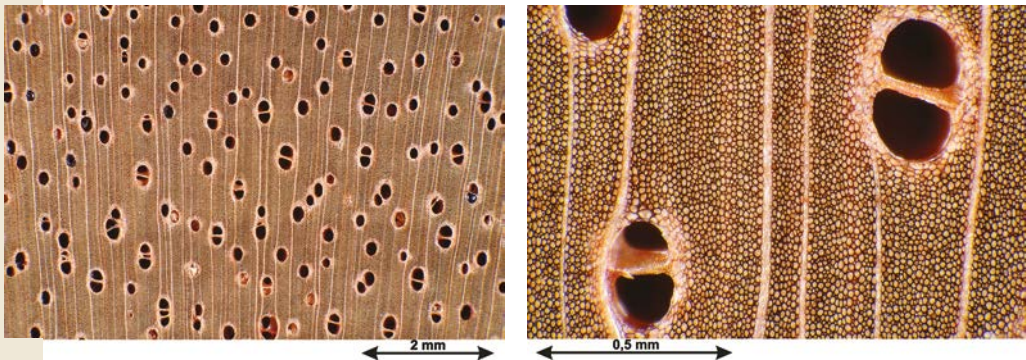
Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Acacia mangium*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Fibre or particle boards
- Pulp

Common names

Country	Local name
Australia	Black wattle, Brown salwood
United States	Black wattle, Brown salwood
France	Acacia mangium
Indonesia	Mangge hutan, Tongke hutan
Malaysia	Kayu safoda
Papua New Guinea	Arr
United Kingdom	Black wattle, Brown salwood
Thailand	Kra thin tepa

Açacu / Sandbox*

* Common commercial name

Family. Euphorbiaceae

Botanical name

Hura crepitans L.

Continent Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 15 to 25 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Bark contains a sap that is a strong irritant. Colour varies from cream white to pinkish brown. Presence of tension wood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.5
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	4.7 %
Total radial shrinkage (Rs):	2.9 %
T/R anisotropy ratio	1.6
Fibre saturation point	27 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	31 MPa
Static bending strength ⁽¹⁾	56 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 – non-durable

Resistance to dry wood borers. Class S susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Very prone to blue stain.



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Slow drying is recommended to reduce defects. In which case, wood must be treated against blue stain.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Log turning sawing recommended to avoid shakes (tension wood). Fuzzy surface. Silica content is variable depending on the country of origin.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

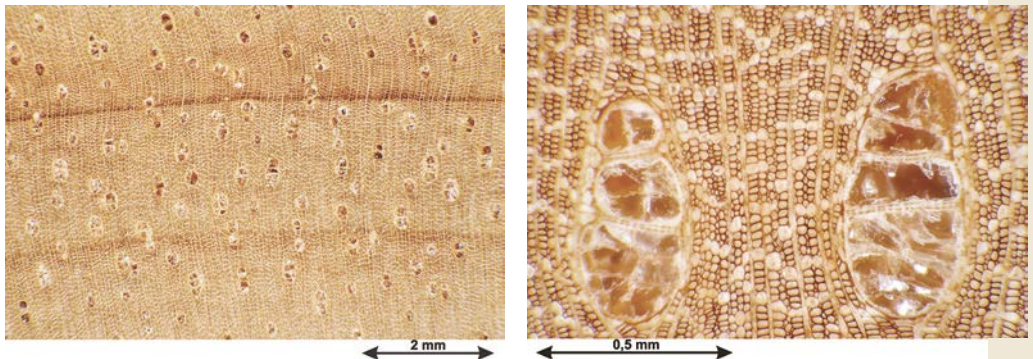
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Hura crepitans*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Formwork
- Boxes and crates
- Floats
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Model building
- Blockboard
- Fibre or particle boards
- Marquetry

Notes. Açacu is a possible substitute for Obeche (*Triplochiton scleroxylon*). Careful sanding and filling are recommended to obtain a good finish.

Common names

Country	Local name
Bolivia	Ochoho
Brazil	Açacu, Assacu
Colombia	Ceiba lechosa
Ecuador	Habillo
United States	Possumwood
Guyana	Sandbox
French Guiana	Bois du diable, Sablier
Peru	Catahua
Suriname	Possum, Possentrie, Ura wood
Venezuela	Ceiba habillo, Jabillo

Acajou Cailcédrot

Family. Meliaceae

Botanical name

Khaya senegalensis A. Juss.

Continent Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. More or less demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood pink brown turns to red brown with purple tint. Lustrous aspect.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.78
Monnin hardness ⁽¹⁾	5.9
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	5.6 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.1
Fibre saturation point	27 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	18,720 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	86 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,650 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from fairly hard to hard.

Natural durability and treatability

Resistance to decay. Class 3 – moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 – poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Half-quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of checking and distortion in presence of highly interlocked grain and tension wood.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Acajou caïlcédrat has a tendency to woolliness. Keep sawing tools sharp. A reduced cutting angle is required during machining in the presence of interlocked grain.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

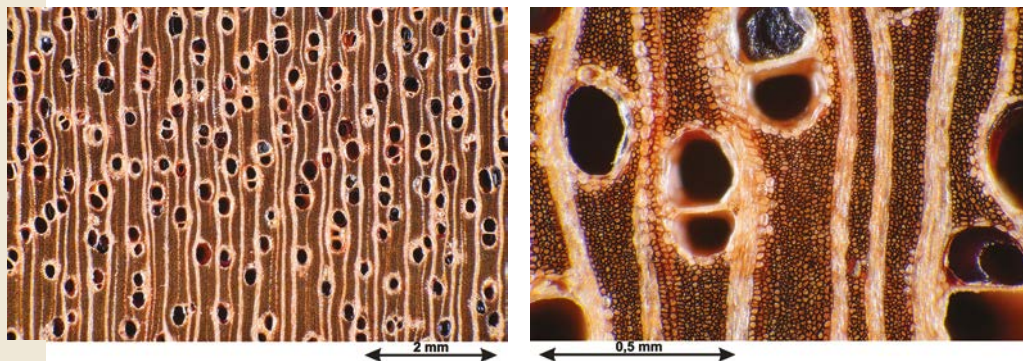
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Khaya senegalensis*



- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Notes. Resistant to one or several acids

Common names

Country	Local name
Benin	Abgo, Acajou cailcédrot, Zunzatin
Côte d’Ivoire	Acajou Cailcédrot
Guinea	Diala
Guinea-Bissau	Bissilom
Mali	Acajou bissilom
Senegal	Bissilom



Guinean-style djembé – African percussion (Guinea).

African Cordia* / Cordia d'Afrique

* Common commercial name

Family. Boraginaceae

Botanical names

Cordia africana Lam. (Syn. *Cordia abyssinica*) (Syn. *Cordia holstii*)

Cordia millenii Baker

Cordia platythyrsa Baker

Cordia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Light brown to pale golden brown, sometimes pinkish brown. Aromatic odour for green wood. Medium to coarse texture.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	1.3
Coefficient of volumetric shrinkage	0.25 % per %
Total tangential shrinkage (Ts):	4.6 %
Total radial shrinkage (Rs):	3.4 %
T/R anisotropy ratio	1.4
Fibre saturation point	31 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	73 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)



Half-quarter sawn

Quarter sawn



Resistance to termites. Class D - durable

Treatability. Class 1 – treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

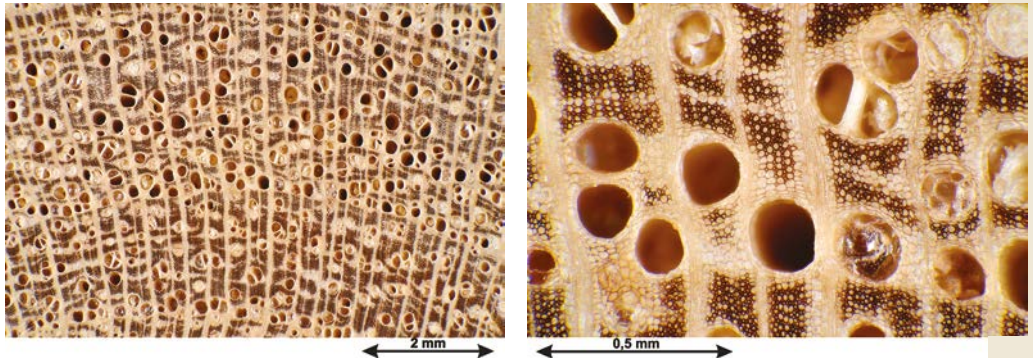
- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Cordia africana*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Sliced veneer
- Marquetry

Notes. Filling is required to obtain a good finish.

Common names

Country	Local name
Germany	African cordia
Cameroon	Ébais, Ébé
Congo	Makobokobo, Mringaringa, Mukumari
Côte d'Ivoire	Bon
Ethiopia	Awhi, Ekhi
France	Cordia d'Afrique
Gabon	Ébais, Ébé
Nigeria	Omo
Uganda	Mukebu
Democratic Republic of Congo	Sumba
United Kingdom	African cordia

African Ebony* / Ébène d'Afrique

* Common commercial name

Family. Ebenaceae

Botanical names

Diospyros crassiflora Hiern

Diospyros mespiliformis Hochst.

Diospyros viridicans Hiern

Diospyros p.p.

Continent. Africa

CITES (Washington Convention of 2017)

Only *Diospyros* from Madagascar are listed in CITES Appendix II (logs, sawn wood, veneer sheets).

Notes. Wood often commercialised in small logs of 1 to 1.5 metres long. Other African *Diospyros* species are not commercialised due to their light colour (ex.: *Diospyros sanzaminika*).

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. 5 to 12 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Black

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Logs may present different kinds of defects, especially small pinholes and heartwood rot. Wood is uniform black to black brown (*Diospyros mespiliformis*).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.90
Monnin hardness ⁽¹⁾	7.0
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	11.0 %
Total radial shrinkage (Rs):	7.0 %
T/R anisotropy ratio	1.6
Fibre saturation point	29 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	130 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Half-quarter sawn

Half-quarter sawn



Notes. Properties are very variable according to the species and the origin. As a result, specific gravity varies from 0.75 to 1.1.

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

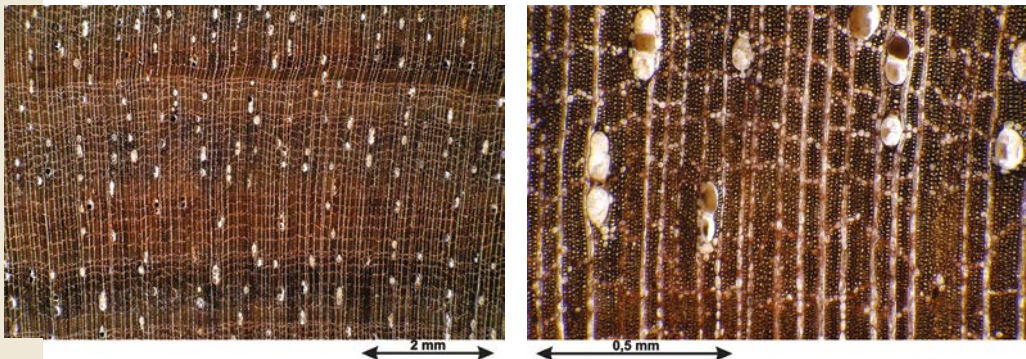
Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Powerful machines are necessary for machining and slicing due to the significant hardness of wood. Sawdust may cause dermatitis. Sawed veneer sheets are frequently used in cabinet work.

Cross sections of *Diospyros crassiflora*



Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Wind instruments
- Tool handles (resilient woods)
- Sawn veneer sheets
- Sculpture
- Marquetry

Notes. A preliminary surface treatment with alcohol is recommended for polyester coatings and undercoats.

Common names

Country	Local name
Germany	Afrikanisches ebenholz
Benin	Cubaga, Ébène
Cameroon	Épindé-pindé, Mavini, Mévini, Ndou
Congo	Mopini
France	Ébène d'Afrique
Gabon	Évila
Equatorial Guinea	Ebano
Nigeria	Abokpo, Kanran, Nyareti, Osibin
Central African Republic	Bingo, Ngoubou
United Kingdom	African ebony



Burkinabé sculpture, Montpellier (France).

African Mahogany* / Acajou d'Afrique

* Common commercial name

Family. Meliaceae

Botanical names

Khaya anthotheca C. DC.

Khaya grandifoliola C. DC.

Khaya ivorensis A. Chev. (Syn. *Khaya klainei*)

Continent Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Occasional presence of tension wood and brittleheart. Wood pink brown to deep red with copper sheen.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.57
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	5.5 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.5
Fibre saturation point	28 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	77 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,820 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. *Khaya grandifoliola* is fairly hard. Physical and mechanical properties of *K. ivorensis* are lower than other species.

Natural durability and treatability

Resistance to decay. Class 3 – moderately durable



Flat sawn

Quarter sawn



Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. The African Mahogany cannot be used without appropriate preservation treatment for end uses under use class 3, except for certain sections of a structure, such as windows, which are less exposed than others (entrance doors, shutters, etc.)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of distortion may increase in the presence of tension wood or interlocked grain that is occasionally high.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

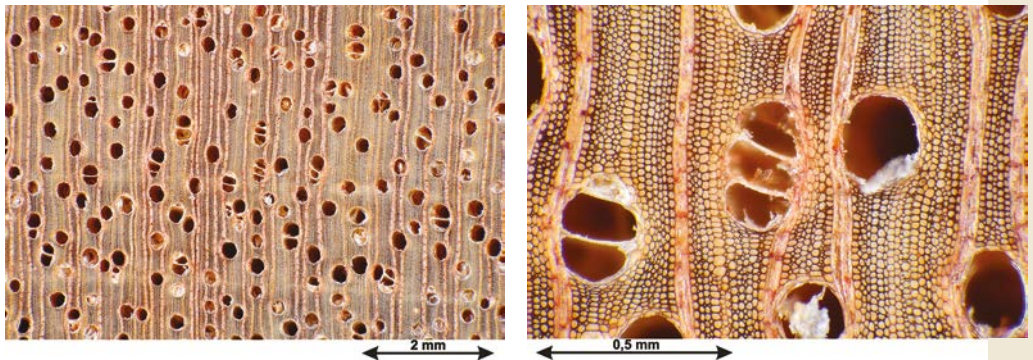
Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Tendency to woolliness (tension wood) in sawing. Risks of tearing (interlocked grain) in planing. Ribbon-like aspect on quartersawn. Sawdust is an irritant.

Cross sections of *Khaya anthotheca*



Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Coffins
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Open boats
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Sliced veneer
- Exterior panelling

Notes. Pores sometimes filled with black deposits. Filling is required to obtain a better finish.

Common names

Country	Local name
Germany	Khaya mahogani
Angola	N'dola, Undia nunu
Benin	Kaju
Cameroon	Mangona, N'gollon,
Congo	N'dola
Côte d'Ivoire	Acajou bassam, Acajou blanc, Krala
France	Acajou bassam (<i>K. ivorensis</i>), Acajou blanc (<i>K. ivorensis</i>), Acajou d'Afrique
Gabon	Zaminguila
Ghana	African mahogany, Ahafo, Takoradi mahogany,
Equatorial Guinea	Caoba del galon, Zamanguila
Nigeria	Akuk, Benin mahogany, Ogwango
Uganda	Eri kire, Munyama
Central African Republic	Déké
United Kingdom	African mahogany, Ahafo, Takoradi mahogany,

African Padauk* / Padouk d'Afrique

* Common commercial name

Family. Leguminosae (Fabaceae)

Botanical names

Pterocarpus osun Craib

Pterocarpus soyauxii Taub.

Pterocarpus tinctorius Welw.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 6 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood bright red becoming purplish brown with light.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	8.3
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	5.0 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	1.6
Fibre saturation point	21 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,870 MPa

(1) at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 2 - moderately treatable.



Half-quarter sawn



Quarter sawn

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species only naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) for uses in temperate and cold environments. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawdust is an irritant. Sawing and machining requires powerful equipment. Sometimes difficulties due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Pre-boring necessary due to risk of splitting, in particular for small pieces.

Commercial grading

Sawn timber appearance grading

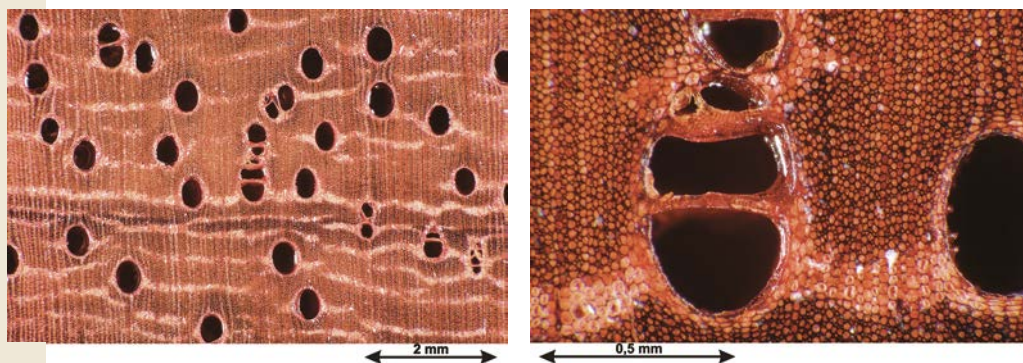
According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Cross sections of *Pterocarpus soyauxii*



Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Percussion instruments, xylophones
- Exterior joinery
- Interior joinery
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Sculpture
- Seats
- Hydraulic works (seawater)
- Sleepers

Common names

Country	Local name
Germany	Padauk
Angola	Tacula
Belgium	Corail
Cameroon	Mbel
Congo	Kisésé
France	Padouk d'Afrique
Gabon	Mbel
Equatorial Guinea	Palo rojo
Italy	Paduk
Nigeria	Osun
Netherlands	Padoek
Central African Republic	Padouk
Democratic Republic of Congo	Mongola, Mukula, N'gula
United Kingdom	African padauk, Barwood, Camwood, Padauk



Façade of the ministry of water and forests building, Libreville (Gabon).



Flat sawn

Half-quarter sawn



Afrosmosia

Family. Leguminosae (Fabaceae)

Botanical names

Pericopsis elata Meeuwen (Syn. *Afrosmosia elata*)

Continent. Africa

CITES (Washington Convention of 2017)

Afrosmosia is listed in CITES Appendix II for logs, sawn wood and veneer sheets.

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Logs irregularly shaped. Wood yellow brown with darker veins, turning dark brown on exposure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	7.0
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	1.8
Fibre saturation point	20 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	93 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,140 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Risks of burning in machining. Slight tendency to tearing in planing (interlocked grain). Sawdust reported to be irritant.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Can stain when gluing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

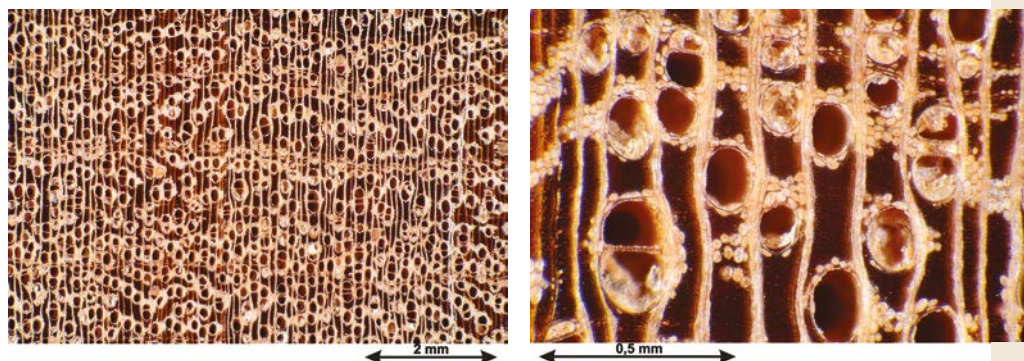
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Pericopsis elata*



- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III
- Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0 Elevated deck – Design by Terrasse Nature, Antony (France).



Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Exterior panelling

Notes. Excellent substitute for teck.

Common names

Country	Local name
Cameroon	Obang
Congo	Obang
Côte d’Ivoire	Assaméla
France	Assaméla, Oleo pardo
Ghana	Afromosia, Kokrudua
Central African Republic	Obang
Democratic Republic of the Congo	Bohala, Bohélé, Moholé, Ole, Olé

Aiélé / African Canarium*

* Common commercial name

Family. Burseraceae

Botanical name

Canarium schweinfurthii Engl.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Light brown slightly pinkish. Possible presence of wind shakes (internal fractures in wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.49
Monnin hardness ⁽¹⁾	1.3
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	9.9 %
Total radial shrinkage (Rs):	5.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	40 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	36 MPa
Static bending strength ⁽¹⁾	59 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 – non-durable

Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class S – susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Prone to blue stain.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Must be dried slowly.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

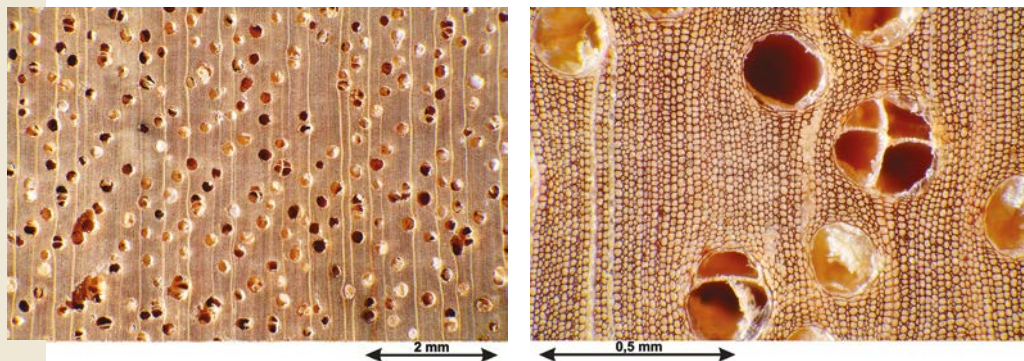
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Canarium schweinfurthii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Sliced veneer

Notes. Can be used as a substitute for Okoumé (*Aucoumea klaineana*) for plywood.

Common names

Country	Local name
Angola	M'bili
Cameroon	Abel
Congo	M'bili
Côte d'Ivoire	Aiéélé / African Canarium
Gabon	Abeul, Ovili
Ghana	Bediwunua, Eyere
Equatorial Guinea	Abe
Nigeria	Elemi
Uganda	Mwafu
Central African Republic	Gbéri
Democratic Republic of the Congo	Bidikala, M'bidikala
United Kingdom	Canarium
Sierra Leone	Billi

Αιέουέκο / Dakama*

* Common commercial name

Family. Leguminosae (Caesalpiniaaceae)

Botanical names

Dimorphandra polyandra Benoist

(Syn. *Dimorphandra hohenkerkii*)

Dimorphandra p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 75 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Logs are frequently irregularly shaped. Frequent brittleheart. Light yellow when sawn, quickly turning light brown to brown or reddish brown. Grain usually straight but sometimes slight irregular interlocked grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	3.9
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.8
Fibre saturation point	27 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,770 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	107 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 – moderately durable

Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class M – moderately durable



Half-quarter sawn

Quarter sawn



Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Possible presence of internal stresses. Low yield < 30 % (brittleheart).

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

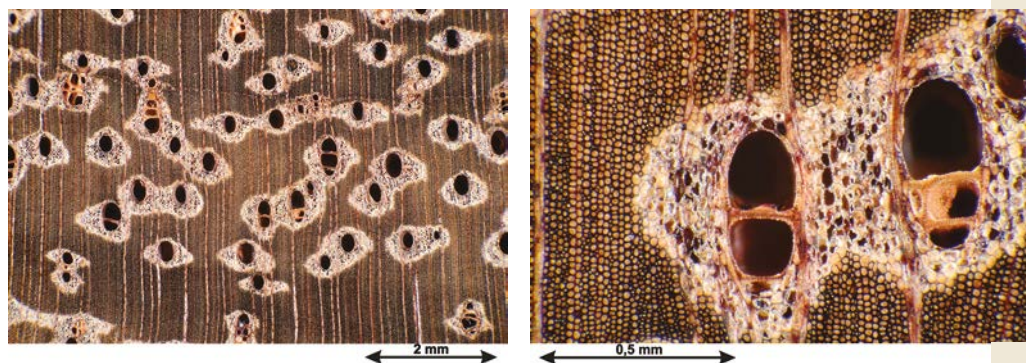
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Dimorphandra polyandra*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item

Common names

Country	Local name
Brazil	Louro tamaquare
Guyana	Dakama
French Guiana	Αιέουέκο
Suriname	Anjama



Front door, Belem (Pará, Brazil).

Ako / Antiaris*

* Common commercial name

Family. Moraceae

Botanical names

Antiaris toxicaria Lesch. (Syn. *Antiaris africana*)
(Syn. *Antiaris welwitschii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood cream white to light yellow.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.47
Monnin hardness ⁽¹⁾	1.5
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	1.7
Fibre saturation point	35 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	17,636 kJ/kg
Crushing strength ⁽¹⁾	36 MPa
Static bending strength ⁽¹⁾	58 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 – non-durable

Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class S – susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of end checks with thick material.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

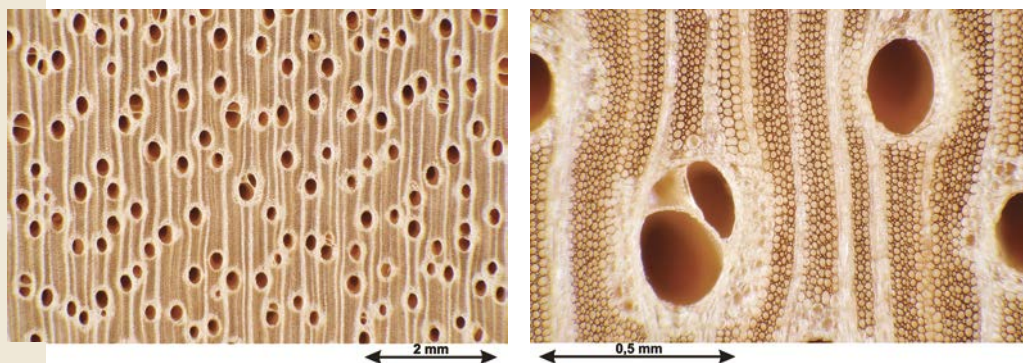
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections *Antiaris toxicaria*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Marquetry
- Rolling shutters

Notes. Can be used as a substitute for Limba or Koto.

Common names

Country	Local name
Germany	Antiaris
Angola	Sansama
Benin	Guxotin
Cameroon	Diolosso
Congo	Nioumbou
Côte d'Ivoire	Akédé, Ako
Gabon	Andoum
Ghana	Chenchen, Kyenkyen
Nigeria	Ogiovu, Oro
Uganda	Kirundu, Mumaka
Central African Republic	N'dombou
Democratic Republic of the Congo	Bonkongo, Bonkonko
United Kingdom	Antiaris
Tanzania	Mkuzu, Mlulu

Akossika / Odoko*

* Common commercial name

Family. Achariaceae (Flacourtiaceae)

Botanical names

Scottellia klaineana Pierre (Syn. *Scottellia coriacea*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible presence of grey or dark veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	3.4
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	9.3 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	2.1
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	94 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,750 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 – non-durable

Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class S – susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Very prone to blue stain.



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

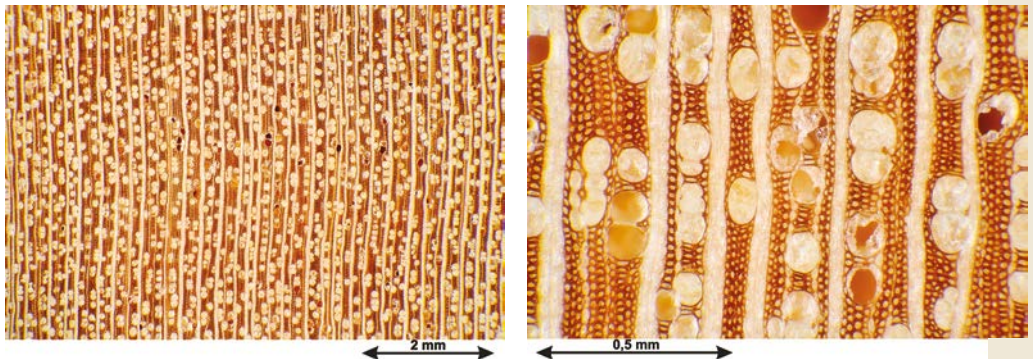
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Scottellia klaineana*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Marquetry

Common names

Country	Local name
Germany	Odoko
Cameroon	Ngobisolo
Côte d'Ivoire	Akossika / Odoko
Gabon	Bilogh-bi-nkélé
Ghana	Koroko, Kruku
Italy	Odoko
Liberia	Korokon
Nigeria	Odoko
Central African Republic	Kélembicho
United Kingdom	Odoko

Alan / Alan-Batu*

* Common commercial name

Family. Dipterocarpaceae

Botanical name

Shorea albida Symington

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible brittleheart. Sometimes presence of white streaks (resin canals).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	6.0
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	3.1 %
T/R anisotropy ratio	2.1
Fibre saturation point	29 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	57 MPa
Static bending strength ⁽¹⁾	103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,860 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 – moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S – susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Resin may clog the tools and may have a blunting effect. Filling is required to obtain a good finish.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Risk of splitting when nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

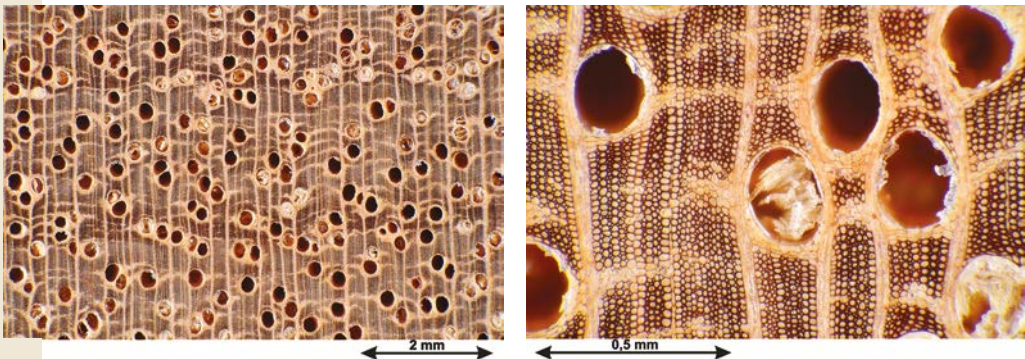
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Shorea albida*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Ship building (ribs)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Exterior panelling

Common names

Notes. Alan-Batu is the commercial name for heavy varieties of *Shorea albida*, Alan-Bunga the commercial name of lighter ones.

Country	Local name
Brunei	Alan-batu, Alan-bunga
Malaysia	Alan-batu, Alan-bunga, Alan-meraka, Alan-paya, Meraka, Red selangan, Selangan merah



Flat sawn

Quarter sawn



Alep

Family. Irvingiaceae

Botanical names

Desbordesia insignis Pierre (Syn. *Desbordesia glaucescens*)
(Syn. *Desbordesia pierreana*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 100 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Logs must be sawn quickly after felling (cracks during drying). Wood turns to dark brown with air. Dark veins more or less numerous.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.05
Monnin hardness ⁽¹⁾	10.9
Coefficient of volumetric shrinkage	0.67 % per %
Total tangential shrinkage (Ts):	10.9 %
Total radial shrinkage (Rs):	6.8 %
T/R anisotropy ratio	1.6
Fibre saturation point	28 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	16,460 kJ/kg
Crushing strength ⁽¹⁾	80 MPa
Static bending strength ⁽¹⁾	157 MPa
Longitudinal modulus of elasticity ⁽¹⁾	23,390 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 – poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

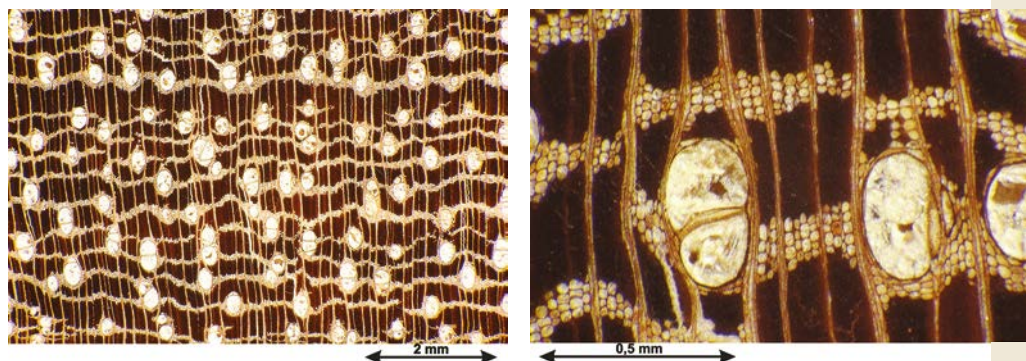
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Desbordesia insignis*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Decking
- Bridges (parts in contact with water or ground)
- Poles
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Cameroon	Omang
Congo	Benga
Gabon	Alep
Nigeria	Kowo
Democratic Republic of the Congo	Benga

Almon

Family. Dipterocarpaceae

Botanical name

Shorea almon Foxw.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 150 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish white

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Pink wood more or less dark. Ribbon-like aspect on quartersawn. Brittleheart. Presence of black holes and white streaks (resin canals).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	7.2 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	2.1
Fibre saturation point	27 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	45 MPa
Static bending strength ⁽¹⁾	83 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class S – susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. Said to be the easiest to dry among all the Lauan species.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

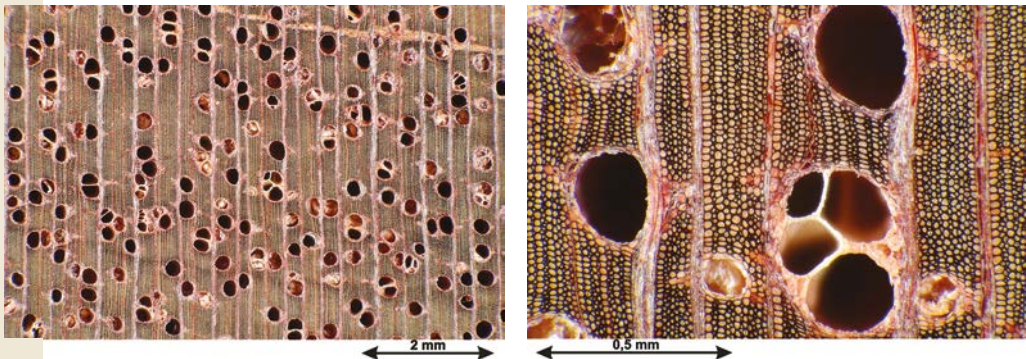
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Shorea almon*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cigar boxes
- Framing
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Fibre or particle boards
- Sliced veneer
- Pulp
- Exterior panelling

Common names

Country	Local name
Philippines	Almon, Light Red Lauan, White Lauan

Notes. Almon comes from the Philippines. It can also be sold under the name White Lauan or Light Red Lauan depending on its colour.



Half-quarter sawn

Quarter sawn



Alumbi

Family. Leguminosae (Caesalpinieae)

Botanical names

Julbernardia seretii Troupin (Syn. *Berlinia seretii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 90 cm

Thickness of sapwood. 5 to 15 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight to entangled

Interlocked grain. Slight

Notes. Sapwood yellow. Heartwood red-brown, sometimes with brown or yellow stripes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	4.5
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.8
Fibre saturation point	29 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	109 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class S – susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Bad

Suitability for slicing. Good

Notes. Very fine surface after sanding.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

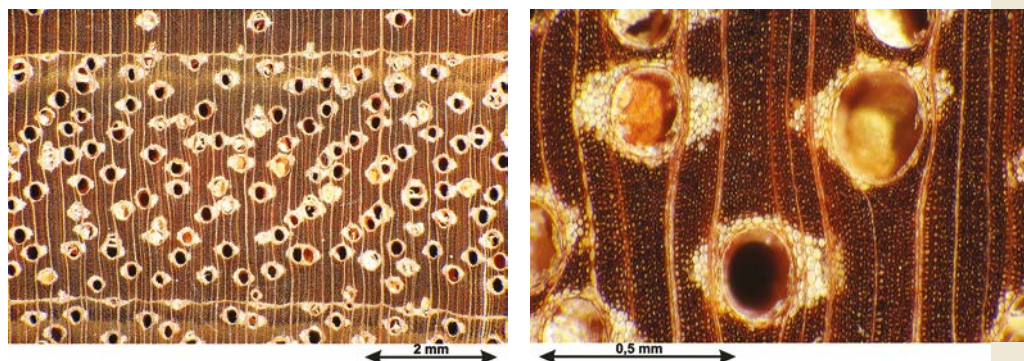
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Julbernardia seretii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Common names

Country	Local name
Gabon	Mbangandourgou
Equatorial Guinea	Nfum
Democratic Republic of the Congo	Alumbi, Bokoko, Kua, Mubangu

Amesclào

Family. Burseraceae

Botanical names

Tetragastris altissima Swart

Tetragastris panamensis Kuntze

Tetragastris p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The genus *Trattinickia* is also commercialised under the name Amesclào, despite the species of this genus having different properties than the genus *Tetragastris*.

Log description

Diameter. 50 to 60 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Orange yellow

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood light brown to orangey yellow. Sometimes frequent small black resinous spots.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	7.2
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	8.6 %
Total radial shrinkage (Rs):	5.2 %
T/R anisotropy ratio	1.7
Fibre saturation point	26 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	18,660 kJ/kg
Crushing strength ⁽¹⁾	71 MPa
Static bending strength ⁽¹⁾	128 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable



Half-quarter sawn



Quarter sawn

Treatability. Class 3 – poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Sawing and machining are more or less easy according to the species and the interlocked grain. Silica content is variable.

Assembling

Nailing/screwing. Good but pre-boring necessary

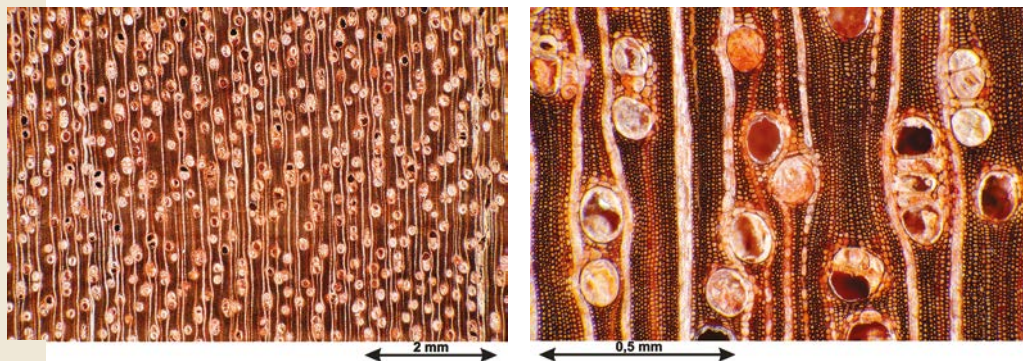
Notes. Amesclão tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Cross sections of *Tetragastris altissima*



Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Sali». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Vehicle or container flooring
- Exterior joinery
- Interior joinery
- Flooring
- Industrial or heavy flooring
- Bridges (parts not in contact with water or ground)

Common names

Country	Local name
Brazil	Amesclão, Breu grande, Breu manga, Breu preto, Breu-sucuruba, Breu vermelho, Morcegueira
Colombia	Trementino azucarero
Cuba	Palo cochino
Ecuador	Copal
Guyana	Haiawaballi, Joeliballi-tataroe, Ulu
French Guiana	Bois cochon, Encens rouge, Grand moni, Sali
Puerto Rico	Masa, Palo de Aceite
Suriname	Joeliballi-tataroe, Salie, Tingimoni



Flat sawn

Quarter sawn



Andira

Family. Leguminosae (Fabaceae)

Botanical names

Andira coriacea Pulle (Syn. *Andira wachenheimi*)

Andira inermis DC. (Syn. *Andira jamaicensis*)

Andira parviflora Ducke

Andira p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Pink brown to red brown. Bands of light coloured parenchyma tissue give this wood a distinctive figure. Presence of internal stresses and wind shakes (internal fractures in the wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.86
Monnin hardness ⁽¹⁾	8.8
Coefficient of volumetric shrinkage	0.65 % per %
Total tangential shrinkage (Ts):	7.3 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.6
Fibre saturation point	23 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	19,180 kJ/kg
Crushing strength ⁽¹⁾	72 MPa
Static bending strength ⁽¹⁾	128 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,170 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 – poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. The species *Andira coriacea* is very resistant to decay (class 1); it naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water). According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Good

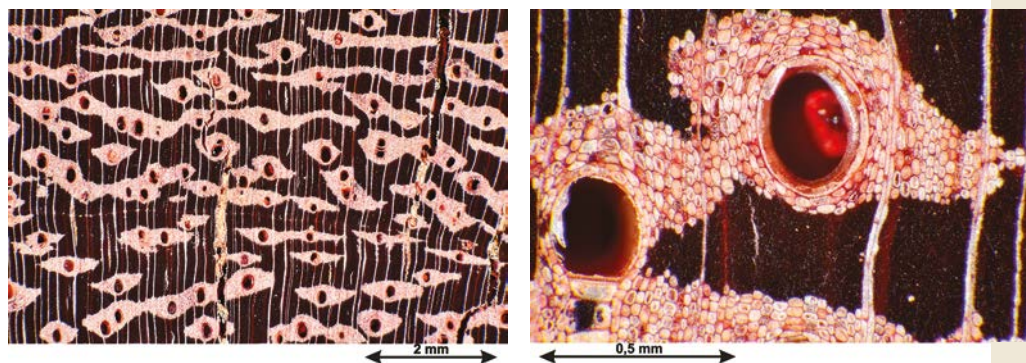
Notes. It is difficult to obtain a smooth surface in planing because of the alternate bands of hard and soft wood. Splinters may cause infection.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Andira coriacea*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Saint Martin Rouge». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4



Traditional bench made of Saint Martin rouge – Organic Collection – Design by Sous le Fromager, Kourou (French Guiana).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Vehicle or container flooring
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Common names

Country	Local name
Brazil	Acapurana, Almendro de rio, Andira, Angelim, Andira uchi
Colombia	Congo
Costa Rica	Mocha colorado
Ecuador	Moton
Guyana	Bat seed, Koraro
French Guiana	Saint-Martin rouge
Mexico	Maquilla
Peru	Quinillo colorado
Suriname	Roode kabbes
Trinidad and Tobago	Angelin
Venezuela	Sarrapio montanero

Andiroba

Family. Meliaceae

Botanical names

Carapa guianensis Aubl. (Syn. *Carapa nicaraguensis*)

Carapa procera DC.

Carapa p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Carapa procera* may be found in Africa under the name "Crabwood".

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Buoyancy is variable: Andiroba branca (varzea) floats. Andiroba vermelha (terra firme) does not float.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.67
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.6
Fibre saturation point	27 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	18,700 kJ/kg
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	102 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,530 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

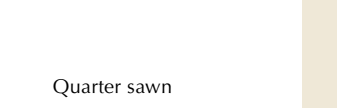
Resistance to dry wood borers. Class S – susceptible (risk in all the wood)

Resistance to termites. Class M – moderately durable

Treatability. Class 3 – poorly treatable



Flat sawn



Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties in planing in the presence of interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

Sawn timber appearance grading

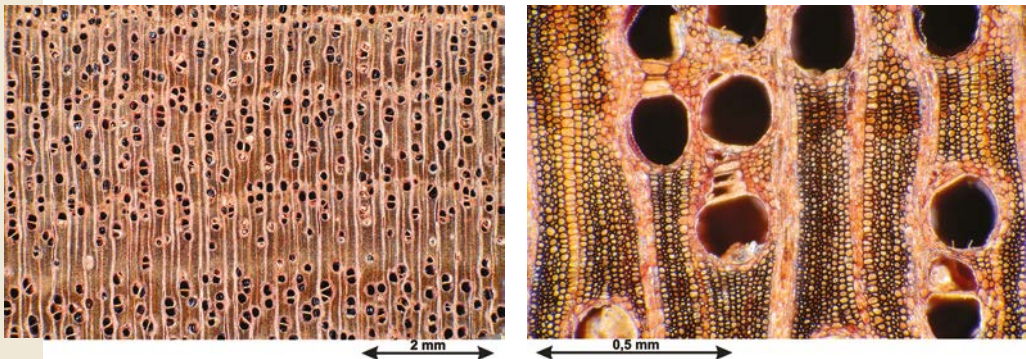
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Carapa». Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Carapa guianensis*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shingles
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item



Staircase in Carapa for the Yawapa carbet (traditional gazebo-like structure) – Designed by Laurent Pilaoukou (French Guiana).

- Moulding
- Flooring
- Sliced veneer
- Exterior panelling
- Seats

Notes. This wood is often used as a substitute for Mahogany.

Common names

Country	Local name
Brazil	Andiroba, Andiroba branca, Andiroba vermelha, Andirobeira, Carapa, Nandiroba
Colombia	Güino, Masabalo, Mazabalo
Costa Rica	Cedro bateo, Cedro macho
Ecuador	Figueroa, Tangare,
Guyana	Crabwood
French Guiana	Carapa
Honduras	Bastard mahogany
Panama	Cedro bateo
Paraguay	Andiroba
Peru	Andiroba
Suriname	Krappa
Trinidad and Tobago	Crappo
Venezuela	Carapa, Masabalo

Andok

Family. Irvingiaceae

Botanical name

Irvingia gabonensis (Aubry-Lecomte ex O'Rorke) Baill.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. n.d.

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellow with red stripes. Heartwood pale green-brown or orange-yellow, can fade to grey-brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.93
Monnin hardness ⁽¹⁾	6.8
Coefficient of volumetric shrinkage	0.63 % per %
Total tangential shrinkage (Ts):	11.2 %
Total radial shrinkage (Rs):	6.6 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	76 MPa
Static bending strength ⁽¹⁾	140 MPa
Longitudinal modulus of elasticity ⁽¹⁾	25,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

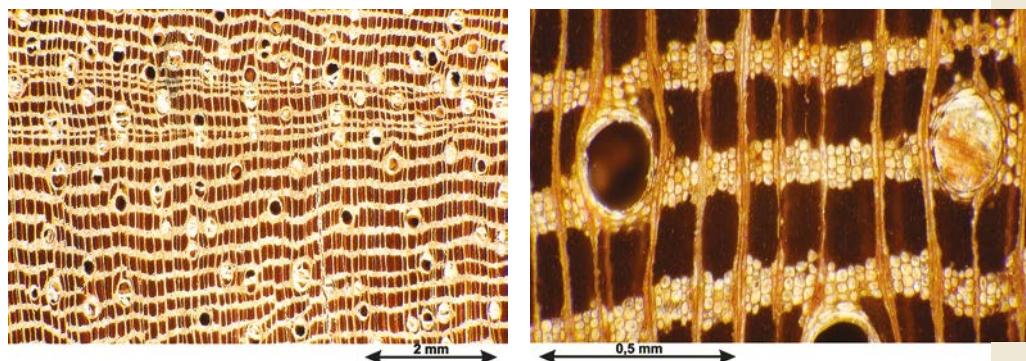
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections *Irvingia gabonensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shipbuilding
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- House framing
- Flooring
- Industrial or heavy flooring
- Decking

Notes. Not present on the international market but widely used for a large range of everyday objects.

Common names

Country	Local name
Cameroon	Bwiba bambale, Ntwa, Pékié, Unyom
Congo	Eniok
Côte d'Ivoire	Boborou
Gabon	Andok
Nigeria	Ogwe, Oro
Central African Republic	Ebi

Andoung

Family. Leguminosae (Caesalpinaceae)

Botanical names

Aphanocalyx hedinii Wieringa (Syn. *Monopetalanthus hedinii*)

Aphanocalyx heitzii Wieringa (Syn. *Monopetalanthus heitzii*)

Bikinia coriacea Wieringa (Syn. *Monopetalanthus coriacea*)

Bikinia durandii Wieringa (Syn. *Monopetalanthus durandii*)

Bikinia le-testui Wieringa (Syn. *Monopetalanthus le-testui*)

Bikinia pellegrini Wieringa (Syn. *Monopetalanthus pellegrini*)

Bikinia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Wood frequently confused with Ekaba (*Tetraberlinia* p.p)

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 5 to 15 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Pink brown to red brown. Possible wind shakes (internal fractures in wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.59
Monnin hardness ⁽¹⁾	3.0
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	7.4 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	1.9
Fibre saturation point	28 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	18,740 kJ/kg
Crushing strength ⁽¹⁾	48 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,010 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Quarter sawn



Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. High risk of distortion in case of highly interlocked grain.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties in the presence of interlocked grain. Tendency to woolliness.

Assembling

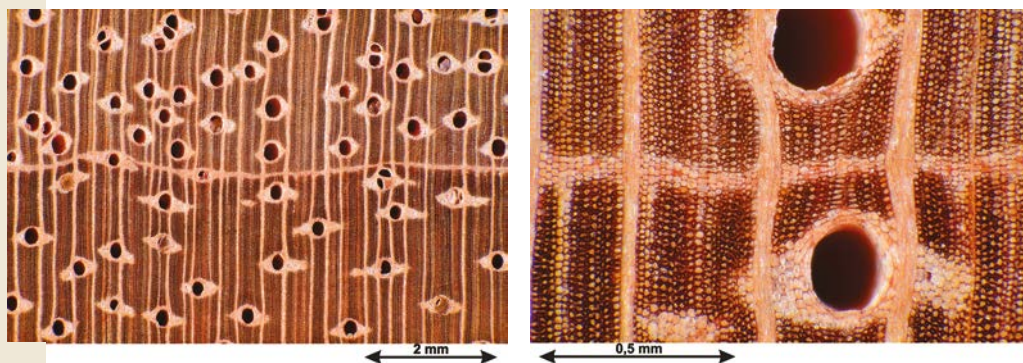
Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

Cross sections of *Bikinia* sp.



- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Common names

Country	Local name
Cameroon	Ékop-mayo, Zoélé
France	N'douma
Gabon	Andoung, N'douma
Equatorial Guinea	Andjung, Ekop



Bed frames – Gabon Wood Industries, Nkok (Gabon).



Flat sawn

Quarter sawn



Angelim

Family. Leguminosae (Fabaceae)

Botanical names

Hymenolobium elatum Ducke

Hymenolobium excelsum Ducke

Hymenolobium petraeum Ducke

Hymenolobium p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Orange yellow

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Yellow brown becoming pinkish brown on exposure. Fairly important waxen patches more or less frequent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	6.3
Coefficient of volumetric shrinkage	0.67 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	25 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,050 kJ/kg
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	119 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,870 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Resistance to decay moderate to good according to the species.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Bad

Suitability for slicing. Good

Notes. Possible sawing and machining difficulties if the waxen patches are numerous. These patches remain visible after machining.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to end checks when nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

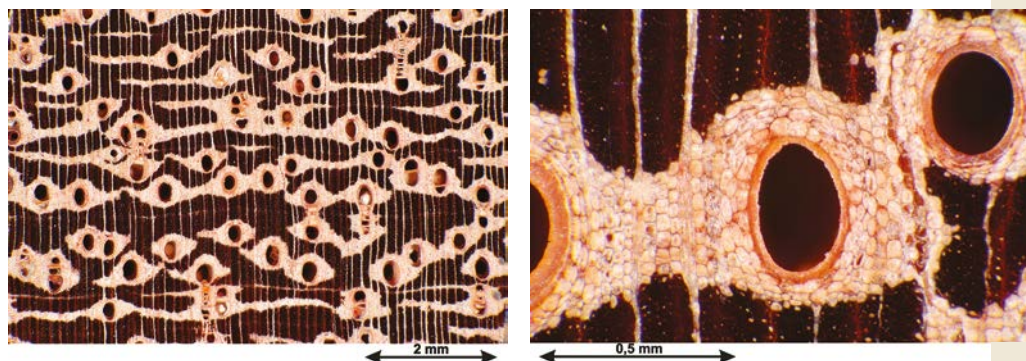
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Hymenolobium excelsum*



In French Guiana, the local name of this species is Saint Martin Jaune. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Exterior panelling

Notes. Extensive sanding is needed to obtain a good finish.

Common names

Country	Local name
Brazil	Angelim amarelo, Angelim da mata, Angelim pedra, Angelim rosa, Mirarena, Sapupira amarella
France	Angelim
Guyana	Koraroballi
French Guiana	Saint-Martin gris, Saint-Martin jaune
Suriname	Makkakabes, Saandoe



Table for child's bedroom – Kourou (French Guiana).

Angelim rajado / Snakewood*

* Common commercial name

Family. Leguminosae (Mimosaceae)

Botanical names

Zygia racemosa Barneby & J.W. Grimes
(Syn. *Marmaroxylon racemosum*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 25 to 60 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Orange yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood with irregular dark brown veins. These veins are not present in sapwood. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.03
Monnin hardness ⁽¹⁾	10.6
Coefficient of volumetric shrinkage	0.74 % per %
Total tangential shrinkage (Ts):	10.5 %
Total radial shrinkage (Rs):	6.0 %
T/R anisotropy ratio	1.8
Fibre saturation point	28 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	83 MPa
Static bending strength ⁽¹⁾	150 MPa
Longitudinal modulus of elasticity ⁽¹⁾	27,030 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Difficulties due to hardness and interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

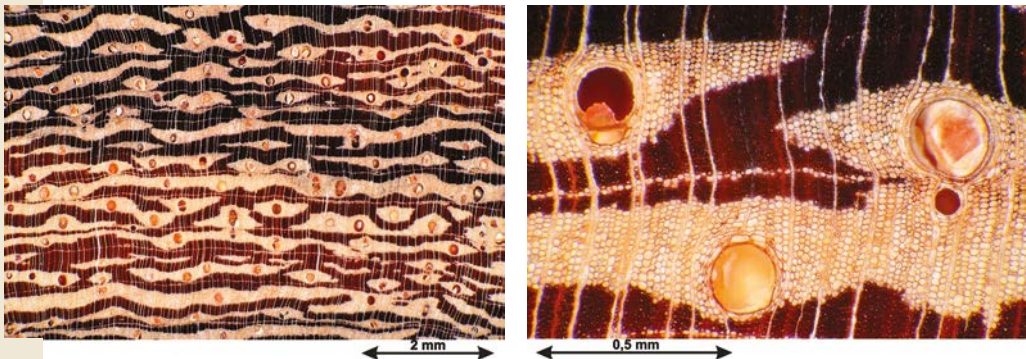
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In Guyana, the local name of this species is «Bois serpent». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Zygia racemosa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Panelling
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Marquetry
- Hydraulic works (seawater)

Common names

Country	Local name
Brazil	Angelim rajado, Firma, Ingarana, Ingarana da terra firma
Guyana	Snakewood
French Guiana	Bois serpent
Suriname	Bostamarinde, Sneki oedoe



Electric guitar top in Angelim rajado – Design by Cosmik Guitare, Lille (France).

Angelim vermelho

Family. Leguminosae (Mimosaceae)

Botanical name

Dinizia excelsa Ducke

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 65 to 120 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Hollow tree very common. Unpleasant odour when green or rewetted.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.07
Monnin hardness ⁽¹⁾	17.1
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	8.5 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.7
Fibre saturation point	23 %
Thermal conductivity (λ)	0.34 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	89 MPa
Static bending strength ⁽¹⁾	160 MPa
Longitudinal modulus of elasticity ⁽¹⁾	26,280 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or



Flat sawn



Quarter sawn

regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. Kiln drying must be handled slowly and carefully. Air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

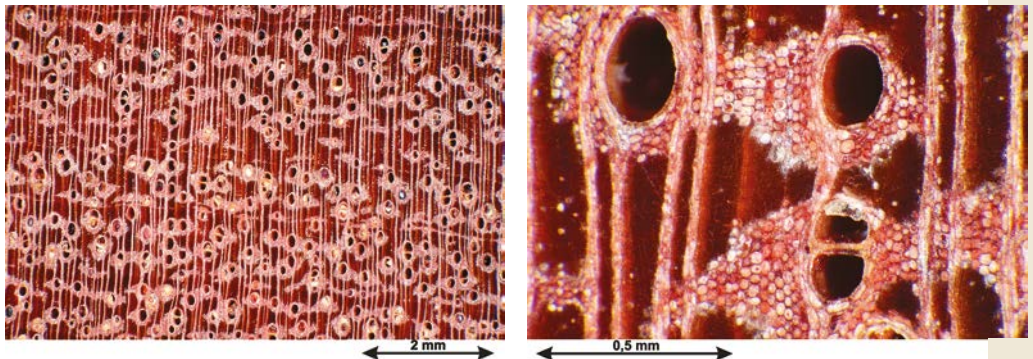
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Dinizia excelsa*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading. Strength class D50 can be also provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Stairs (inside)
- Vehicle or container flooring
- Industrial or heavy flooring
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Sleepers

Common names

Country	Local name
Brazil	Angelim falso, Angelim ferro, Angelim pedra, Angelim vermelho, Faveira preta, Faveira grande, Gurupa
Guyana	Parakwa



Sub-structure of the planking of the Forum Saint-Martin in Perpignan (France).

Angoa

Family. Vochysiaceae

Botanical name

Erismadelphus exsul Mildbr.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellowish. Heartwood yellowish to brown, often with greenish brown marks near the heart.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	4.8
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	9.9 %
Total radial shrinkage (Rs):	5.6 %
T/R anisotropy ratio	1.8
Fibre saturation point	36 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	100 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,030 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
 In case of temporary humidification. Use of this wood is not recommended
 In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid
 Risk of distortion. Slight risk
 Risk of case hardening. No known specific risk
 Risk of checking. No risk or very slight risk
 Risk of collapse. Yes
 Notes. Inclination to twist and cup.
 Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High
 Tooth for sawing. Stellite-tipped
 Machining tools. Tungsten carbide
 Suitability for peeling. Good
 Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good

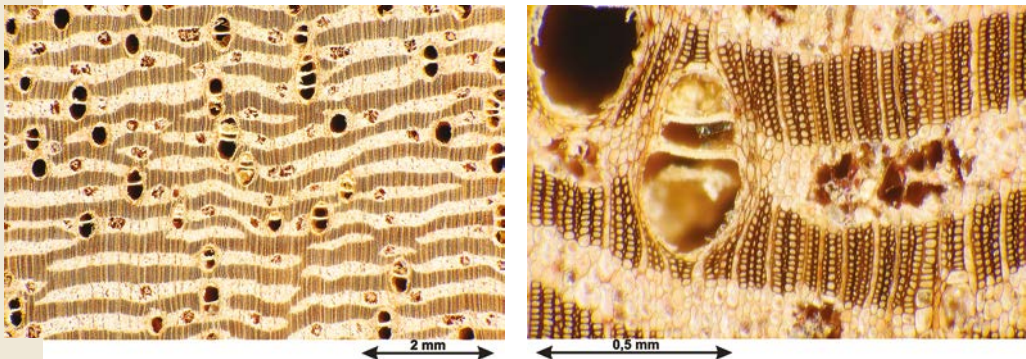
Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”
- Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV
- Possible grading for short-length lumbers: choice I, choice II
- Possible grading for short-length rafters: choice I, choice II, choice III
- For the “Special Market”
- Possible grading for strips and small boards: choice I, choice II, choice III
- Possible grading for rafters: choice I, choice II, choice III

Cross sections *Erismadelphus exsul*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Flooring

Notes. Needs filling before polishing.

Common names

Country	Local name
Cameroon	Afoé bilobi, Bokokkwanjube
Gabon	Angoa, Essang-afane



Flat sawn



Quarter sawn

Angueuk

Family. Olacaceae

Botanical name

Ongokea gore Pierre

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 7 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pale yellow slightly brownish, darkens with light. Ribbon-like aspect on quartersawn. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	5.8
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	11.8 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	2.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	107 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,610 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from fairly hard to hard.

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Must be dried on quartersawns to reduce distortion.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

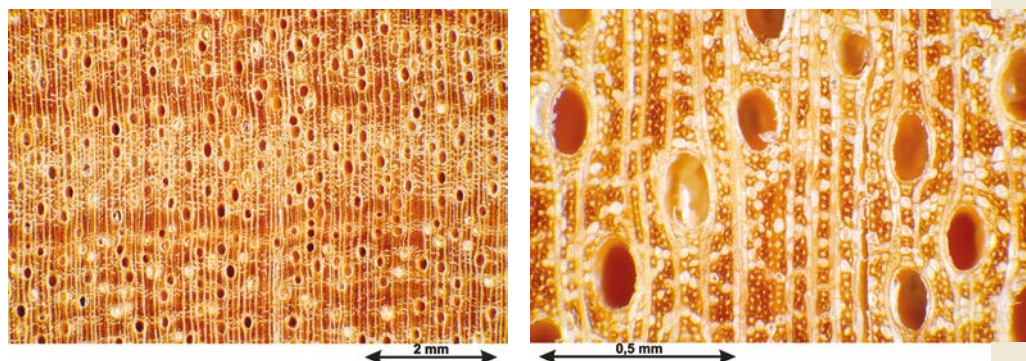
Notes. Requires power.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections *Ongokea gore*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Vehicle or container flooring
- Exterior joinery
- Interior joinery
- Industrial or heavy flooring
- Sliced veneer

Common names

Country	Local name
Cameroon	Angueuk, Bwelabako
Congo	Sanu
Côte d'Ivoire	Kouéro
Gabon	Angueuk
Ghana	Bodwe
Nigeria	Ekuso, Elede
Central African Republic	Mobengé
République démocratique du Congo	Boléko

Aniégré / Aningeria*

* Common commercial name

Family. Sapotaceae

Botanical names

Chrysophyllum giganteum A. Chev.
(Syn. *Gambeyobotrys gigantea*)

Pouteria altissima Baehni (Syn. *Aningeria altissima*)

Pouteria pierrei Baehni (Syn. *Aningeria robusta*)

Pouteria superba L. Gaut. (Syn. *Aningeria superba*)
(Syn. *Malacantha superba*)

Pouteria p.p. (Syn. *Aningeria* p.p.)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Aniégré is sometimes confused with Longhi (*Chrysophyllum* p.p.)

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood cream white to pale pink brown, veined, lustrous aspect. Grain sometimes wavy producing a moiré aspect.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.57
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.9
Fibre saturation point	31 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	19,650 kJ/kg
Crushing strength ⁽¹⁾	48 MPa
Static bending strength ⁽¹⁾	84 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,690 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 4-5 – poorly durable to not durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Tendency to blue stain, especially in the early stages of air drying.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

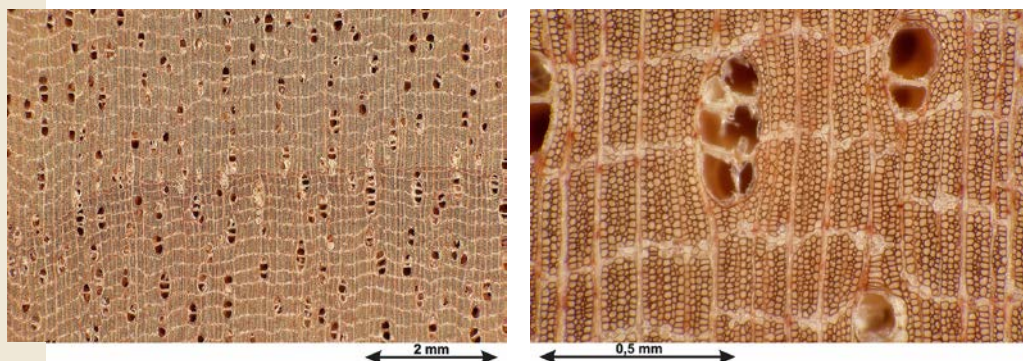
Suitability for slicing. Good

Notes. Risks of splinters in cross cutting, boring or mortising. Stains well.

Assembling

Nailing/screwing. Good

Cross sections of *Pouteria superba*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market” Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length

lumpers: choice I, choice II

Possible grading for short-length rafters:

choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small

boards: choice I, choice II, choice III

Possible grading for rafters: choice I,

choice II, choice III



Flitches prepared for slicing – Tropical wood, Adzopé (Côte d'Ivoire).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard

NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer

Notes. Can be used as a substitute for Merisier. Very prone to blue stain.

Common names

Country	Local name
Germany	Aningre, Tanganyka nuss
Angola	Kali, Mukali
Cameroon	Nom abam
Congo	Mukali, N'kali
Côte d'Ivoire	Aniégré, Aninguéri blanca
Ethiopia	Kararo
Ghana	Asanfena
Italy	Tanganyka noce
Kenya	Mukangu, Muna
Nigeria	Landojan
Uganda	Osan
Central African Republic	M'boul
Democratic Republic of Congo	Tutu
United Kingdom	Aningeria



Flat sawn

Half-quarter sawn



Anzèm / Nténé*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical name

Copaifera religiosa J. Léonard

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 10 to 15 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood whitish to pale pink. Heartwood pale pink brown to reddish brown, copper tinge, with darker veining. Frequent resin exudation.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.58
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.33 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	5.3 %
T/R anisotropy ratio	1.3
Fibre saturation point	33 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	47 MPa
Static bending strength ⁽¹⁾	81 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,340 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

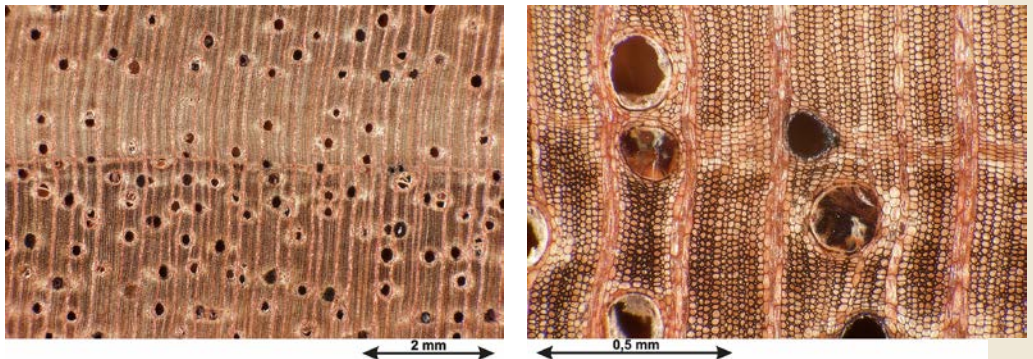
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Copaifera religiosa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Flooring

Notes. Possible confusion with Anzèm and Mutényé as logs (similar bark) and with Ghéombi as sawn timber. Substitute for Walnut.

Common names

Country	Local name
Cameroon	Anzèm
Congo	N'téné
Gabon	Anzèm rouge
Equatorial Guinea	Andem, Azem
Democratic Republic of Congo	Bengi

Araracanga

Family. Apocynaceae

Botanical names

Aspidosperma album Benoist

Aspidosperma desmanthum Benth.

Aspidosperma p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The genus *Aspidosperma* is also associated with other woods (Peroba rosa, Quebracho blanco, Carreto, Piquia marfim). The species *Aracacanga* presents great variability.

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood orange light brown sometimes with large pink veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.94
Monnin hardness ⁽¹⁾	8.3
Coefficient of volumetric shrinkage	0.75 % per %
Total tangential shrinkage (Ts):	9.8 %
Total radial shrinkage (Rs):	6.3 %
T/R anisotropy ratio	1.6
Fibre saturation point	26 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	18,720 kJ/kg
Crushing strength ⁽¹⁾	89 MPa
Static bending strength ⁽¹⁾	153 MPa
Longitudinal modulus of elasticity ⁽¹⁾	26,140 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable



Half-quarter sawn



Quarter sawn

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water). According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

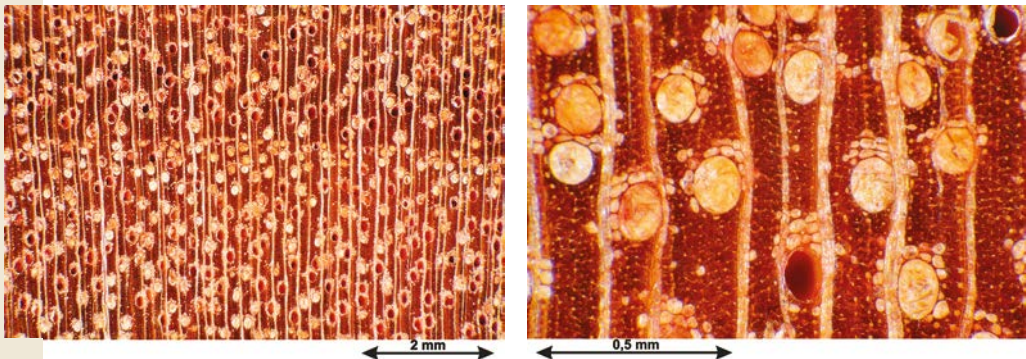
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Aspidosperma album*



In French Guiana, the local name of this species is Kouamanti Oudou. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D50 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- building (ribs)
- Cabinetry (high-end furniture)
- Vehicle or container flooring
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Sculpture
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Belize	My lady
Bolivia	Gavetillo
Brazil	Jacamin, Ararauba, Araracanga
Colombia	Copachi, Quillo caspi
Guatemala	Chichica
Guyana	Shibadan
French Guiana	Kiantioutiou, Koumanti oudou
Honduras	Chapel, Chaperna
Mexico	Volador, Pelmax
Panama	Alcarreto
Peru	Pumaquiro
Suriname	Kromanti kopi
Venezuela	Nielillo negro



Flat sawn



Quarter sawn

Ash

Family. Oleaceae

Botanical names

Fraxinus excelsior L.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Creamy white wood when fresh, it turns yellow with light. Sometimes wavy grain. Heart of some logs is marked with veins or black areas.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	5.1
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	9.6 %
Total radial shrinkage (Rs):	5.7 %
T/R anisotropy ratio	1.7
Fibre saturation point	32 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	17,850 kJ/kg
Crushing strength ⁽¹⁾	51 MPa
Static bending strength ⁽¹⁾	113 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Low risk of splits or deformation with natural drying.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Ash wood has a good aptitude for bending.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very porous and slightly acidic: to be taken into account when gluing.

Commercial grading

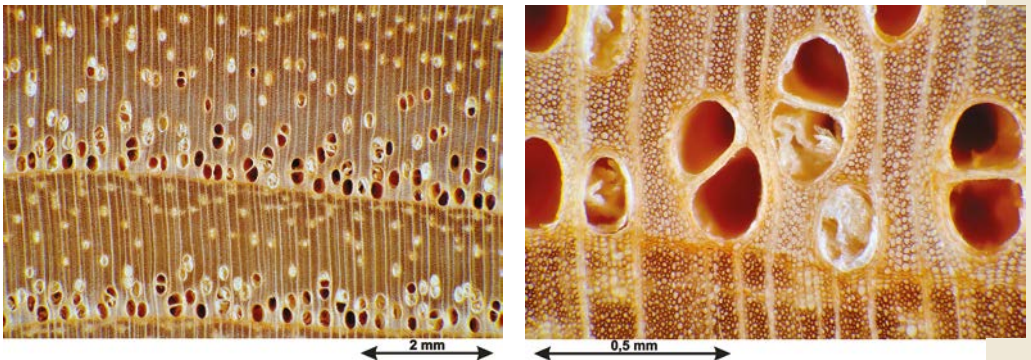
Sawn timber appearance grading

No conventional grading rules for this species. Sawn products are graded according to final uses.

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Cross sections of *Fraxinus excelsior*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Coffins
- Cabinetry (high-end furniture)
- Tool handles (resilient woods)
- Interior joinery
- Flooring
- Sliced veneer
- Seats
- Coopersage

Notes. This wood is particularly renowned for its flexibility (aptitude for bending) and its resistance to impacts.

Common names

Country	Local name
Germany	Esche
Spain	Fresno
France	Frêne
Italy	Frassino
United Kingdom	Ash



Pays de Bresse wardrobe in cherry wood and ash burr, 18th century – Éric Orsini, Pézenas (France).

Asian Black Ebony* / Ébène noire d'Asie

* Common commercial name

Family. Ebenaceae

Botanical names

Diospyros ebenum J. Koenig

Diospyros melanoxyton Roxb.

Diospyros mollis Griff.

Diospyros mun A. Chev.

Diospyros vera A. Chev. (Syn. *Diospyros ferrea*)

Diospyros p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

Notes. Only *Diospyros* from Madagascar are listed in CITES Appendix II (logs, sawn wood, veneer sheets).

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. 6 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Black

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellowish white to pink grey or pale reddish brown. Heartwood uniform black. Very thin, uniform structure, wavy bands of parenchyma fibres on horizontal side, highly decorative.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.10
Monnin hardness ⁽¹⁾	11.7
Coefficient of volumetric shrinkage	0.72 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	5.4 %
T/R anisotropy ratio	1.6
Fibre saturation point	32 %
Thermal conductivity (λ)	0.35 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	250 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Half-quarter sawn



Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

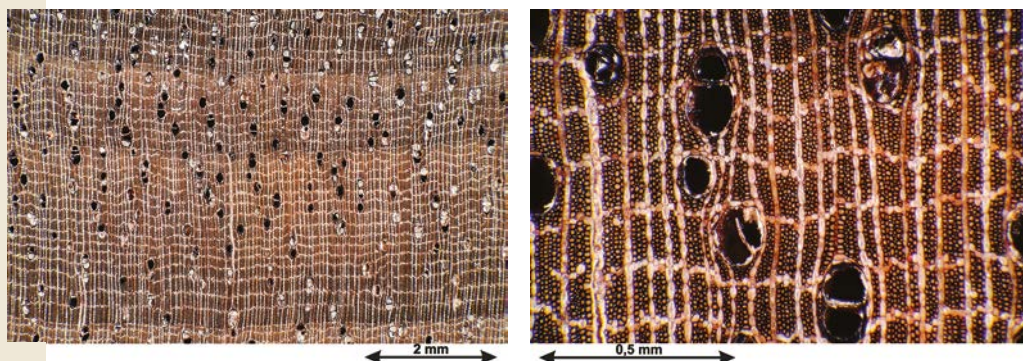
Notes. Machining and sanding dust may cause irritation.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity and extractive content: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Diospyros ebenum*



Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Tool handles (resilient woods)
- Sliced or sawed veneer
- Sculpture
- Marquetry

Common names

Country	Local name
France	Ébène noire d'Asie
India	Black Ebony, Ebony
Indonesia	Kaju hitam
United Kingdom	Asian Black Ebony, Ebony, Ebony persimmon
Sri Lanka	Ceylon Ebony
Thailand	Ma klua
Viet Nam	Mun



Flat sawn

Quarter sawn



Asian Grained Ebony* / Ébène veinée d'Asie

* Common commercial name

Family. Ebenaceae

Botanical names

Diospyros celebica Bakh.

Diospyros marmorata R. Parker

Diospyros rumphii Bakh.

Diospyros p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

Only *Diospyros* from Madagascar are listed in CITES Appendix II (logs, sawn wood, veneer sheets).

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. 7 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellowish white to pink grey or pale reddish brown. Heartwood black with irregular stripes caused by layers or veins of varying width. Wide variations possible in colour combinations for some species. Very thin, uniform structure, wavy bands of parenchyma fibres on horizontal side, highly decorative.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.20
Monnin hardness ⁽¹⁾	14.3
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	3.4 %
T/R anisotropy ratio	2.3
Fibre saturation point	29 %
Thermal conductivity (λ)	0.38 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	250 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

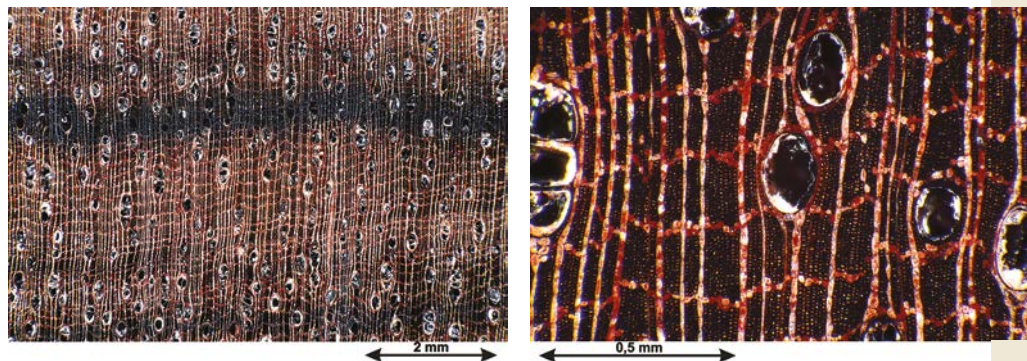
Notes. Machining and sanding dust may cause irritation.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity and extractive content: important that gluing especially be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Diospyros celebica*



Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Pair of whales in Macassar Ebony, Éric Orsini, Pézenas (France).

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Tool handles (resilient woods)
- Sliced or sawed veneer
- Sculpture
- Marquetry

Common names

Country	Local name
France	Ébène veinée d'Asie, Ébène de Macassar
India	Marblewood
Indonesia	Ebony, Kayu hitam
Malaysia	Kajol martem, Macassar Ebony
United Kingdom	Asian Grained Ebony

Avodiré

Family. Meliaceae

Botanical name

Turraeanthus africana Pellegr.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood cream white or light yellow, lustrous aspect, turns to golden yellow with light. Moiré or ribbon-like aspect on quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.58
Monnin hardness ⁽¹⁾	2.7
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	39 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	19,590 kJ/kg
Crushing strength ⁽¹⁾	52 MPa
Static bending strength ⁽¹⁾	94 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,590 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Prone to blue stain.



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Bad

Suitability for slicing. Good

Notes. Poor aptitude for peeling (irregularly-shaped logs). Very irritant sawdust; good ventilation required. Sometimes tearing in planing.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Slight tendency to split when nailing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

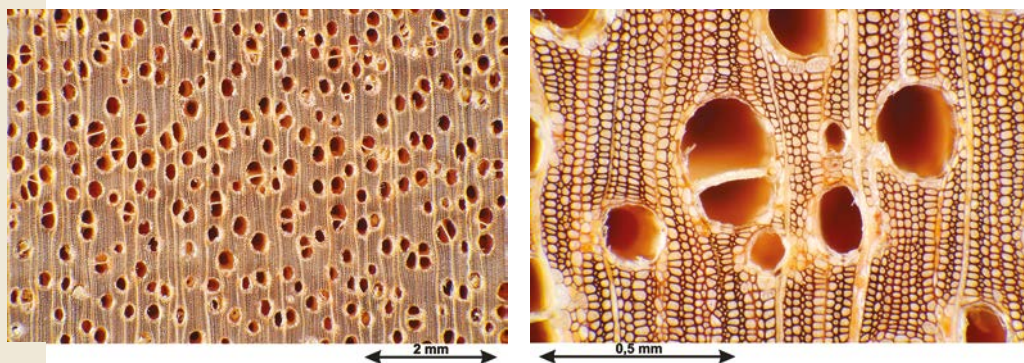
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Turraeanthus africana*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cabinetry (high-end furniture)
- Musical instruments
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer

Notes. Substitute for sycamore [sycamore maple in US] for furniture.

Common names

Country	Local name
Belgium	Lusamba
Cameroon	Asama
Côte d'Ivoire	Avodiré
Ghana	Apapaya, Avodire
Liberia	Blima-pu
Nigeria	Apaya
Democratic Republic of Congo	Lusamba, M'fubé



Half-quarter sawn

Quarter sawn



Awoura

Family. Leguminosae (Caesalpiniaaceae)

Botanical names

Julbernardia pellegriniana Troupin (Syn. *Paraberlinia bifoliolata*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 10 to 15 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood highly veined with alternate dark and light coloured streaks. Sometimes oblique grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.77
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	8.9 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	2.1
Fibre saturation point	27 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	19,630 kJ/kg
Crushing strength ⁽¹⁾	68 MPa
Static bending strength ⁽¹⁾	128 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,840 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Possibility of discolouration during drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Risks of distortion in machining (especially in planing).

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

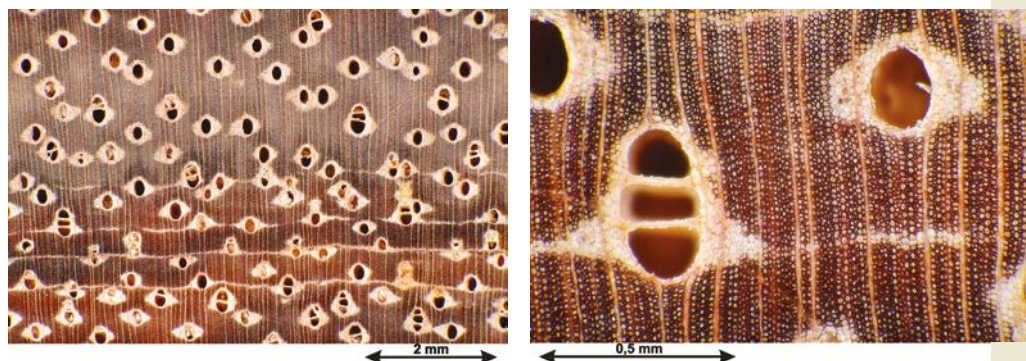
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Julbernardia pellegriniana*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Common names

Country	Local name
Germany	Zebrali
Cameroon	Ékop-béli
France	Zébrali
Gabon	Awoura, Béli



Sculpture made of Béli (Gabon).

Ayous / Obeche*

* Common commercial name

Family. Malvaceae (Sterculiaceae)

Botanical name

Triplochiton scleroxylon K. Schum.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 140 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Black holes, brittleheart, ring shakes and grub holes in some logs. Yellowish white to light yellow, heartwood sometimes darker. Ribbon-like aspect on quartersawn. Grain sometimes irregular.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.38
Monnin hardness ⁽¹⁾	1.1
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	5.0 %
Total radial shrinkage (Rs):	2.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	29 %
Thermal conductivity (λ)	0.14 W/(m.K)
Lower heating value	18,990 kJ/kg
Crushing strength ⁽¹⁾	30 MPa
Static bending strength ⁽¹⁾	52 MPa
Longitudinal modulus of elasticity ⁽¹⁾	7,260 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. Poorly to moderately permeable to preservation treatment. Prone to blue stain and dot.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. During air drying, it is recommended to use large spacer sticks to allow good air circulation.

Suggested drying schedule. Schedule #2 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Tends to crumble when machining end grain and tends to tear in mortising (it is recommended to keep sharp edges and to reduce the cutting angle). Filling recommended.

Assembling

Nailing/screwing. Poor

Notes. Very porous and absorbent: to be taken into account when gluing.

Commercial grading

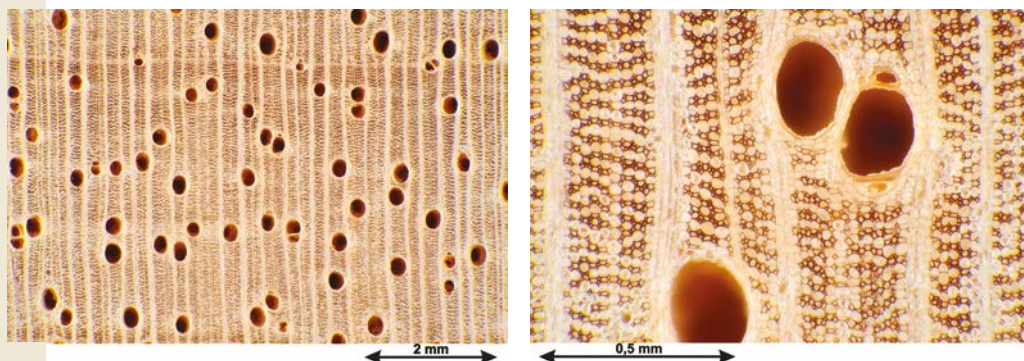
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Triplochiton scleroxylon*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

• For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.



Ceiling of Paris-Charles-de-Gaulle airport in Roissy-en-France (France).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Coffins
- Pencils
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Sculpture

Notes. Ayous is a substitute for Poplar for several end-uses: light furniture, panelling etc.

Common names

Country	Local name
Germany	Abachi
Benin	Xwetin
Cameroon	Ayous, Ayus
Congo	Éguess
Côte d'Ivoire	Samba
France	Ayous, Samba
Gabon	Ayous / Obeche
Ghana	Wawa
Equatorial Guinea	Ayous, Ayus
Nigeria	Arere, Obeche
Central African Republic	Bado, M'bado
United Kingdom	Ayous, Obeche, Wawa



Flat sawn

Half-quarter sawn



Azobé / Ekki*

* Common commercial name

Family. Ochnaceae

Botanical names

Lophira alata Banks (Syn. *Lophira procera*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark red

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Dark red to purple brown wood. Intermediate zone between sapwood and heartwood. White deposits in the pores.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.06
Monnin hardness ⁽¹⁾	10.7
Coefficient of volumetric shrinkage	0.69 % per %
Total tangential shrinkage (Ts):	10.3 %
Total radial shrinkage (Rs):	7.3 %
T/R anisotropy ratio	1.4
Fibre saturation point	28 %
Thermal conductivity (λ)	0.34 W/(m.K)
Lower heating value	19,590 kJ/kg
Crushing strength ⁽¹⁾	96 MPa
Static bending strength ⁽¹⁾	162 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,420 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. Transitional wood has a variable durability. Good resistance to marine borers in temperate water but moderate resistance in tropical water. This species is thus considered as “moderately durable” for marine borers and covers the use class 5 only when used in temperate or cold salt water, sea water or brackish water. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Air drying period recommended (3 to 4 months under shelter) prior to kiln drying. Drying very difficult for thicknesses > 38 mm.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

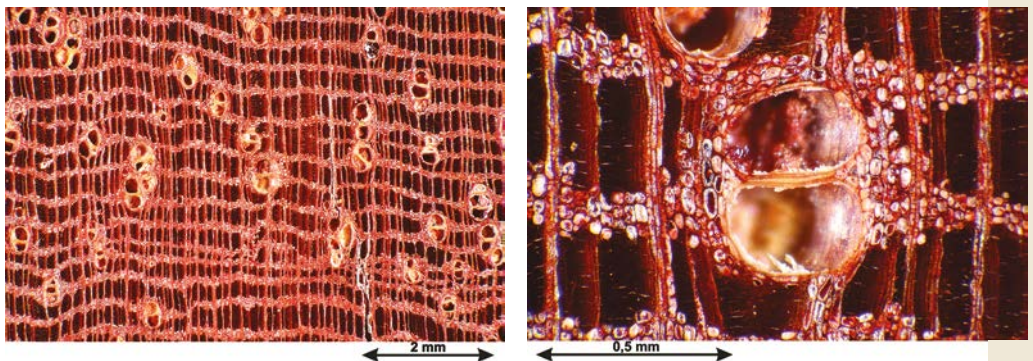
Notes. Log turning sawing recommended (internal stresses). Some difficulties in planing due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Lophira alata*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D70 can be provided by visual grading. Strength class D50 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Vehicle or container flooring
- House framing
- Industrial or heavy flooring
- Stakes
- Decking
- Poles
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Cooperage
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. In permanent humidification, transition wood must be eliminated. Resistant to one or several acids.

Common names

Country	Local name
Germany	Bongossi, Bonkole
Benin	Éki
Cameroon	Bongossi, Okoka
Congo	Bonkolé
Côte d'Ivoire	Azobé / Ekki
Gabon	Akoga
Ghana	Kaku
Equatorial Guinea	Akoga
Nigeria	Eba, Ekki
Central African Republic	Kofyo
United Kingdom	Ekki
Sierra Leone	Hendui



“Tillac” on the Calais pier – Design by Bois et loisirs (France).

Bacuri

Family. Clusiaceae

Botanical name

Platonia insignis Mart.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 3 to 9 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Occasional ringshakes in logs.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.85
Monnin hardness ⁽¹⁾	6.2
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.4 %
T/R anisotropy ratio	1.9
Fibre saturation point	27 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	18,830 kJ/kg
Crushing strength ⁽¹⁾	73 MPa
Static bending strength ⁽¹⁾	147 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,610 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Must be dried slowly.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Silica content is variable.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

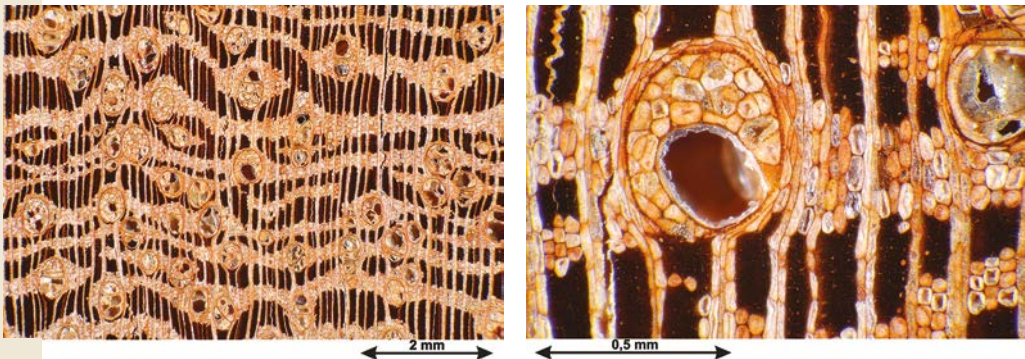
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Parcouri». Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Platonia insignis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Common names

Country	Local name
Brazil	Bacuri, Bacuriuba, Bacuri-açu, Ubucari
Ecuador	Matazama
Guyana	Mammea apple, Pakuri
French Guiana	Parcouri
Paraguay	Bacury
Suriname	Goelhart, Pakoeli



Flat sawn



Quarter sawn

Balau, Red

Family. Dipterocarpaceae

Botanical names

Shorea balangeran Burck

Shorea collina Ridl.

Shorea guiso Blume

Shorea inaequilateralis Symington

Shorea kunstleri King

Shorea ochrophloia Symington

Shorea subgen. *Rubroshorea* p.p.

Notes. *Shorea* subgen. *Rubroshorea* species with specific gravity between 0.78 and 0.95.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood light to dark red brown or purplish red brown to grey brown. Canals filled with white resin.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	7.0
Coefficient of volumetric shrinkage	0.69 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.8
Fibre saturation point	27 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	80 MPa
Static bending strength ⁽¹⁾	119 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,670 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Specific gravity varies from 0.78 to 0.95. Fairly hard to hard.

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

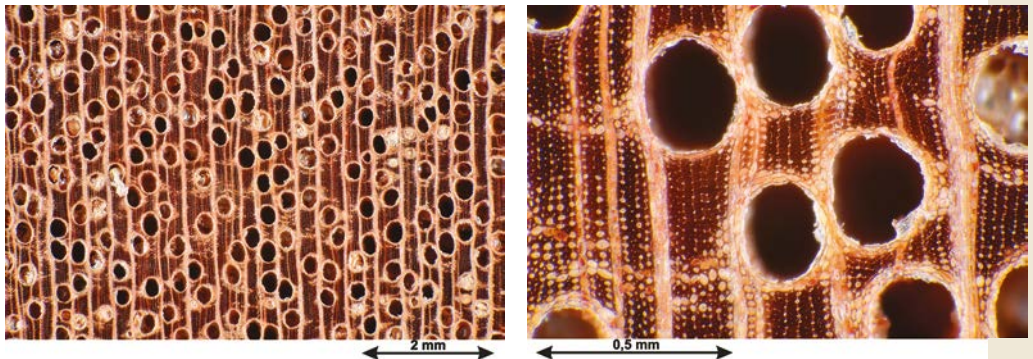
Notes. Planed surfaces present a variable lustre. Occasional difficulties due to highly interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Shorea balangeran*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- building (ribs)
- Boxes and crates
- Stairs (inside)
- Vehicle or container flooring
- Musical instruments
- Exterior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Bridges (parts not in contact with water or ground)
- Cooperage

Notes. Filling is required to obtain a good finish.

Common names

Country	Local name
France	Balau red
Indonesia	Balangeran, Balau merah, Belangeran
Malaysia	Balau laut merah, Balau membatu, Damar laut merah, Empenit-meraka, Membatu, Red balau, Red selangan batu, Selangan batu merah, Selimbar, Semayur, Sengawan, Seraya sirup, Seri
Philippines	Gisok, Guijo
Thailand	Chan khah, Chankhau, Makata

Balau, Yellow / Bangkirai*

* Common commercial name

Family. Dipterocarpaceae

Botanical names

Shorea glauca King

Shorea laevis Ridl.

Shorea maxwelliana King

Shorea superba Symington

Shorea subgen. *Eushorea* p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Shorea* subgen. *Eushorea*. Yellow Balau is usually used for woods imported from Malaysia, Bangkirai for woods from Indonesia.

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. 2 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Yellow brown to reddish brown more or less dark. White resin canals. Sawnwoods may present black holes. This defect is acceptable if it remains limited and not frequent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	7.3
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	2.3
Fibre saturation point	23 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,910 kJ/kg
Crushing strength ⁽¹⁾	85 MPa
Static bending strength ⁽¹⁾	150 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,940 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Quarter sawn



Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. The possible presence of few demarcated sapwood may have an influence on durability. Only *Shorea laevis* has a good enough natural durability to allow end-uses under use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water). It is due to its high specific gravity and high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Initial air drying is recommended prior to kiln drying.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

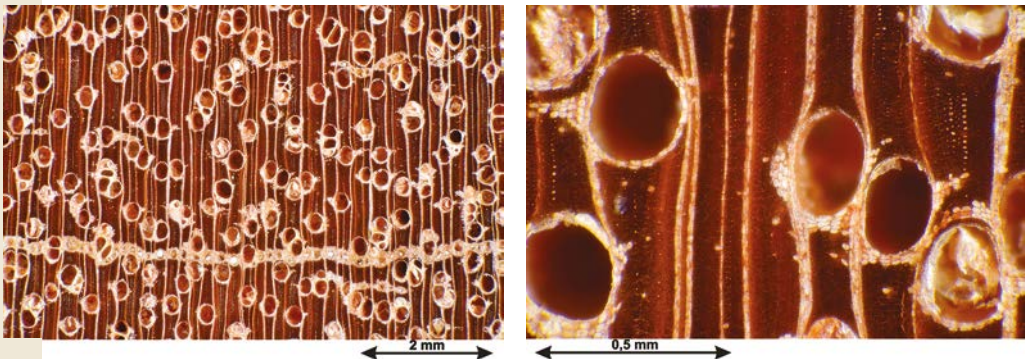
Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Some difficulties due to interlocked grain during planing.

Cross sections of *Shorea laevis*



Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Boxes and crates
- Vehicle or container flooring
- Exterior joinery
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Cooperage
- Hydraulic works (fresh water)
- Sleepers

Notes. Other possible end-uses: garden furniture.

Common names

Country	Local name
India	Sal
Indonesia	Agelam, Balau, Bangkirai, Benuas, Kedawang, Kumus, Pooti, Selangan batu, Selangan batu kumus
Malaysia	Balau, Balau kumus, Balau simantok, Damar laut, Damar laut kumus, Selangan batu, Sengkawang, Sengkawan darat, Yellow balau
Myanmar	Thitya
Philippines	Gisok, Malaykal, Yakal
Thailand	Ak, Aek, Chan, Pa-Yom dong



Sound protection screen, A10 motorway – Châtelleraut (France).

Balsa

Family. Malvaceae (Bombacaceae)

Botanical names

Ochroma pyramidale Urb. (Syn. *Ochroma lagopus*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Wood cream white to pink white.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.14
Monnin hardness ⁽¹⁾	0.3
Coefficient of volumetric shrinkage	0.21 % per %
Total tangential shrinkage (Ts):	5.2 %
Total radial shrinkage (Rs):	2.2 %
T/R anisotropy ratio	2.4
Fibre saturation point	34 %
Thermal conductivity (λ)	0.07 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	11 MPa
Static bending strength ⁽¹⁾	24 MPa
Longitudinal modulus of elasticity ⁽¹⁾	5,140 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Impregnation in autoclave not recommended.

Impregnation by soaking satisfactory.



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Kiln drying is preferable to air drying to reduce the defects. Drying must be done slowly.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Sharp tools are necessary to avoid fuzzy surface.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

Specific grading according to uses

Fire safety

Conventional French grading

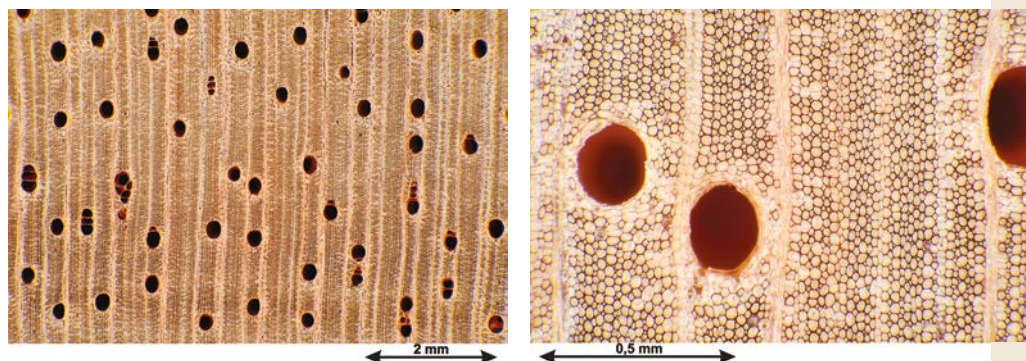
Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. Ungraded

Average density under 0.35.

Cross sections of *Ochroma pyramidale*



Main end uses

- Floats
- Insulation
- Model building
- Marquetry

Notes. Filling is required to obtain a good finish.

Common names

Country	Local name
Bolivia	Tami
Brazil	Pau de balsa
Colombia	Lanu
El Salvador	Algodon
Ecuador	Balsa
Guatemala	Lanilla
Honduras	Balsa, Guano
Nicaragua	Catillo, Gatillo
Peru	Balsa, Palo de balsa, Topa
Trinidad and Tobago	Bois flot
Venezuela	Balso



"Sanctuary" – Design by Pauline Grapa (France).

Balsamo

Family. Leguminosae (Fabaceae)

Botanical names

Myroxylon balsamum Harms (Syn. *Myroxylon toluiferum*)

Myroxylon peruiferum L. f.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 60 cm

Thickness of sapwood. 1 to 4 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Sapwood cream white. Heartwood purplish-red to reddish brown darkening on exposure, with stripes of lighter colour. Very fine storeyed structure, perceptible. Sporadic resinous marks. Pleasant slight scent when sawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.95
Monnin hardness ⁽¹⁾	10.0
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.6
Fibre saturation point	23 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	85 MPa
Static bending strength ⁽¹⁾	149 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,560 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Good results in turnery. Very fine surface obtained after sanding.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

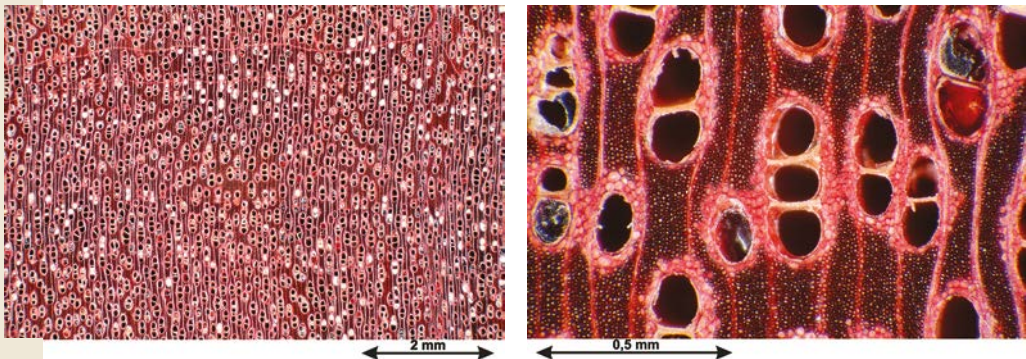
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Myroxylon balsamum*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shipbuilding
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Moulding
- Flooring
- Sliced veneer

Notes. Sometimes difficulties with finishing caused by resin. Used medicinally and in perfumery.

Common names

Country	Local name
Argentina	Incienso, Quina-quina
Belgium	Balsam
Brazil	Cabreuva, Cabreuva vermelha, Oleo vermelho
Colombia	Myroxylon
Ecuador	Sandalo
Honduras	Balsamo
Mexico	Arbol del bálsamo, Bálsamo
Paraguay	Incienso
Peru	Bálsamo de tolu, Bálsamo de Perú, Estoraque, Quina-quina

Basralocus

Family. Leguminosae (Caesalpinieae)

Botanical names

Dicorynia guianensis Amshoff

Dicorynia paraensis Benth.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 2 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Colour turns bronze brown or purplish brown with air. Sometimes, presence of internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	5.7
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.6
Fibre saturation point	29 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,200 kJ/kg
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	121 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,350 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Half-quarter sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. Resistance to decay: moderate to good depending on decay. This species does not cover the use class 4, but it naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) owing to its high silica content and its high specific gravity. Resistance to termites ranges from moderately good to good. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Slow drying recommended in order to reduce risks of checking and distortion. Risks of casehardening with thick material.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Must be sawn green in order to reduce blunting effect. Sawing requires power and a cutting angle of 20° is recommended.

Assembling

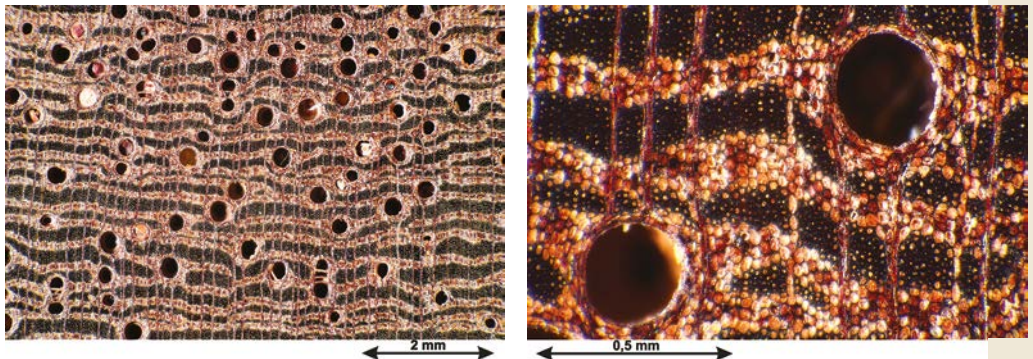
Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Cross sections of *Dicorynia guianensis*



Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Angélique». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D24 can be provided by visual grading. For Basralocus from French Guiana (known as Angélique locally), strength class D50 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. C-s1, d0

Grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with a minimal thickness of 22 mm.

Assigned according to procedures of the European standard NF EN 13501-1. Relevant European grading report N°RA05-0238D prepared by CSTB.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Sculpture
- Cooperage
- Hydraulic works (seawater)

Notes. Resistant to one or several acids.

Common names

Country	Local name
Brazil	Angelica, Angelica do para, Tapaiuna,
French Guiana	Angélique, Basralocus,
Suriname	Barakaroeballi, Basralokus



Traditional framework in Basralocus (shingles in Wallaba) – Kourou (French Guiana).

Batibatra

Family. Leguminosae (Mimosaceae)

Botanical name

Enterolobium schomburgkii Benth.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Logs are often clearly curved. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.83
Monnin hardness ⁽¹⁾	5.5
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	9.0 %
Total radial shrinkage (Rs):	4.1 %
T/R anisotropy ratio	2.2
Fibre saturation point	26 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	19,570 kJ/kg
Crushing strength ⁽¹⁾	66 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,090 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. In order to reduce the risks of casehardening, air drying must be done under cover. A high level of humidity should be maintained during kiln drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Requires power. Raised grain occurs when planing in presence of interlocked grain. Sawdust sometimes an irritant.

Assembling

Nailing/screwing. Good

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

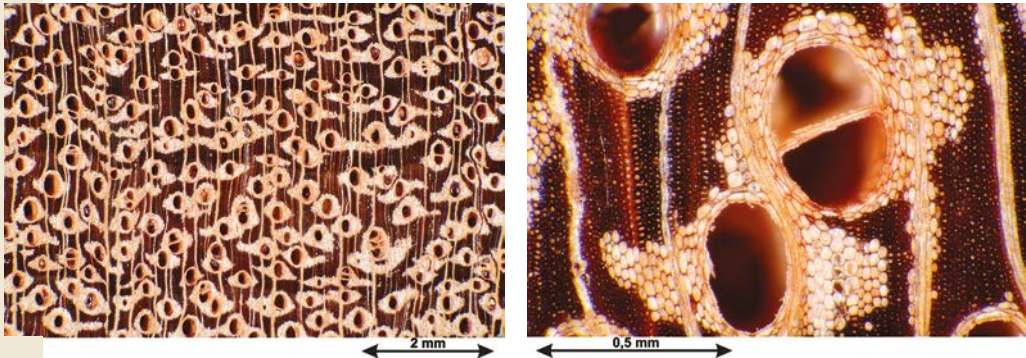
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Enterolobium schomburgkii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Brazil	Batibatra, Fava de rosca, Fava orelha de macaco, Fava orelha de negro, Genizero, Orelha de macaco, Timbauba, Timborana
French Guiana	Acacia franc, Bougou bati batra
Suriname	Tamaren prokoni



Section of flooring – Olliwood (Brazil).

Beech

Family. Fagaceae

Botanical name

Fagus sylvatica L.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Temperate western European species. Found until 60th northern parallel and up to an altitude of 1,500 metres.

Log description

Diameter. 40 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Fine

Grain. Straight to wavy

Interlocked grain. Absent

Notes. Light brown wood from cream white to pale pink sometimes with reddish areas near the heart. Thin characteristic silver figure. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density(1)	0.71
Monnin hardness(1)	4.2
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	11.6 %
Total radial shrinkage (Rs):	5.7 %
T/R anisotropy ratio	2.0
Fibre saturation point	32 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,290 kJ/kg
Crushing strength(1)	57 MPa
Static bending strength(1)	111 MPa
Longitudinal modulus of elasticity(1)	15,300 MPa

(1) at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Half-quarter sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Red heartwood is not permeable to preservation products.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. The frequent presence of growth stresses in the logs might complicate sawing (risk of splits and distortions in boards during sawing). Beech wood has a good aptitude for bending.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very absorbent wood: to be taken into account when gluing.

Commercial grading

Sawn timber appearance grading

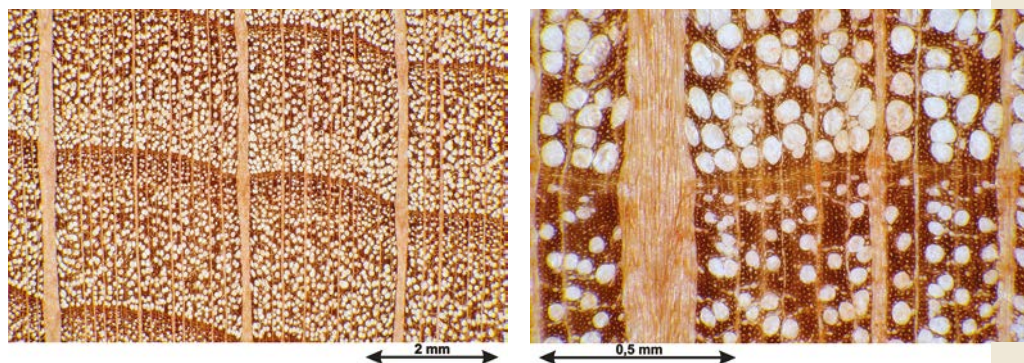
According to French standard NF EN 975-1 (April 2009)

Possible grading for boules: F-BA, F-B1, F-B2, F-B3

Possible grading for selected boards: F-SA, F-S1, F-S2, F-S3

Possible grading for strips and square edged timber: F-F1, F-F2, F-F3

Cross sections of *Fagus sylvatica*



Possible grading for pre-cut wood: F-DA, F-D1, F-D2

The letter “R” after the class indicates “red heart included”.

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes D35 and D40 can be provided by visual grading. Strength classes D18, D24, D35 and D40 can be provided by visual grading according to French standard NF B 52-001-1/A3 (2016).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Coffins
- Boxes and crates
- Veneer for back or face of plywood
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Seats
- Marquetry

Notes. Beech wood is easy to stain.

Common names

Country	Local name
Germany	Buche
Spain	Haya
France	Fayard, Hêtre
Italy	Faggio
United Kingdom	Beech



Glued laminated timber and interior décor in beech and common spruce: Les Woodies, holiday homes and technological showcase for beech wood construction, Terres de hêtre®; Communauté de communes de la Vôge, vers les rives de la Moselle, Xertigny (France).

Bété /Mansonia*

* Common commercial name

Family. Malvaceae (Sterculiaceae)

Botanical name

Mansonia altissima A. Chev.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Yellowish brown to dark grey brown with purplish glints. Veins more or less visible.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	3.8
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	7.4 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.6
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	60 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,620 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Half-quarter sawn

Quarter sawn



Notes. Although *Mansonia* displays class 1 durability against decay (very durable) in the NF EN 350 standard, it should be noted that it is sensible to *Coriolus versicolor* white rot attacks. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sawdust is considered allergenic and can have a toxic effect.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

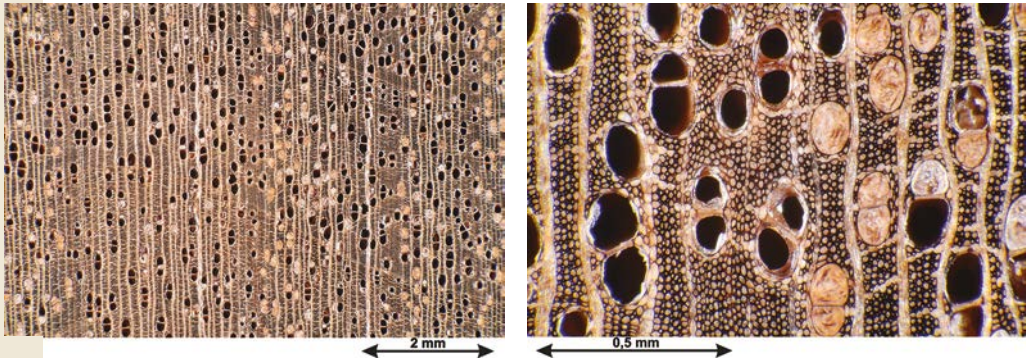
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Mansonia altissima*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shingles
- Coffins
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Moulding
- Flooring
- Sliced veneer
- Rolling shutters

Notes. Resistant to one or several acids.

Common names

Country	Local name
Cameroon	Koul
Congo	Guissépa
Côte d'Ivoire	Bété
France	Bété
Ghana	Aprono, Mansonia
Nigeria	Ofun
Central African Republic	Koul
United Kingdom	Mansonia

Bilinga / Opepe*

* Common commercial name

Family. Rubiaceae

Botanical names

Nauclea diderrichii Merr. (Syn. *Sarcocephalus diderrichii*)

(Syn. *Nauclea trillesii*). *Nauclea gillettii* Merr.

Nauclea xanthoxylon Aubrev. (Syn. *Sarcocephalus xanthoxylon*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Orange yellow

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood is a perfect golden yellow or slightly moiré orange yellow. In interior end-uses, the colour remains stable.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.76
Monnin hardness ⁽¹⁾	5.3
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	25 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	19,600 kJ/kg
Crushing strength ⁽¹⁾	63 MPa
Static bending strength ⁽¹⁾	95 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,660 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. Bilinga naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water). According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Difficult to dry due to high interlocked grain. Quartersawn recommended to reduce defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Bad

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Wood presents slight tendency to split when nailing. Wood is acidic: to be taken into account when gluing.

Commercial grading

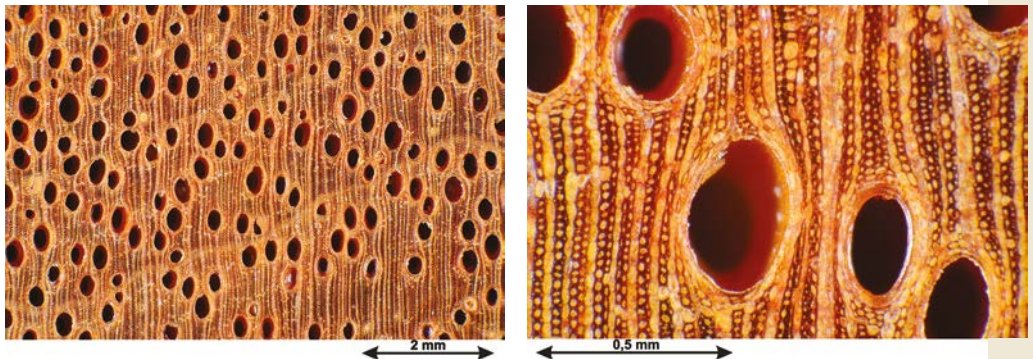
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Nauclea diderrichii*



Possible grading for short-length lumbers: choice I, choice II
 Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading. Strength class D35 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Vehicle or container flooring
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Hydraulic works (seawater)
- Sleepers

Notes. Risk of splitting in outdoor uses in dry, hot environments. Needs filling before polishing. Resistant to one or several acids.

Common names

Country	Local name
Germany	Aloma
Angola	Engolo
Benin	Opépé
Cameroon	Akondoc
Congo	Linzi, Mokessé, N’gulu-maza,
Côte d’Ivoire	Badi
Gabon	Bilinga
Ghana	Kusia
Equatorial Guinea	Aloma
Nigeria	Opepe
Uganda	Kilingi
Central African Republic	Kilu
Democratic Republic of Congo	N’gulu-maza, Bonkingu
United Kingdom	Opepe
Sierra Leone	Bundui



Glued laminated indoor structure at the Mary Queen of the Apostles Basilica in Yaoundé (Cameroon)

Billian

Family. Lauraceae

Botanical name

Eusideroxylon zwageri Teijsm. & Binn.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 4 to 9 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood pale yellowish. Heartwood yellow/brown to reddish yellow/brown, deepening, with greenish tinge, lustrous. Lemon scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.93
Monnin hardness ⁽¹⁾	7.9
Coefficient of volumetric shrinkage	0.64 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	86 MPa
Static bending strength ⁽¹⁾	143 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,690 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its hardness and high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. This species of wood requires strong steaming necessary before slicing.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

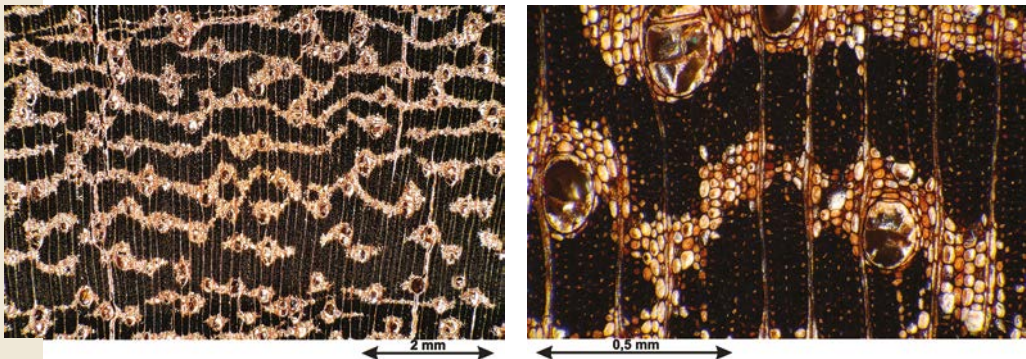
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Eusideroxylon zwageri*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Heavy carpentry
- Vehicle or container flooring
- Exterior joinery
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. Substitute for Greenheart and Azobe (Eki).

Common names

Country	Local name
Indonesia	Belian, Billian, Onglen, Ulin, Sakan
Philippines	Tambulian

Bintangor

Family. Calophyllaceae (Clusiaceae)

Botanical names

Calophyllum ferrugineum Ridl.
Calophyllum inophyllum L.
Calophyllum neo-ebudicum Guillaumin
Calophyllum papuanum Lauterb.
Calophyllum teysmannii Miq.
Calophyllum vitiense Turrill
Calophyllum p.p.

Continent. Asia, Oceania, Madagascar

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark red

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood dark red to brown red or pinkish brown, with darker veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	5.7
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.3
Fibre saturation point	31 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	19,090 kJ/kg
Crushing strength ⁽¹⁾	66 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable



Half-quarter sawn



Quarter sawn

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. Risk of end checks. It is recommended to stack the piles in the alignment of spacer sticks in order to avoid warping.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Risks of internal stresses. Tendency to woolliness. Filling is recommended to obtain a good finish.

Assembling

Nailing/screwing. Good but pre-boring necessary

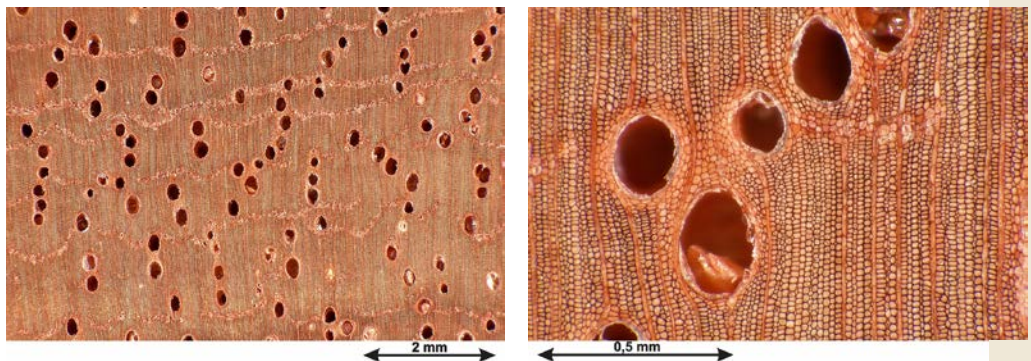
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Calophyllum inophyllum*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Formwork
- Ship building (planking and deck)
- building (ribs)
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Notes. Can be used for high-end furniture if the grain is not highly interlocked.

Common names

Country	Local name
Solomon Islands	Koila
India	Poona, Pumma, Punna, Vumma, Pinnay, Poonnai
Indonesia	Bintangur
Magadascar	Vintanina
Malaysia	Bintangor, Penaga,
Myanmar	Sultan champa, Tharapi
New Caledonia	Tamanou
Papua New Guinea	Calophyllum
Philippines	Bansanghal, Vutalau
Sri Lanka	Domba-gass
Thailand	Kathing, Poon, Tanghon
Vanuatu	Tamanou
Viet Nam	Cong, Mu-u



Utility door, CIRAD wood workshop, Montpellier (France).

Bitis

Family. Sapotaceae

Botanical names

Madhuca betis J.F. Macbr.

Madhuca utilis H.J. Lam

Madhuca p.p.

Mimusops elengi L.

Payena leerii Kurz

Payena obscura Burck

Payena p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. This commercial species covers three genera and several species with properties which vary from one genus or species to another.

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 4 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood pale yellowish. Heartwood reddish brown to red/chocolate brown, slightly lustrous. Very thin silver figure. Silica deposits. Sour smell when fresh.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.85
Monnin hardness ⁽¹⁾	6.4
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	5.6 %
T/R anisotropy ratio	1.2
Fibre saturation point	%
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	90 MPa
Static bending strength ⁽¹⁾	154 MPa
Longitudinal modulus of elasticity ⁽¹⁾	29,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Half-quarter sawn

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. Variable durability according to the species and genus.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

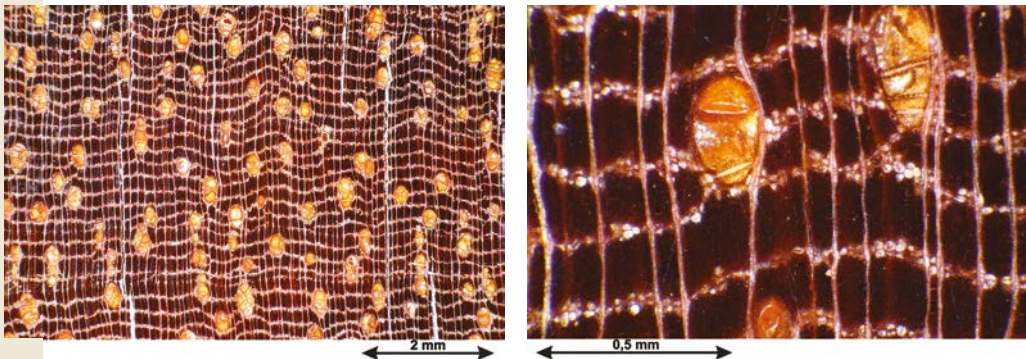
Notes. Important dulling effect due to high silica content.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Madhuca longifolia*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Tool handles (resilient woods)
- Exterior joinery
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Sleepers

Notes. Due to its appearance and properties, Bitis can be a substitute for outdoor species such as Makore, Moabi, Mukulungu and Greenheart.

Common names

Country	Local name
Indonesia	Mahua
Malaysia	Bitis
Philippines	Betis, Maloba

Black Locust

Family. Leguminosae (Fabaceae)

Botanical name

Robinia pseudoacacia L.

Continent. North America, Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Black Locust was first found in the eastern United States and brought to Europe by Jean Robin in the 17th century. It is frequently called "Acacia", which is a source of confusion. The name «Acacia» must be used only for woods of the *Acacia* genus (tropical species). Some of them, from plantations, are arriving on the European market today (i.e. *Acacia mangium*, see corresponding sheet).

Log description

Diameter. 15 to 50 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Not applicable

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Yellow to greenish yellow when freshly cut, heartwood comes darker and rapidly takes a golden brown shade sometimes quite dark.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	9.5
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,560 kJ/kg
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	126 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,900 MPa

(1) at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable



Flat sawn

Quarter sawn



Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. It is the only temperate hardwood introduced in Europe which naturally covers the use class 4. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

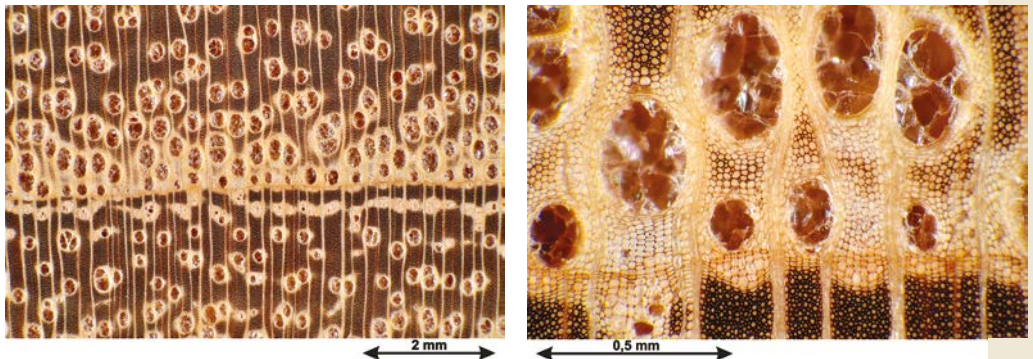
Notes. Black Locust has a good aptitude for bending.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Wood prone to splits.

Cross sections of *Robinia pseudoacacia*



Commercial grading

Sawn timber appearance grading

No conventional grading rules for this species.
Sawn products are graded according to final uses.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Framing at a nursery (wood in direct contact with the ground), Pépinière Filippi, Mèze (France).

Main end uses

- Pit props
- Shipbuilding
- Tool handles (resilient woods)
- Stakes
- Sliced veneer
- Decking
- Exterior panelling
- Marquetry
- Hydraulic works (fresh water)

Common names

Country	Local name
Germany	Falsche akazie, Robinie
Spain	Robinia
United States	Black locust
France	Acacia, Robinier
Italy	Robinia
United Kingdom	False acacia, Robinia

Bodioa

Family. Rhizophoraceae

Botanical names

Anopyxis klaineana Engl. (Syn. *Anopyxis ealaensis*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. n.d.

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood light brown with pink or ochre shades. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.89
Monnin hardness ⁽¹⁾	7.0
Coefficient of volumetric shrinkage	0.65 % per %
Total tangential shrinkage (Ts):	10.3 %
Total radial shrinkage (Rs):	6.2 %
T/R anisotropy ratio	1.7
Fibre saturation point	30 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	17,740 kJ/kg
Crushing strength ⁽¹⁾	75 MPa
Static bending strength ⁽¹⁾	132 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,290 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Prone to blue stain.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

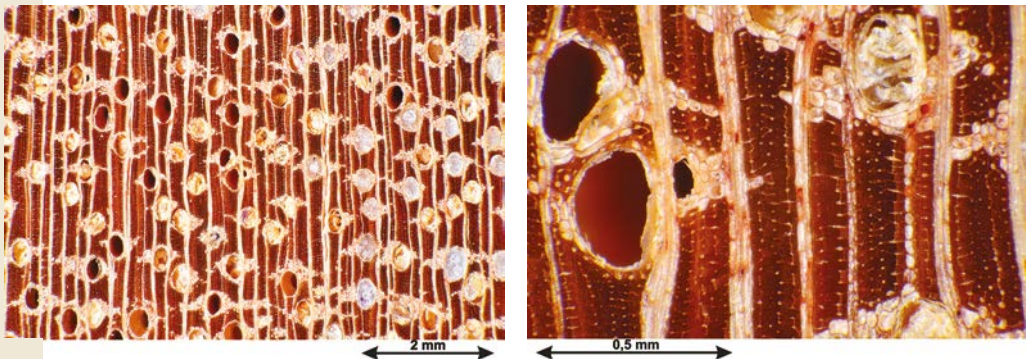
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Anopyxis klaineana*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Industrial or heavy flooring
- Sliced veneer

Common names

Country	Local name
Cameroon	Noudougou
Congo	Pamiel
Côte d'Ivoire	Bodioa
Gabon	Évam
Ghana	Kokoti
Nigeria	Ekiawa, Otutu
Central African Republic	Moboma
Democratic Republic of Congo	Bobenkusu
Sierra Leone	Kpomusi

Bomanga / Ariella*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Brachystegia laurentii Louis

Brachystegia mildbraedii Harms (Syn. *Brachystegia nzang*)

Brachystegia zenkeri Harms

Brachystegia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 10 to 15 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood very wide and easily attacked by insects. Wood light brown, with copper brown veins. Possible wind shakes (internal fractures in wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.56
Monnin hardness ⁽¹⁾	2.9
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	6.0 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.6
Fibre saturation point	28 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	19,220 kJ/kg
Crushing strength ⁽¹⁾	49 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,400 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Wood soft to fairly hard.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. A preservation treatment is recommended as sawnwoods often contain sapwood.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

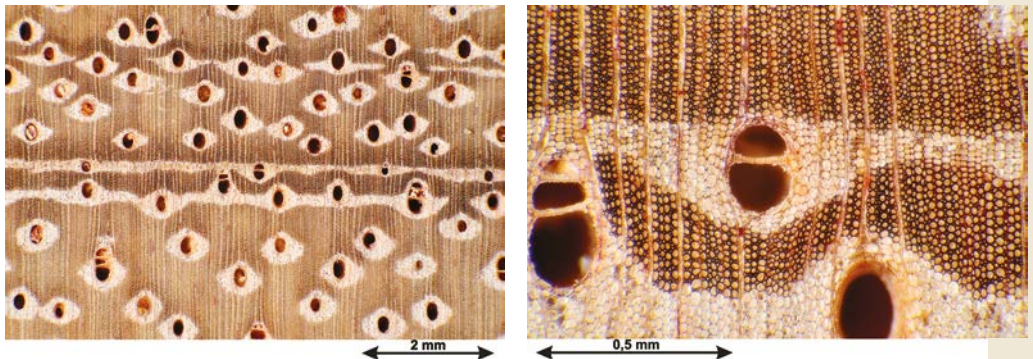
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Brachystegia laurentii*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Fibre or particle boards
- Flooring
- Sliced veneer
- Cooperage

Common names

Country	Local name
Cameroon	Ékop-évène, Ékop-léké
Congo	Bomanga
France	Ariella, Bomanga
Gabon	Nzang, Yegna
Democratic Republic of Congo	Bomanga
United Kingdom	Ariella

Bubinga

Family. Leguminosae (Caesalpinaceae)

Botanical names

Guibourtia demeusei J. Léonard

Guibourtia pellegriniana J. Léonard

Guibourtia tessmannii J. Léonard

Continent. Africa

CITES (Washington Convention of 2017)

The 3 Bubinga species are listed in CITES Appendix II

Log description

Diameter. 90 to 150 cm

Thickness of sapwood. 2 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pink or reddish brown, with some fine purplish red veins. Some brown veins. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.92
Monnin hardness ⁽¹⁾	10.2
Coefficient of volumetric shrinkage	0.62 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.4
Fibre saturation point	24 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	19,750 kJ/kg
Crushing strength ⁽¹⁾	76 MPa
Static bending strength ⁽¹⁾	137 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,180 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from hard to very hard.

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable



Half-quarter sawn



Quarter sawn

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended to avoid defects.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Care is needed in presence of irregular grain. Very decorative veneers.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

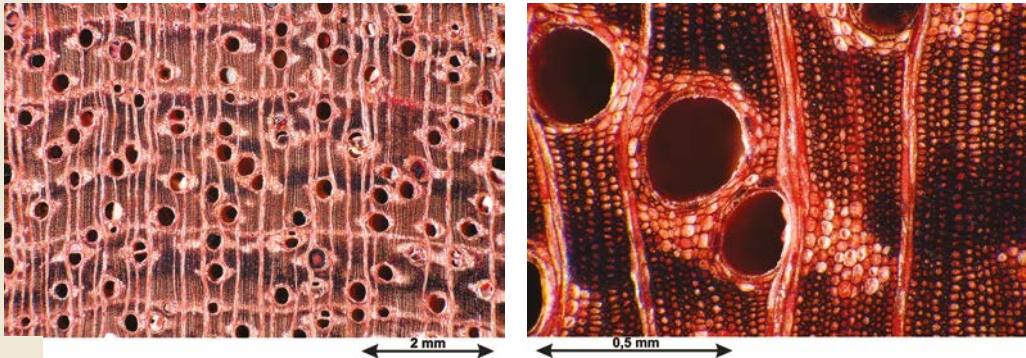
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Guibourtia tessmannii*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

• For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.



Bubinga Ravier® crystal door (solid wood and acrylic glass assembly), Amstelveen (Netherlands) – Made by Ravier SARL, Domblans (France).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Seats
- Sleepers

Common names

Country	Local name
Cameroon	Bubinga, Essingang
Congo	Lianu
United States	Akume
Gabon	Ébana, Kévazingo
Equatorial Guinea	Ovèng
Democratic Republic of Congo	Waka

Bungur

Family. Lythraceae

Botanical name

Lagerstroemia p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 6 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Important risks of logs splitting. Sometimes wood presents pink or grey shades. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.7
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.6
Fibre saturation point	26 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	63 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,690 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of cracks in large boards.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. The wavy grain may be problematic for planing and result in fuzzy surfaces.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

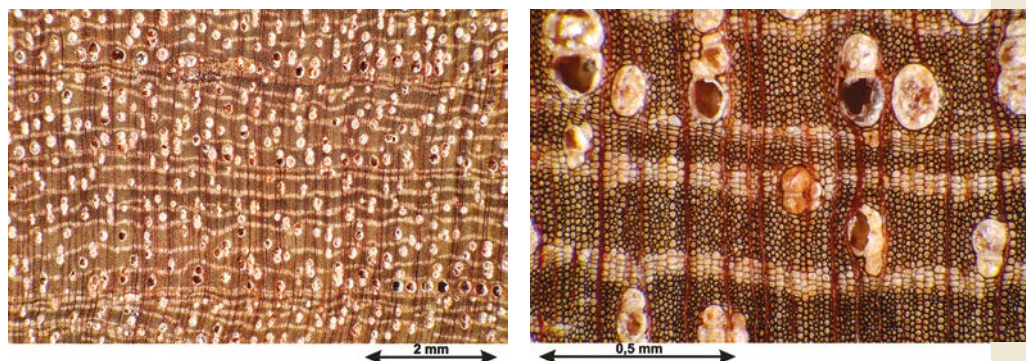
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Lagerstroemia speciosa*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Sculpture
- Cooperage

Common names

Country	Local name
Cambodia	Sralao
India	Bangor, Benteak, Jarul, Nandi, Ventaku, Ventak, Venteak, Venthek
Indonesia	Bungur
Laos	Mai puay
Malaysia	Bungor, Kabek
Myanmar	Jarul, Pyinma
Philippines	Banaba
Thailand	Intanin, Salao, Tabek
Viet Nam	Bang lang

Cambara

Family. Vochysiaceae

Botanical names

Erisma nitidum DC.

Erisma uncinatum Warm.

Erisma p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 4 to 14 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Occasional presence of internal stresses. Wood pink brown, more or less dark, sometimes with red or purplish shades.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	2.7
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	9.3 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	2.1
Fibre saturation point	30 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	18,880 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,520 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

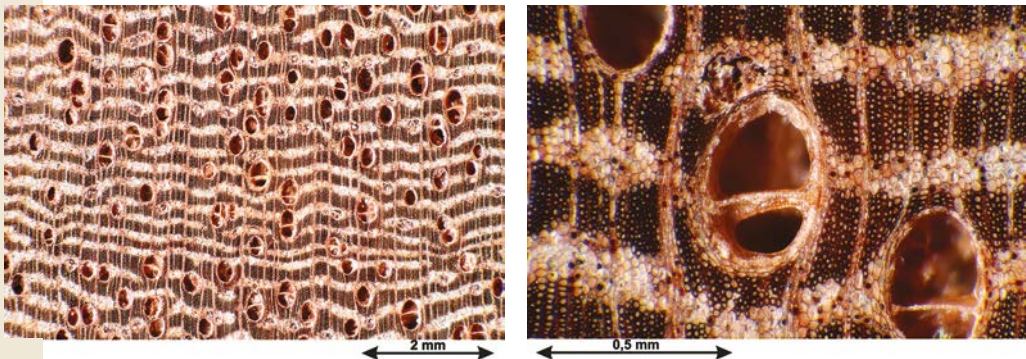
In French Guiana, the local name of this species is «Jaboty». Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to European standard EN 1912 (2012) and associated with French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Cross sections of *Erisma uncinatum*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Marquetry

Common names

Country	Local name
Brazil	Cambara, Cedrinho, Jaboty, Quaruba tinga, Quaruba vermelha, Quarubarana
French Guiana	Felli kouali, Jaboty, Manonti kouali
Peru	Cambara
Suriname	Singri-kwari
Venezuela	Mureillo

Cardeiro

Family. Malvaceae (Bombacaceae)

Botanical name

Scleronema micranthum Ducke

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Frequent presence of traumatic canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	3.3
Coefficient of volumetric shrinkage	0.67 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.4 %
T/R anisotropy ratio	1.9
Fibre saturation point	28 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,920 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	100 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,140 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

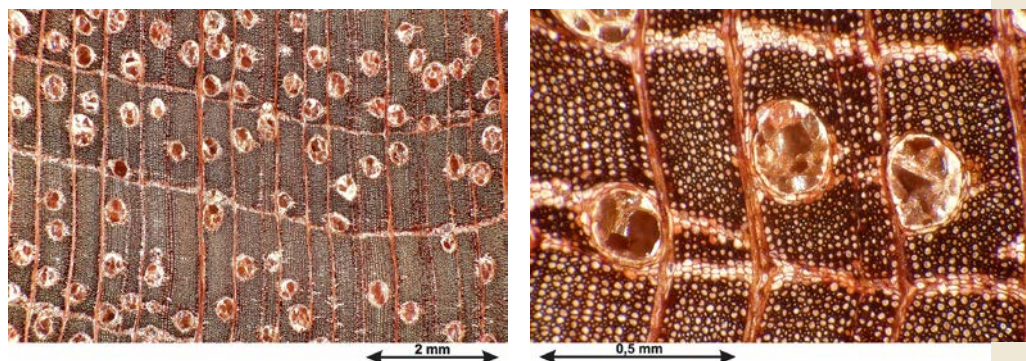
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Scleronema micranthum*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Heavy carpentry
- Veneer for interior of plywood
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Flooring

Notes. Decorative end-uses are not recommended due to frequent traumatic canals.

Common names

Country	Local name
Brazil	Cardeiro, Castanha de paca, Cedrinho, Cedro bravo, Cordeiro
Colombia	Castañó, Yolombo

Caribbean Pine

Family. Pinaceae

Botanical name

Pinus caribaea Morelet

Continent. Africa, Latin America, Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to Central America and the Caribbean, this fast-growing species has been widely planted throughout the tropical and subtropical world. Woods presently commercialised are almost exclusively from plantations.

Log description

Diameter. 25 to 50 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Pale yellow to yellow brown wood. When wood has a lot of resin there is frequently a reddish brown area forming a star shape at the heart of the log. This shape is sometimes considerable.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.58
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	7.1 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.9
Fibre saturation point	28 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	19,070 kJ/kg
Crushing strength ⁽¹⁾	45 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,600 MPa

(1) at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties of Caribbean Pine vary greatly according to the origin and age of the trees. Specific gravity varies from less than 0.4 to over 0.8.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable



Flat sawn



Quarter sawn

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. However this standard refers to woods from natural plantings whose durability is higher than that of planted trees, especially when they are young. Wood is usually used with sapwood, which is permeable to preservation products.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid to normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

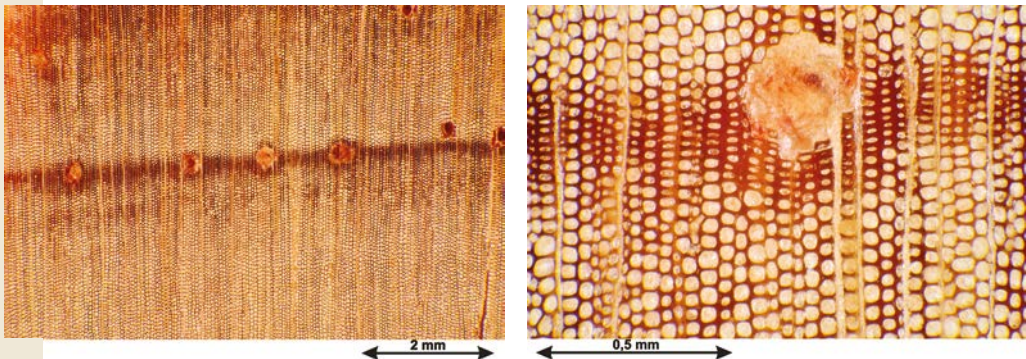
Notes. Risks of clogging of saw blades, tools, work surfaces and feeding devices due to resin.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Resin exudations: to be taken into account when gluing.

Cross sections of *Pinus caribaea*



Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C18 and C24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Heavy carpentry
- Formwork
- Boxes and crates
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Poles
- Exterior panelling

Common names

Country	Local name
Cuba	Pino macho
United States	Caribbean pine
France	Caribbean Pine
Honduras	Pitch pine, Pino veta, Pitchpin
Nicaragua	Ocote, Pitchpin
New Caledonia	<i>Pinus</i>
French Polynesia	Pin de Polynésie



Mesh cladding on Hienghène city hall – By: Les Charpentiers du Nord (New Caledonia).

Castanheiro

Family. Lecythidaceae

Botanical name

Bertholletia excelsa Bonpl.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Presence of traumatic canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.77
Monnin hardness ⁽¹⁾	4.4
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	2.0
Fibre saturation point	26 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	89 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,950 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended in order to reduce the risks of casehardening for thick material.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

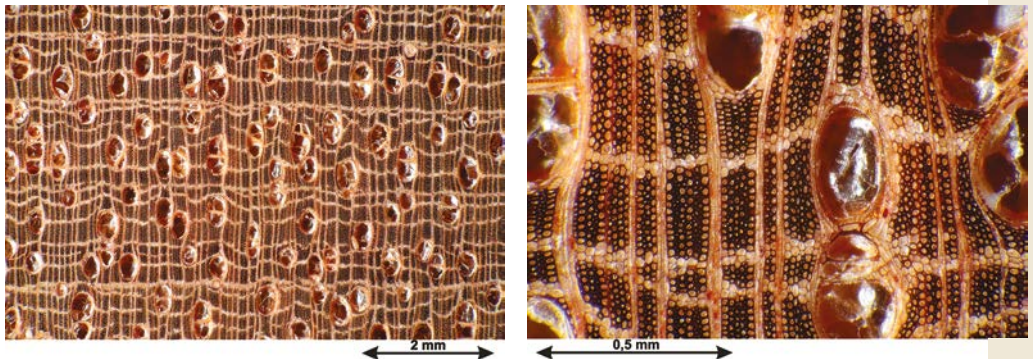
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Bertholletia excelsa*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Common names

Country	Local name
Brazil	Castanha do Brasil, Castanha do para, Castanheiro
Colombia	Castaña, Castana del maranon, Castana del maranhao, Nuez del Brazil
Venezuela	Brazil nut, Jubia

Catucaém / Louro faia*

* Common commercial name

Family. Proteaceae

Botanical name

Roupala brasiliensis Klotzsch

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. 1 to 4 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight to entangled

Interlocked grain. Absent

Notes. Sapwood light reddish brown. Heartwood reddish brown to dark brown. Very characteristic silver figure due to wide and high rays.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.1
Coefficient of volumetric shrinkage	0.69 % per %
Total tangential shrinkage (Ts):	12.3 %
Total radial shrinkage (Rs):	6.3 %
T/R anisotropy ratio	2.0
Fibre saturation point	24 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	-59 MPa
Static bending strength ⁽¹⁾	-103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	-15,160 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 3 - not in ground contact, outside



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Risks of splitting during machining.

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

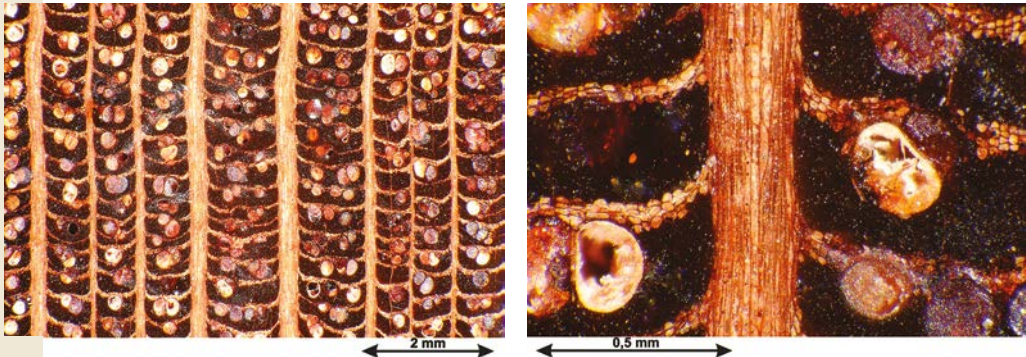
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Roupala brasiliensis*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Catucaém is popular for turnery and cabinet work due to very marked silver figure.

Common names

Country	Local name
Brazil	Carvalho, Carvalho do brazil, Catucaém, Louro faia
Costa Rica	Danto carne
Ecuador	Roble
Panama	Arbol carne
Venezuela	Chaparro

Cedar

Family. Pinaceae

Botanical name

Cedrus atlantica Manetti

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Comes from North Africa. Introduced in France in the middle of the 19th century. It is used for reforestation across Southern Europe.

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 4 to 10 cm

Buoyancy. Not applicable

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Yellow brown to reddish brown. Cedar's odour is strong and characteristic. It lasts a long time. A thin brown silver figure is visible with the naked eye on the quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.51
Monnin hardness ⁽¹⁾	2.4
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	6.0 %
Total radial shrinkage (Rs):	4.1 %
T/R anisotropy ratio	1.5
Fibre saturation point	28 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	19,120 kJ/kg
Crushing strength ⁽¹⁾	42 MPa
Static bending strength ⁽¹⁾	82 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. Use class 3 only covers wood components without sapwood. This species is listed in the NF EN 350 standard (May 2013). According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Small, very hard knots are present in the wood. Cedar yields good results in turnery.

Assembling

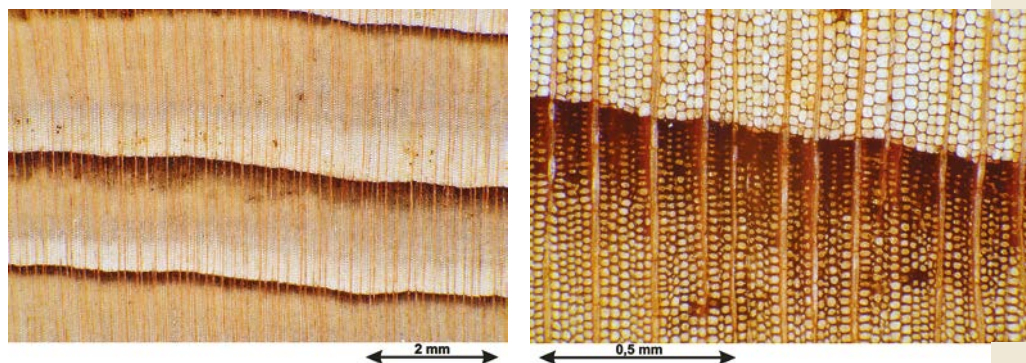
Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

No conventional grading rules. Sawn products are graded according to final uses.

Cross sections of *Cedrus atlantica*



Fire safety

Conventional French grading

Thickness > 18 mm: M3
(moderately flammable)

Thickness < 18 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Exterior joinery
- Interior joinery
- House framing
- Sliced veneer
- Exterior panelling
- Marquetry

Notes. This wood is interesting for structures requiring a good durability as well as a low density.

Common names

Country	Local name
Germany	Atlantische zeder
Spain	Cedro del Atlas
France	Cèdre de l'Atlas
Italy	Cedro dell'Atlante
United Kingdom	Atlas cedar



Finely crafted Moroccan console table, Vendôme (France).

Cedro

Family. Meliaceae

Botanical names

Cedrela angustifolia Moc. & Sessé

Cedrela fissilis Vell.

Cedrela odorata L. (Syn. *Cedrela mexicana*)

Continent. Latin America

CITES (Washington Convention of 2017)

Cedrela fissilis (Bolivia, Brazil) and *Cedrela odorata* (Brazil, Bolivia) are listed in CITES Appendix III for logs, sawn wood and veneer sheets. In addition, Colombia, Guatemala and Peru have listed their national populations in Appendix III.

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Distinctive cedar scent. Sporadic or sometimes important resin stains. Colour variable, from pink to red brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.46
Monnin hardness ⁽¹⁾	1.6
Coefficient of volumetric shrinkage	0.38 % per %
Total tangential shrinkage (Ts):	6.0 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	1.5
Fibre saturation point	29 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	19,400 kJ/kg
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	62 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,210 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Specific gravity of Cedro varies depending on the country of origin.

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. The different species of Cedro are listed in the NF EN 350 standard. Part of the Cedro sold in the world today comes from young plantations often constituted by woods with properties inferior to the wood in natural forests. These juvenile woods present an incomplete duraminisation which explains their lower natural durability compared to the durability of more mature woods. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. Light wood must be dried at low temperature to prevent risks of collapse.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

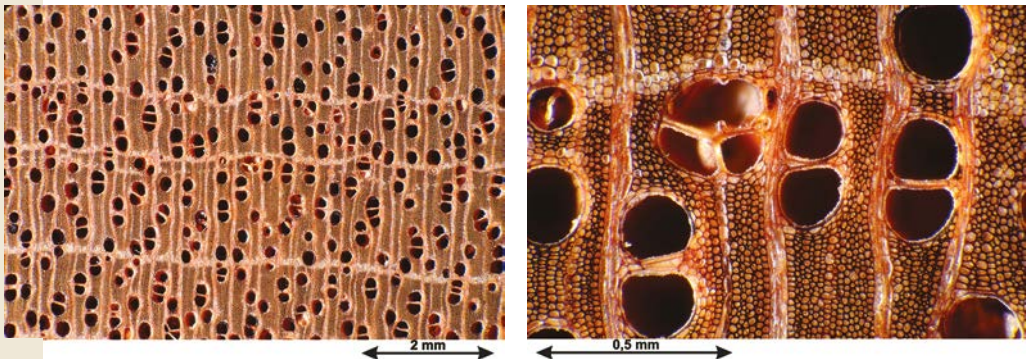
Notes. The presence of resin may cause the clogging of saw blades. Surface sometimes fuzzy.

Assembling

Nailing/screwing. Poor

Notes. Resin exudations: to be taken into account when gluing.

Cross sections of *Cedrela odorata*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Cigar boxes
- Framing
- Formwork
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Boxes and crates
- Veneer for back or face of plywood
- Musical instruments
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Fibre or particle boards
- Sliced veneer
- Sculpture
- Seats
- Marquetry

Notes. Mentioned end-uses depend on the specific gravity and on the importance of resin (especially for furniture and interior joinery).

Common names

Country	Local name
Argentina	Cedro
Brazil	Cedro
Colombia	Cedro
French Guiana	Cedro, Cedrat
Guyana	Red Cedar
Honduras	Cedro, Cigarbox
Mexico	Cedro
Panama	Cedro
Suriname	Ceder
Venezuela	Cedro



Flat sawn

Half-quarter sawn



Cerejeira

Family. Leguminosae (Fabaceae)

Botanical name

Amburana cearensis A.C. Sm.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Scent of Cerejeira similar to vanilla. Wood sometimes veined.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.59
Monnin hardness ⁽¹⁾	2.7
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	4.5 %
Total radial shrinkage (Rs):	2.4 %
T/R anisotropy ratio	1.9
Fibre saturation point	19 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	45 MPa
Static bending strength ⁽¹⁾	73 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,980 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Significant risk of casehardening for thicknesses over 50 mm.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

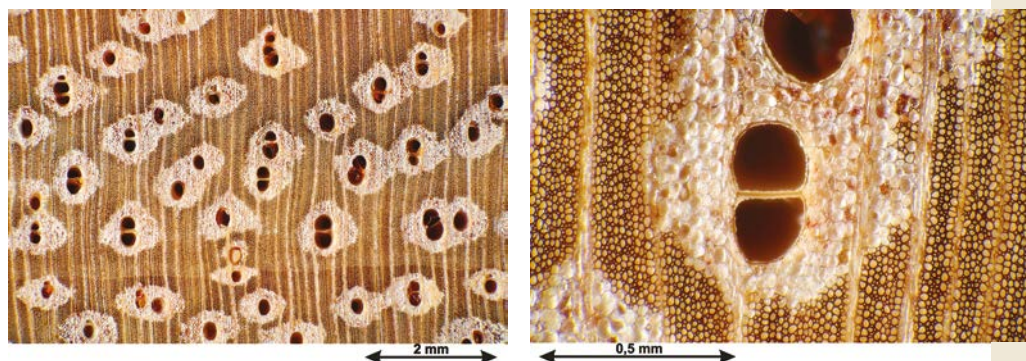
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Amburana cearensis*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Sliced veneer
- Sculpture
- Cooperage

Notes. Filling is recommended.

Common names

Country	Local name
Argentina	Palo trébol, Roble, Roble criollo, Roble del país, Trébol
Bolivia	Roble americano, Soryoko
Brazil	Amburana, Cerejeira, Cumarú de cheiro, Imburana
Paraguay	Trébol
Peru	Ishpingo, Siroco

Chengal

Family. Dipterocarpaceae

Botanical names

Neobalanocarpus heimii P.S. Ashton (Syn. *Balanocarpus heimii*)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 150 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Heartwood varies from brown olive to red brown. Presence of slight resinous areas.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	7.5
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	7.4 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	2.5
Fibre saturation point	18 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	75 MPa
Static bending strength ⁽¹⁾	134 MPa
Longitudinal modulus of elasticity ⁽¹⁾	24,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hard wood.

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Presence of resin can cause clogs in machining.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Presence of resin and hard wood: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

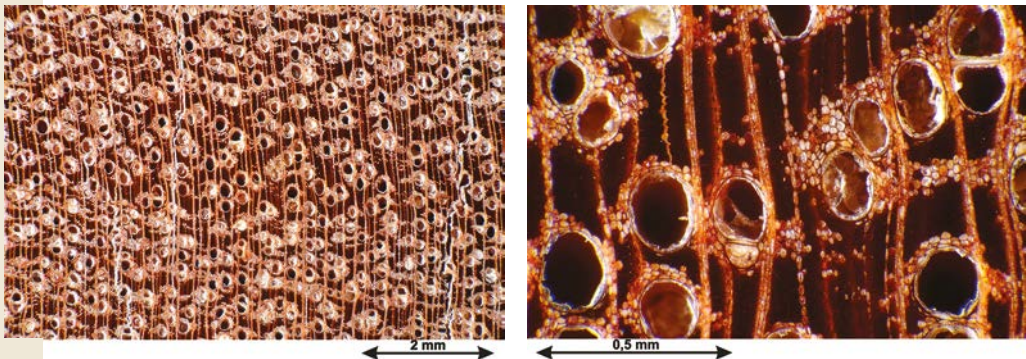
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Neobalanocarpus heimii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Exterior joinery
- Interior joinery
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Sleepers

Common names

Country	Local name
Indonesia	Penak-bunga, Penak-sabut, Penak-tembaga
Malaysia	Chengal
Thailand	Takian chan

Cherry Wood

Family. Rosaceae

Botanical names

Cerasus avium Moench (Syn. *Prunus avium*)

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 35 to 60 cm

Thickness of sapwood. 2 to 6 cm

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Orange yellow

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Yellow brown to reddish brown, sometimes veined, the wood tends to become darker and to have a golden shade with time. The texture is fine to medium for wild trees and medium for orchard trees. Sometimes slightly wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	4.3
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	8.4 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.6
Fibre saturation point	25 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	17,020 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	95 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,200 MPa

(1) at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Flat sawn

Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Cherry wood has a good aptitude for bending.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Acidic glues may cause a lasting stain of the wood.

Commercial grading

Sawn timber appearance grading

No conventional grading rules apply to Cherry wood. Sawn products are graded according to final uses.

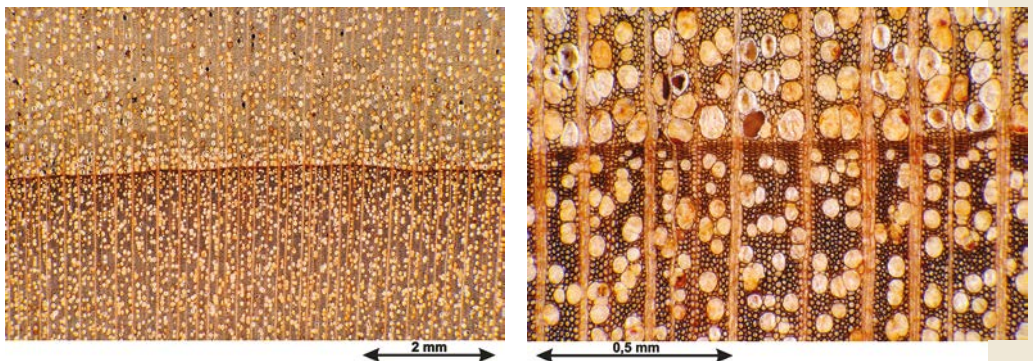
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Cerasus avium*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Interior joinery
- Sliced veneer
- Sculpture

Common names

Country	Local name
Germany	Wildkirsche
Spain	Cerezo silvestre
France	Merisier
Italy	Ciliego selvatico
United Kingdom	Wild cherry

Dresser in solid Cherry wood, Vailly-sur-Sauldre (France).



Chestnut

Family. Fagaceae

Botanical name

Castanea sativa Mill.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 25 to 60 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Not applicable

Log conservation. Good

Wood description

Reference colour. Light yellow

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Light yellow to yellowish brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	2.9
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	18,270 kJ/kg
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	71 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Durability is linked to the presence of water soluble tannins. It decreases with the washing of tannins in cases of exposure to



Flat sawn



Quarter sawn

harsh conditions. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Occasional risk of pockets of humidity.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Wood easy to split (manufacturing of split shingles).

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Chestnut wood splits very easily; precautions must be taken for nailing (small nail diameter, no nails near the ends) and screwing (pre-holes necessary). Nail or screw corrosion if in contact with humidity due to wood acidity.

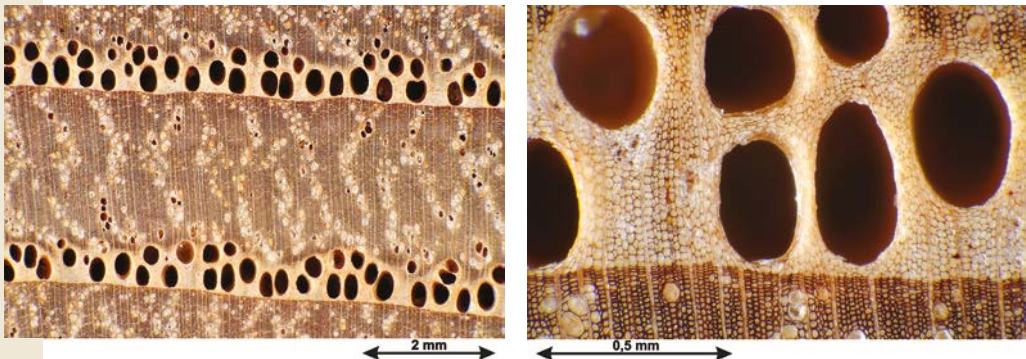
Commercial grading

Sawn timber appearance grading

According to French standard NF B53-801 (2013)

Possible grading for boules: C-BA, C-B1, C-B2

Cross sections of *Castanea sativa*



Possible grading for selected boards: C-SA, C-S1, C-S2

Possible grading for strips and square edged timber: C-FA, C-F1, C-F2, C-F3

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D24 can be provided by visual grading. Strength classes C18 and C24 can also be provided by visual grading according to French standard NF B 52-001-1/A3 (2016).



Triple-lapped chestnut roof shingles on the home and workshop of Jean-Noël Duchemin ('pêcheur de tons'), Beuzec-Cap-Sizun (France)

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Coffins
- Heavy carpentry
- Cabinetry (high-end furniture)
- Panelling
- Exterior joinery
- Interior joinery
- Fibre or particle boards
- Flooring
- Stakes
- Sliced veneer
- Exterior panelling
- Cooperage

Notes. Risk of tannin smudges on woods if not well dried or if processed in a non-protected area or if no product is used for protection or finish.

Common names

Country	Local name
Germany	Edelkastanie, Kastanienbaum
Spain	Castaño
France	Châtaignier
Italy	Castagno
United Kingdom	Chestnut, Sweet chestnut

Chicha

Family. Malvaceae (Sterculiaceae)

Botanical names

Sterculia pruriens K. Schum.

Sterculia rugosa R. Br.

Sterculia speciosa K. Schum.

Sterculia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	10.1 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	2.0
Fibre saturation point	34 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	17,690 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	93 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,690 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Fuzzy surface. To obtain a good finish, sharp cutters are recommended.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

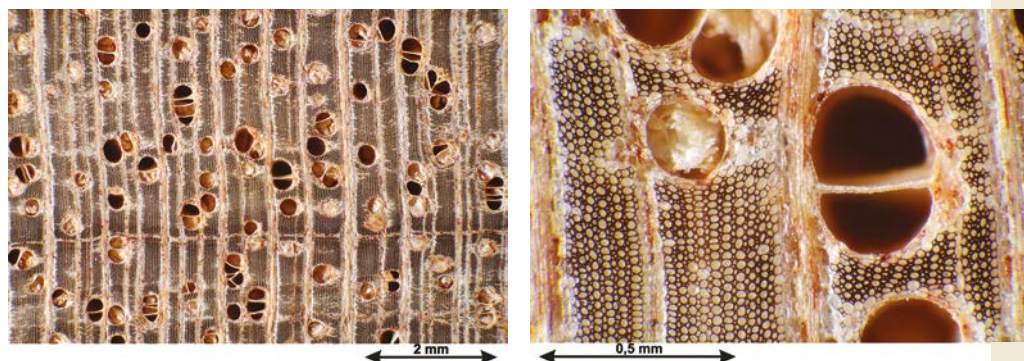
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Sterculia pruriens*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Coffins
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Fibre or particle boards
- Flooring
- Sliced veneer
- Pulp
- Seats

Common names

Country	Local name
Bolivia	Mani
Brazil	Achicha, Chicha, Tacacazeiro
Colombia	Camajura
Cuba	Anacaguita
Ecuador	Cacao de mote, Sapote, Saput, Zapote
Guyana	Maho
French Guiana	Kobé
Mexico	Bellota, Chiapas
Peru	Huarmi-caspi, Zapote silvestre
Puerto Rico	Anacaguita
Suriname	Jahoballi, Kobehe, Okro-oedoe
Trinidad and Tobago	Mahoe
Venezuela	Camoruco, Mayagua, Sunsun

Coconut Wood

Family. Arecaceae

Botanical name

Cocos nucifera L.

Continent. Africa, Latin America, Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Coconut Tree is a monocotyledon. The material of the stipe (trunk) is falsely called wood by analogy with Gymnosperms' and Angiosperms' wood. It has neither sapwood nor heartwood. Only the outlying crown has characteristics similar to that of wood.

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Absent

Texture. Coarse

Grain. Straight to entangled

Interlocked grain. Absent

Notes. Beige to pinkish beige, punctuated with or criss-crossed by red-brown to dark brown fibres, whatever the sawing angle. Proportion of fibre grows from the heart to the outer of the stem. All this together gives this species a very distinctive brown red look.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.90
Monnin hardness ⁽¹⁾	8.3
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	6.1 %
Total radial shrinkage (Rs):	5.6 %
T/R anisotropy ratio	1.1
Fibre saturation point	23 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	18,640 kJ/kg
Crushing strength ⁽¹⁾	60 MPa
Static bending strength ⁽¹⁾	82 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Stem with a very soft and fibrous heart with a great variation of density (along with other properties) from the heart to the periphery (in a ratio of 1 to 5 for density). The material giving the best properties is at the periphery of the stem.



Flat sawn

Flat sawn



This peripheral part has the same end-uses as wood. The indicated values are those of the material taken from this zone.

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2-3 - poorly to moderately permeable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Durability and permeability to preservative products vary greatly with density: wood is denser at the periphery, more durable but less permeable.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

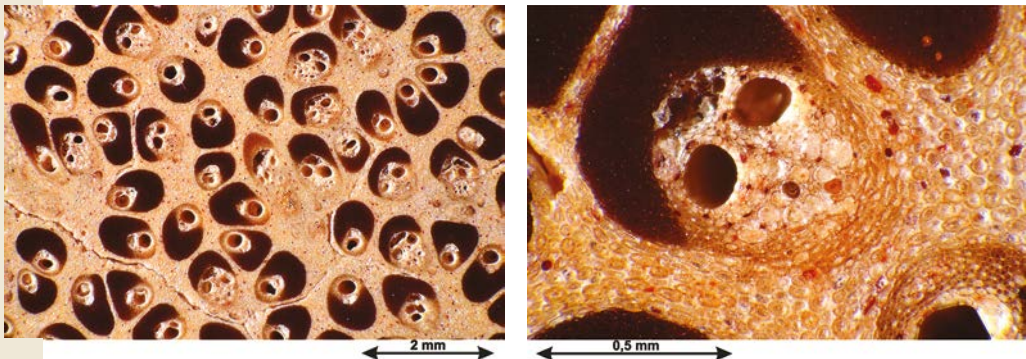
Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Variable density from the heart (< 0,25), which is unusable, to the periphery (> 1). Log turning sawing – with taking of the peripheral stocks only – is compulsory to obtain pieces with homogeneous characteristics. The silica content can be high to very high. Entangled fibres make it difficult to obtain a quality finish.

Cross sections of *Cocos nucifera*



Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

Grading according to final uses.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shingles
- Framing
- Cabinetry (high-end furniture)
- Insulation
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Flooring
- Industrial or heavy flooring
- Marquetry

Notes. Only the heart, very soft and very fibrous, can be used for isolation.

Common names

Country	Local name
Brazil	Coqueiro
Spain	Cocotero
United States	Coconut, Cocowood
France	Cocotier
Gabon	Mbanga
Indonesia	Kelapa
Malaysia	Kelapa
Mexico	Cocotero
Philippines	Niog
Portugal	Coqueiro
United Kingdom	Coconut
Viet Nam	Dua



Coconut sheathing on ceiling frame (*Pinus caribaea*) (New Caledonia).

Congotali

Family. Sapotaceae

Botanical name

Letestua durissima Lecomte

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Possible presence of wind shakes (internal fractures in wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.10
Monnin hardness ⁽¹⁾	15.1
Coefficient of volumetric shrinkage	0.73 % per %
Total tangential shrinkage (Ts):	10.8 %
Total radial shrinkage (Rs):	7.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	23 %
Thermal conductivity (λ)	0.35 W/(m.K)
Lower heating value	20,160 kJ/kg
Crushing strength ⁽¹⁾	92 MPa
Static bending strength ⁽¹⁾	190 MPa
Longitudinal modulus of elasticity ⁽¹⁾	26,700 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently



Flat sawn



Quarter sawn

or regularly submerged in salt water, sea water or brackish water) due to its high density and high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Must be sawn with the highest moisture content possible.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

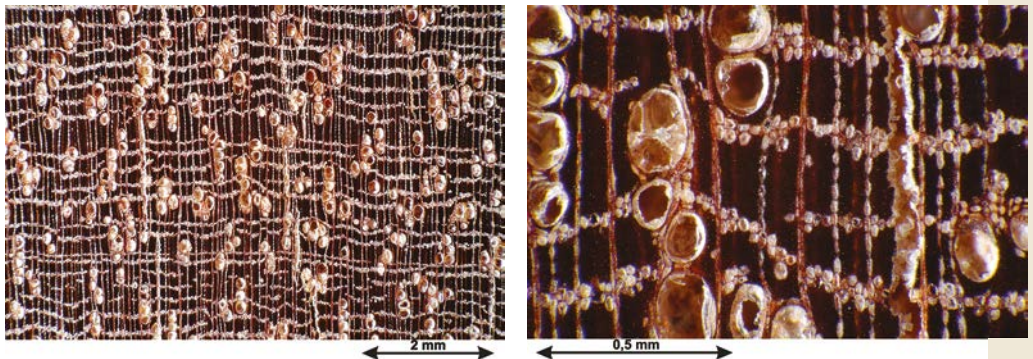
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Letestua durissima*



Possible grading for short-length lumbers: choice I, choice II
 Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Hydraulic works (fresh water)
- Sleepers

Notes. This wood can be used as a substitute for Azobé (*Lophira alata*).

Common names

Country	Local name
Congo	Congotali
Gabon	Kong-afane

Copaiba

Family. Leguminosae (Caesalpinaceae)

Botanical names

Copaifera duckei Dwyer

Copaifera martii Hayne

Copaifera multijuga Hayne

Copaifera officinalis L.

Copaifera reticulata Ducke

Copaifera p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Other species are commercialised under the name Copaiba.

Log description

Diameter. 45 to 80 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood varies from pink to red brown with copper-coloured veins. Resin exudation can occur. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	3.1 %
T/R anisotropy ratio	1.9
Fibre saturation point	26 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	19,030 kJ/kg
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,450 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. Yes

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

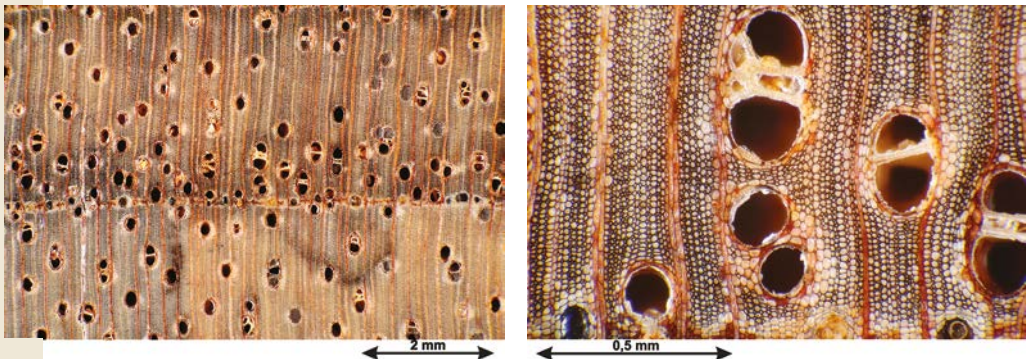
Notes. Fuzzy surface. Keep sharp tools.

Assembling

Nailing/screwing. Poor

Notes. Nail holding variable according to the species.

Cross sections of *Copaifera martii*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Flooring
- Sliced veneer
- Seats

Common names

Country	Local name
Argentina	Timbo-y-ata
Belize	Copaiba
Bolivia	Copaibo
Brazil	Copahyba, Copaiba, Copaibarana, Pau d'oleo
Colombia	Canime
Guyana	Balsam, Maram
French Guiana	Panchimouti
Panama	Cabino blanco, Camiba, Caniva, Cupay
Peru	Copaiba
Suriname	Hoepelhout, Koepajoewa
Venezuela	Aceite, Cabimo



Flat sawn

Quarter sawn



Coracao de negro* / Panacoco

* Common commercial name

Family. Leguminosae (Caesalpinieaceae)

Botanical names

Swartzia leiocalycina Benth.

Swartzia panacoco Cowan

Swartzia tomentosa DC.

Swartzia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Coracao de Negro includes all the species with black heart belonging to the genus *Swartzia* in South America.

Log description

Diameter. 40 to 60 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Logs have a small diameter with a wide light yellow sapwood. Heartwood deep dark brown with lighter thin streaks.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.20
Monnin hardness ⁽¹⁾	18.4
Coefficient of volumetric shrinkage	0.82 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	6.3 %
T/R anisotropy ratio	1.3
Fibre saturation point	23 %
Thermal conductivity (λ)	0.38 W/(m.K)
Lower heating value	19,220 kJ/kg
Crushing strength ⁽¹⁾	110 MPa
Static bending strength ⁽¹⁾	202 MPa
Longitudinal modulus of elasticity ⁽¹⁾	32,700 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Coração de negro wood must be dried slowly and carefully.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

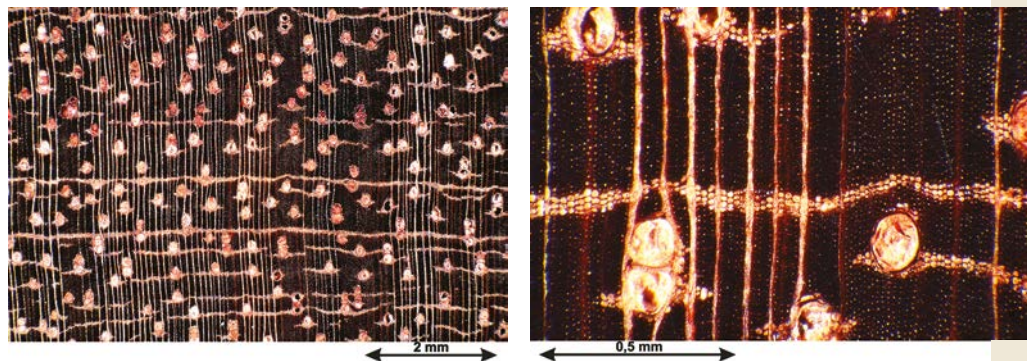
Notes. Difficult to saw due to hardness.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Swartzia leiocalycina*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Stringed instruments (bows)
- Wind instruments
- Panelling
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Uses similar to those of Ebony, but end uses are limited by the small size of logs.

Common names

Country	Local name
Germany	Wamara
Brazil	Carrapatinho, Coração de negro, Gombeira, Mocacahiba, Panacoco
Guyana	Agui, Banya, Wamara
French Guiana	Bois perdrix, Ferreol, Panacoco
United Kingdom	Ironwood, Wamara
Suriname	Gandoe, Ijzerhart, Zwart parelhout

Coula

Family. Olacaceae

Botanical name

Coula edulis Baill.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 3 to 4 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood purplish brown, with dark brown veins. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.01
Monnin hardness ⁽¹⁾	7.5
Coefficient of volumetric shrinkage	0.63 % per %
Total tangential shrinkage (Ts):	8.5 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.9
Fibre saturation point	23 %
Thermal conductivity (λ)	0.32 W/(m.K)
Lower heating value	19,720 kJ/kg
Crushing strength ⁽¹⁾	78 MPa
Static bending strength ⁽¹⁾	142 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Half-quarter sawn

Half-quarter sawn



Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

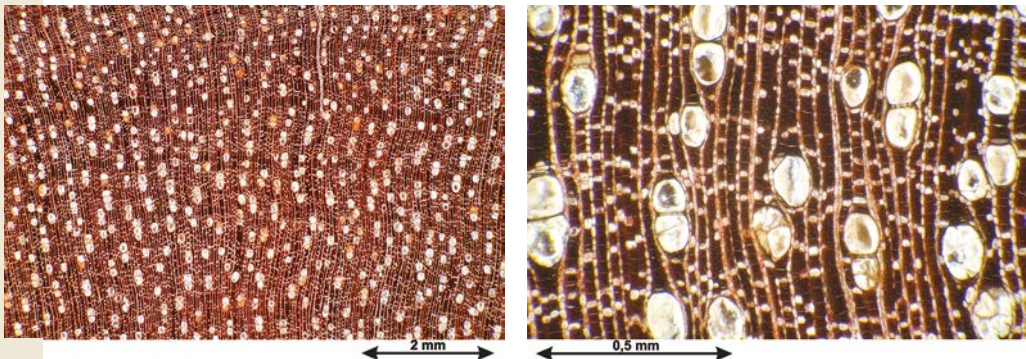
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Coula edulis*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Industrial or heavy flooring
- Stakes
- Sliced veneer
- Decking
- Poles
- Sleepers

Notes. Resistant to one or several acids. Mainly appreciated for its fruits.

Common names

Country	Local name
Cameroon	Éwomè, Ewome, Ngouma
Congo	Kumunu
Côte d'Ivoire	Coula, Attia
Gabon	Éhoumé, Noisetier d'Afrique
Nigeria	Ivianlegbe

Couroupita

Family. Lecythidaceae

Botanical names

Carapa guianensis Aubl.

Couroupita subsessilis Pilg.

Couroupita p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.4
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	33 MPa
Static bending strength ⁽¹⁾	55 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,670 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Drying must be done slowly in order to reduce distortions.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Tendency to woolliness. Dust causes coughing. Filing is recommended to obtain a better finish.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

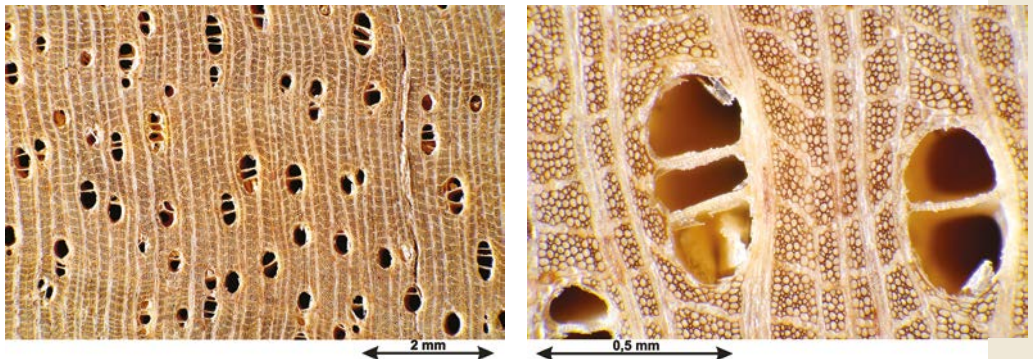
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Couroupita guianensis*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Formwork
- Boxes and crates
- Floats
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Marquetry

Common names

Country	Local name
Brazil	Castanha de macaco, Couroupita, Macacarecuia
France	Couroupita
Guyana	Canon ball
French Guiana	Boulet de canon
Suriname	Boshcalabas

Cryptomeria* / Sugi

* Common commercial name

Family. Taxodiaceae

Botanical name

Cryptomeria japonica D. Don

Continent. Asia-Oceania, Réunion Island

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Cryptomeria japonica* is native to Japan; some vast forest stands are available in the island of Hondo. It also grows in the southern and central regions of China, and in Korea. *Cryptomeria japonica* has been widely used for afforestation in Taiwan and continental China. Outside its natural range of distribution, this species was introduced into the Archipelago of the Azores, and especially on the island of Réunion where some forest stands have reached maturity and are now being logged. Production has started.

Log description

Diameter. 25 to 65 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Light yellow sapwood. Heartwood pinkish brown with darker shades, sometimes even brown or black.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.38
Monnin hardness ⁽¹⁾	1.0
Coefficient of volumetric shrinkage	0.33 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	2.6 %
T/R anisotropy ratio	2.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.14 W/(m.K)
Lower heating value	19,650 kJ/kg
Crushing strength ⁽¹⁾	33 MPa
Static bending strength ⁽¹⁾	55 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Half-quarter sawn

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 2(v)-3(v) - poorly to moderately permeable (v = variable)

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. According to the tests performed on Cryptomeria from the island of Réunion, this species dries well up to 70 °C. Collapse could occur at higher temperatures. For 45mm thickness, drying duration is around 12 days.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

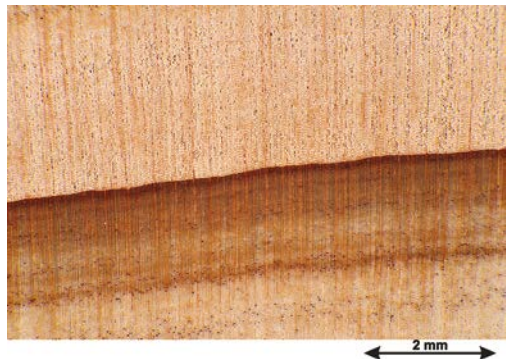
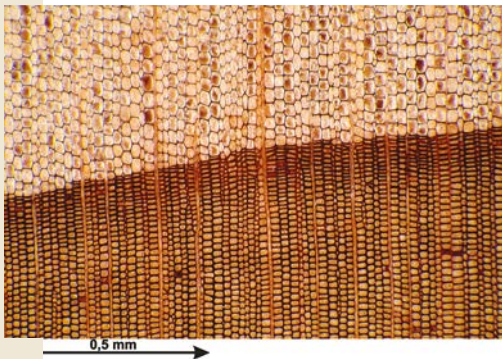
Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. As with most softwoods, Cryptomeria is not recommended for turning.

Cross sections of *Cryptomeria japonica*



Assembling

Nailing/screwing. Good when specific gravity over 0.35.

Commercial grading

Sawn timber appearance grading

Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

According to choice criteria listed in the NF EN 1611-1 standard.

Visual structure grading

According to French standard NF B 52-001-1/A1 (2013), strength classes C14 and C18 can be provided by visual grading.



Ceiling frame, La Réunion (France).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cladding
- Shingles
- Framing
- Formwork
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Pallets
- Sliced veneer
- Exterior panelling

Common names

Country	Local name
Germany	Japanische zeder
China	Liusan, San-sugi
Spain	Criptomeria japonesa
France	Cryptomeria
Italy	Crittomeria giapponese
Japan	Cryptomeria, Sugi
Réunion Island	Cryptomeria
United Kingdom	Japanese cedar
Taiwan	Liusan, San-sugi



Flat sawn

Quarter sawn



Cumaru / Tonka*

* Common commercial name

Family. Leguminosae (Fabaceae)

Botanical names

Dipteryx alata Vogel

Dipteryx micrantha Harms

Dipteryx odorata Willd.

(Syn. *Coumarouna odorata*)

Dipteryx polyphylla Huber

Dipteryx p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Unpleasant wood odour when green. Heartwood varies from yellow brown to reddish brown with darker thin veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.07
Monnin hardness ⁽¹⁾	13.1
Coefficient of volumetric shrinkage	0.73 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.4
Fibre saturation point	22 %
Thermal conductivity (λ)	0.34 W/(m.K)
Lower heating value	19,760 kJ/kg
Crushing strength ⁽¹⁾	103 MPa
Static bending strength ⁽¹⁾	170 MPa
Longitudinal modulus of elasticity ⁽¹⁾	26,610 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Drying must be done slowly. Risks of casehardening with thick material.

Suggested drying schedule. Schedule #9 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

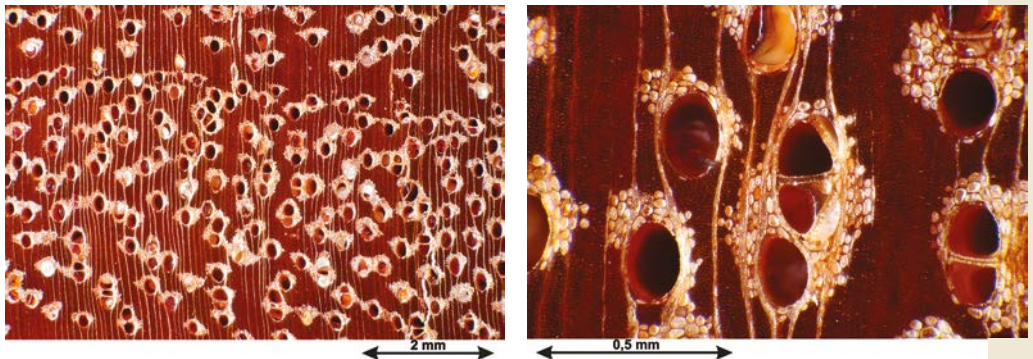
Notes. Sawing and machining are difficult due to hardness and interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Dipteryx odorata*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Gaiac de Cayenne». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D60 can be provided by visual grading. Strength class D50 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Tool handles (resilient woods)
- House framing
- Industrial or heavy flooring
- Stakes
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Cooperage
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. Slicing: only with the best shaped timber, to obtain very decorative veneers.

Common names

Country	Local name
Bolivia	Almendrillo
Brazil	Champanha, Cumaru, Cumaru ferro, Cumarurana,
Colombia	Sarrapia
Costa Rica	Almendro
Guyana	Kumarú, Tonka bean
French Guiana	Gaiac de Cayenne, Tonka
Honduras	Ebo
Peru	Charapilla, Shihuahuaco amarillo
Suriname	Koemaroe, Tonka
Venezuela	Sarrapia



Outdoor staircase in Gaiac de Cayenne, Rémire-Montjoly (French Guiana).

Cupiuba / Kabukalli*

* Common commercial name

Family. Goupiaceae

Botanical name

Goupia glabra Aubl.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked but not frequent

Notes. Very unpleasant odour when green. Sometimes, presence of internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.84
Monnin hardness ⁽¹⁾	6.2
Coefficient of volumetric shrinkage	0.66 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.7
Fibre saturation point	26 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	19,260 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,190 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn

Half-quarter sawn



Notes. This species is listed in the NF EN 350 standard. Resistance to brown cubical rot: good to very good. Resistance to white rot: moderate.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Must be dried very slowly.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Careful polishing is necessary due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

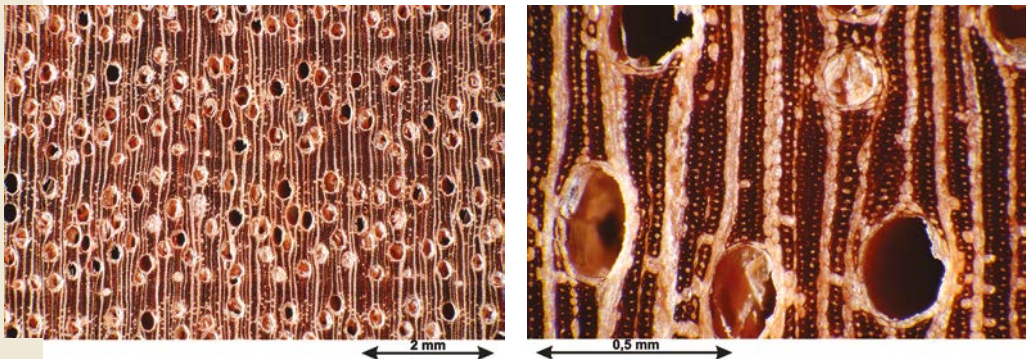
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Goupia glabra*



In French Guiana, the local name of this species is «Goupi». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading for Cupiuba in French Guiana.



‘Maison de la nature’ (Goupi) – Copeaux and Co, Sinnamary (French Guiana).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Stairs (inside)
- Exterior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Exterior panelling

Notes. Its unpleasant odour may limit the use of this timber. For furniture end-uses, filling and varnishing are necessary.

Common names

Country	Local name
Brazil	Cachaceiro, Copiuva, Cupiuba
Colombia	Chaquiro, Saino, Sapino
Guyana	Kabukalli, Copi
French Guiana	Bois caca, Goupi, Kopie
Peru	Capricornia
United Kingdom	Kabukalli
Suriname	Koepi
Venezuela	Congrio blanco

Curupixa

Family. Sapotaceae

Botanical names

Micropholis gardneriana Pierre

Micropholis melinoniana Pierre

Micropholis venulosa Pierre

Micropholis p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Several species with variable properties are commercialized under the name Curupixa.

Log description

Diameter. 50 to 110 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Colour variable, yellow brown to grey brown, with sometimes pink or purplish glints.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.75
Monnin hardness ⁽¹⁾	4.3
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	18,610 kJ/kg
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	109 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class M to class S - moderately durable to susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Resistance to fungi variable according to the species and origins.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Variable silica content according to the species.

Assembling

Nailing/screwing. Good

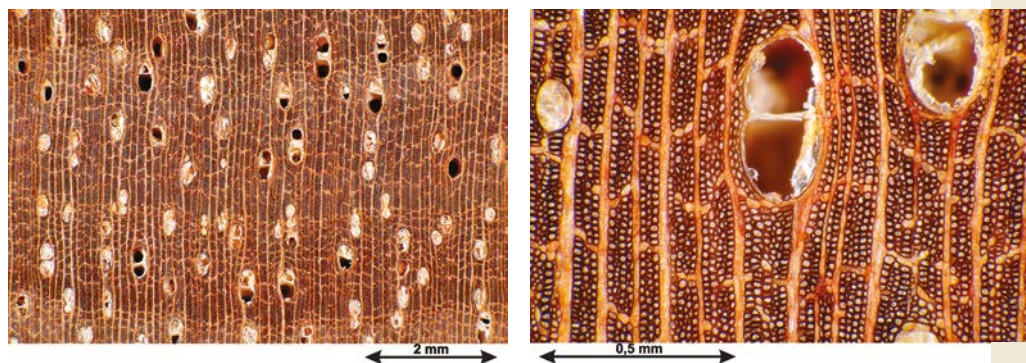
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Micropholis venulosa*



In French Guiana, the local name of this species is «Balata blanc». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Marquetry

Common names

Country	Local name
Argentina	Ibirá camby
Brazil	Abiurana, Bacu mixa, Cubixa, Curupixa, Guajará, Grubixa, Grumixava, Pau de remo, Rosadinho, Rosadinha, Salgueiro
Guyana	Kudi biushi, Moraballi
French Guiana	Baaka bouba, Bacouman, Balata blanc, Balata indien, Bouchi apa, Maaka, Mamantin,
Peru	Barilla de agua
Suriname	Reini lout, Riemhout, Suikerhout

Dabéma / Dahoma*

* Common commercial name

Family. Leguminosae (Mimosaceae)

Botanical names

Piptadeniastrum africanum Brenan (Syn. *Piptadenia africana*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 5 to 15 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood light brown to golden brown, sometimes ribbon-like aspect on quartersawn. Ammoniac odour when green or with rewetted woods.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.4
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	8.5 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	2.2
Fibre saturation point	27 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	19,930 kJ/kg
Crushing strength ⁽¹⁾	57 MPa
Static bending strength ⁽¹⁾	98 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,190 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 2 - moderately treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Half-quarter sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. Resistance to decay: moderate to good. Heart not resistant.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. To reduce distortions, air drying is recommended prior to kiln drying.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Very irritant sawdust. Quartersawn is recommended in order to reduce the risk of distortion.

Assembling

Nailing/screwing. Good

Notes. Risk of end checks.

Commercial grading

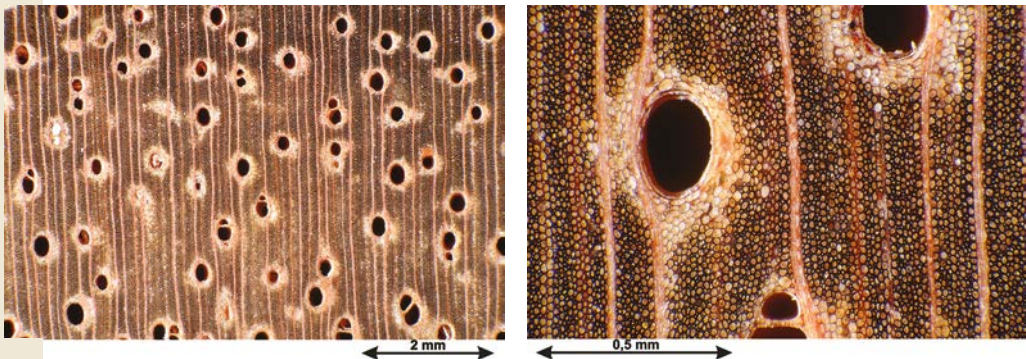
Sawn timber appearance grading

According to SATA grading rules (1996)

For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Piptadeniastrum africanum*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Glued Laminated
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring
- Exterior panelling

Notes. Can be used as a substitute for Oak for some end uses. The unpleasant odour of this wood when green, or rewetted, must be taken into account based on the type of end use and the destination.

Common names

Country	Local name
Angola	N'singa
Benin	Glenren
Cameroon	Atui
Congo	N'singa
Côte d'Ivoire	Dabéma / Dahoma
Gabon	Toum
Ghana	Dahoma
Equatorial Guinea	Tom
Liberia	Mbeli
Nigeria	Agboin, Ekhimi
Uganda	Mpewere
Netherlands	Bukungu
Central African Republic	Mokoungou
Democratic Republic of Congo	Bokungu, Likundu
United Kingdom	Dahoma
Sierra Leone	Guli, Mbele, Mbele-guli

Diania

Family. Cannabaceae (Ulmaceae)

Botanical names

Celtis adolfi-friderici Engl.

Celtis tessmannii Rendle (Syn. *Celtis brieiyi*)

Celtis p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Diania and Ohia are two different groups of *Celtis* species. Sometimes they are grouped together under the name of African Celtis.

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. n.d.

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Yellowish white with greenish veins in the innermost part of the logs. Particularly unpleasant odour when green or rewetted. Sometimes greenish discoloration in the innermost part of the logs.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	7.4 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	1.9
Fibre saturation point	26 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,920 kJ/kg
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	111 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,200 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable



Half-quarter sawn



Quarter sawn

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Very prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Defects can be reduced by top weighting the piles and applying end-coating products. Drying must be done slowly.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

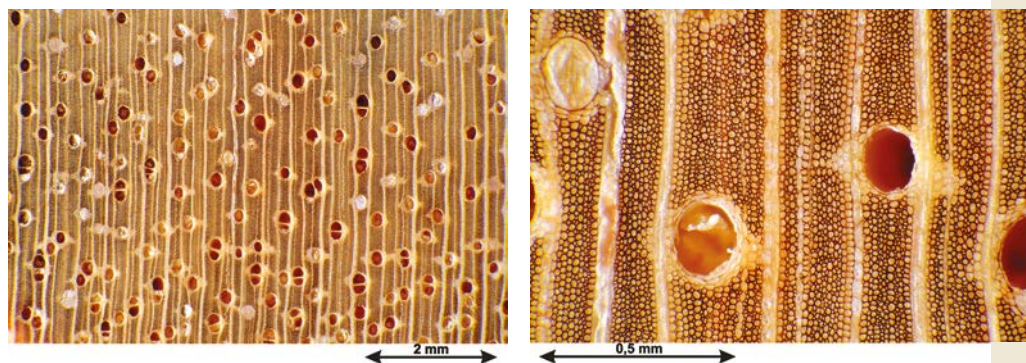
Notes. Possible sawing and machining difficulties if there is interlocked grain. In this case, special tools are recommended. Sometimes, high silica content for *Celtis tessmanii*.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Cross sections of *Celtis adolfi-friderici*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Heavy carpentry
- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer

Common names

Country	Local name
Benin	Bawe
Cameroon	Odou vrai
Congo	Diania, Édou, Kiliakamba
Côte d'Ivoire	Celtis, Lohonfé
Gabon	Engo
Ghana	Esa-biri, Esa-kokoo, Esa-kosua
Kenya	Shiunza
Liberia	Lokonfi
Nigeria	Dunki, Ita, Ohia, Zuwo
Uganda	Ekembe bakaswa, Namanuka
Central African Republic	Balzé
Democratic Republic of Congo	Bolundé, Diania, Kayombo

Dibétou

Family. Meliaceae

Botanical names

Lovoa swynnertonii Baker f.

Lovoa trichilioides Harms (Syn. *Lovoa klaineana*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 3 to 7 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Ring shakes and brittleheart possible in some logs. Wood yellow brown or grey brown, with black streaks or veins taking a golden glint. Black deposits in the pores.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.53
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	5.8 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.6
Fibre saturation point	27 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	19,595 kJ/kg
Crushing strength ⁽¹⁾	47 MPa
Static bending strength ⁽¹⁾	72 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.



Flat sawn



Half-quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

'Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Difficulties due to interlocked grain in planing (tearing). Tools must be kept sharp. Ribbon-like aspect on quartersawn. Sawing and machining dust is an irritant.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

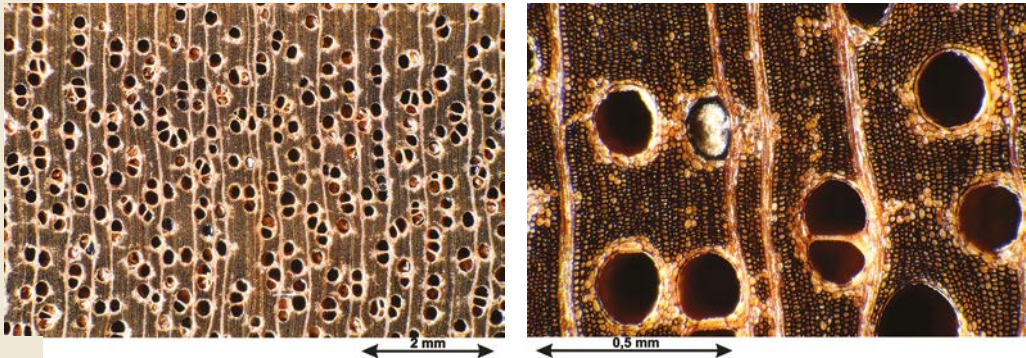
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Lovoa trichilioides*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Sliced veneer
- Seats

Notes. Although local names include Noyer du Gabon and African Walnut / Noyer d'Afrique, this species should not be confused with Walnut (*Juglans regia*), which it resembles.

Common names

Country	Local name
Cameroon	Bibolo
Congo	Bosso
Côte d'Ivoire	Dibétou
United States	Congowood, Tigerwood
France	Dibétou, Noyer d'Afrique, Noyer du Gabon
Gabon	Éyan
Ghana	African walnut, Dubini-biri, Mpengwa
Equatorial Guinea	Embero, M'bero, N'vero
Kenya	Mukongoro
Nigeria	Anamenila, Apopo, Sida
Uganda	Mukusu, Nkoba
Central African Republic	Boyo kondi
Democratic Republic of Congo	Bombulu, Lifaki muindu
United Kingdom	African walnut, Tigerwood
Sierra Leone	Wnaimeï

Difou

Family. Moraceae

Botanical names

Morus mesozygia Stapf (Syn. *Morus lactea*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 5 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Difou is similar in appearance to Iroko. The colour darkens with air and becomes brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.84
Monnin hardness ⁽¹⁾	9.7
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	5.7 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	1.8
Fibre saturation point	21 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	18,440 kJ/kg
Crushing strength ⁽¹⁾	86 MPa
Static bending strength ⁽¹⁾	143 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Half-quarter sawn

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

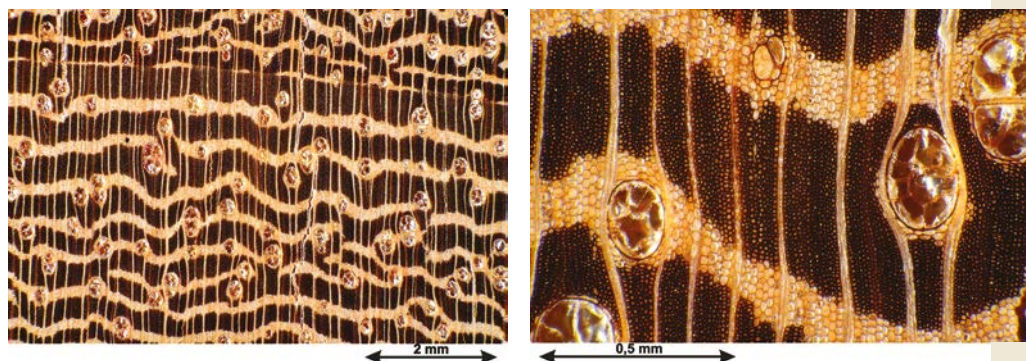
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Morus mesozygia*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Stakes
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Sculpture
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Cameroon	Ossel
Congo	Kessé
Côte d'Ivoire	Difou
Ghana	Wonton
Mozambique	Mecobze, Mecodze
Nigeria	Aye
Central African Republic	Bondé
Democratic Republic of Congo	Kankaté

Douglas fir

Family. Pinaceae

Botanical name

Pseudotsuga menziesii (Mirb.) Franco

Continent. North America, Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Coming from North West of America, Douglas fir is often used for reforestation in France and in Europe. Properties of European planted trees (young and with a rapid growth) which are mentioned on this sheet differ from those of the «Oregon pine» (old and slow growth) coming from its original growing area.

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Heartwood is pinkish brown with veins. Sapwood has a wide span and is yellowish in colour. Wood may show resin pockets, sometimes quite large.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.54
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.7 %
T/R anisotropy ratio	1.5
Fibre saturation point	27 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	18,720 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-5 – moderately durable to not durable



Half-quarter sawn

Quarter sawn



Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Use class 3 only covers wood components without sapwood. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used. Heartwood is not permeable to preservative products. Wood is used most of the time with sapwood which is moderately permeable to preservative products.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

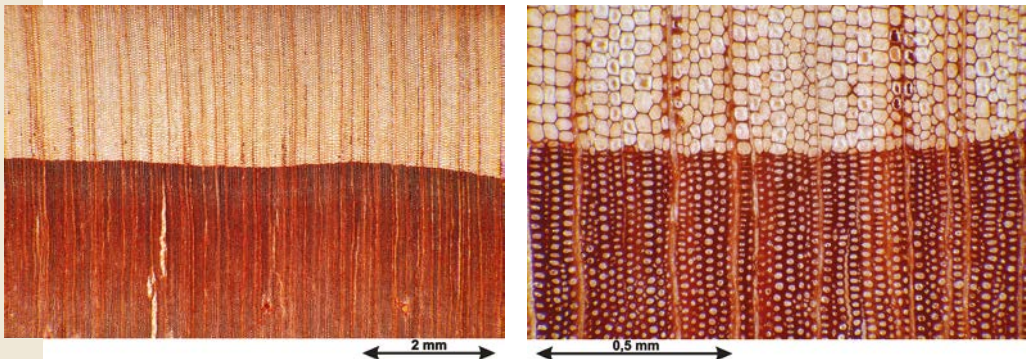
Notes. Risks of clogging of saw blades and tools due to resin pockets.

Assembling

Nailing/screwing. Good

Notes. Wood slightly acidic: nail or screw corrosion if in contact with moisture. Risk of stains.

Cross sections of *Pseudotsuga menziesii*



Commercial grading

Sawn timber appearance grading

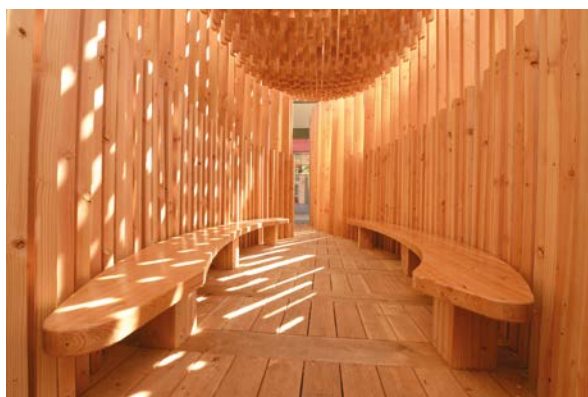
According to French standard NF EN 1611-1 (October 1999)

Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C14, C16, C18, C20, C22, C24, C30 and C35 can be provided by visual grading. Strength classes C18, C24 and C30 can be provided by visual grading according to French standard NF B 52-001-1 (2011).



Temporary micro-architecture display – Forum Bois Construction, Lyon 2016; Built for: France Douglas; Architect: Patriarche & Co (France).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Shipbuilding
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- House framing
- Poles
- Exterior panelling

Common names

Country	Local name
Germany	Douglasie
United States	Douglas fir
France	Douglas, Pin d'Oregon, Sapin de Douglas

Douka

Family. Sapotaceae

Botanical name

Tieghemella africana Pierre

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 150 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Marked but not frequent

Notes. Sapwood whitish to pale pink. Heartwood light pink brown to dark pink brown or light red. Sometimes, presence of light veins. Often moiré.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	4.2
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	5.3 %
T/R anisotropy ratio	1.3
Fibre saturation point	27 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	20,050 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Flat sawn

Quarter sawn

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended to limit defects related to drying.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

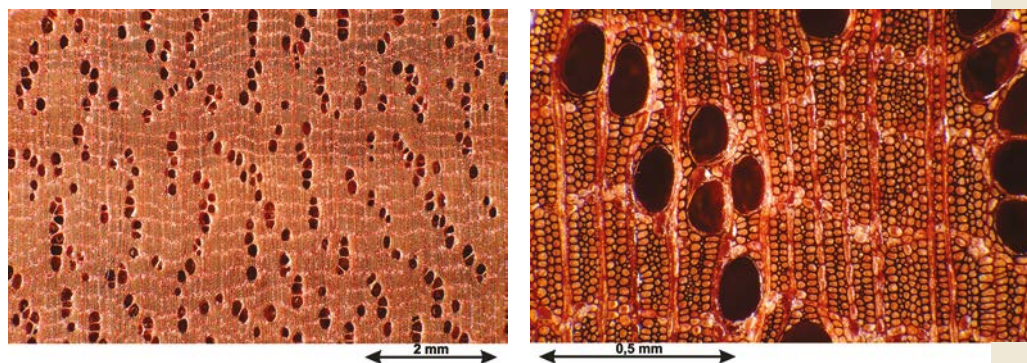
Notes. Very irritant sawdust. Occasional clogging of saw blades.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Cross sections of *Tieghemella africana*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- building (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Sculpture

Common names

Country	Local name
Cameroon	Douka
Congo	N'duka
Gabon	Douka
Equatorial Guinea	Okola

Doussié / Afzelia*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Afzelia africana Sm.

Afzelia bella Harms

Afzelia bipindensis Harms

Afzelia pachyloba Harms

Afzelia quanzensis Welw. (Syn. *Afzelia cuanzensis*)
(Syn. *Intsia cuanzensis*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood golden brown to light red brown, sometimes with darker veins. *Afzelia bipindensis* can often be identified by the presence of yellow powder at its heart.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	7.7
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	4.4 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	1.5
Fibre saturation point	19 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,840 kJ/kg
Crushing strength ⁽¹⁾	74 MPa
Static bending strength ⁽¹⁾	124 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,020 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Difficulties in extracting moisture from the heart of pieces. Slow drying necessary (3 to 5 months).

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Peeling possible for decorative veneer.

Suitability for slicing. Good

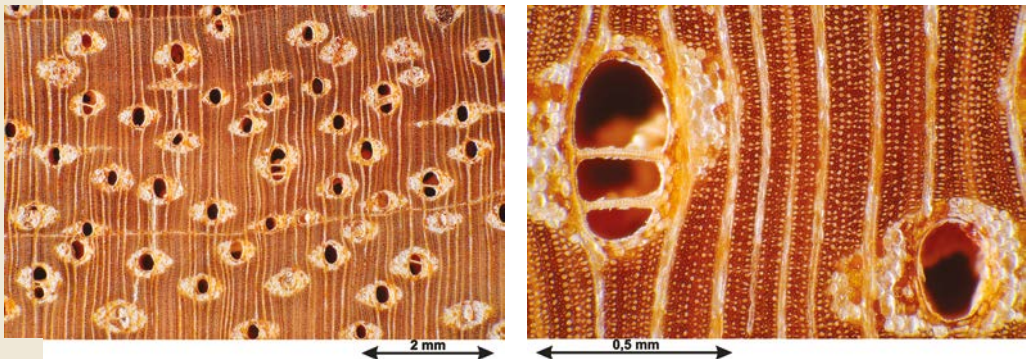
Notes. Sawdust is an irritant. Some difficulties due to interlocked grain (tearing).

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. Gluing may be difficult due to wood extractives. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Afzelia bipindensis*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Heavy carpentry
- Ship building (planking and deck)
- building (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Cooperage

Notes. Resistant to one or several acids. Yellow powder, sometimes visible in areas near the heart, contain substances that might hinder varnish drying. Filling is recommended to obtain a good finish.

Common names

Country	Local name	Country	Local name
Germany	Afzelia	Mozambique	Chanfuta, Mussacossa
Angola	N'kokongo, Uvala	Nigeria	Aligna, Apa, Apa igbo
Benin	Kpakpatin, Pakpajide	Portugal	Chanfuta
Cameroon	Doussié, M'bangá	Democratic Republic of Congo	Bolengu
Congo	N'kokongo	United Kingdom	Afzelia
Côte d'Ivoire	Azodau, Lingué	Senegal	Lingué
Gabon	Édoumeuleu	Sierra Leone	Kpendei
Ghana	Papao	Tanzania	Mbembakofi, Mkora
Guinea-Bissau	Pau conta		

Duabanga

Family. Lythraceae (Sonneratiaceae)

Botanical names

Duabanga grandiflora Walp.

Duabanga moluccana Blume

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light yellow to light brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	1.6
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	6.7 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	1.9
Fibre saturation point	27 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	39 MPa
Static bending strength ⁽¹⁾	64 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,120 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Surface sometimes fuzzy. Keep sharp tools. Filling is required to obtain a good finish.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

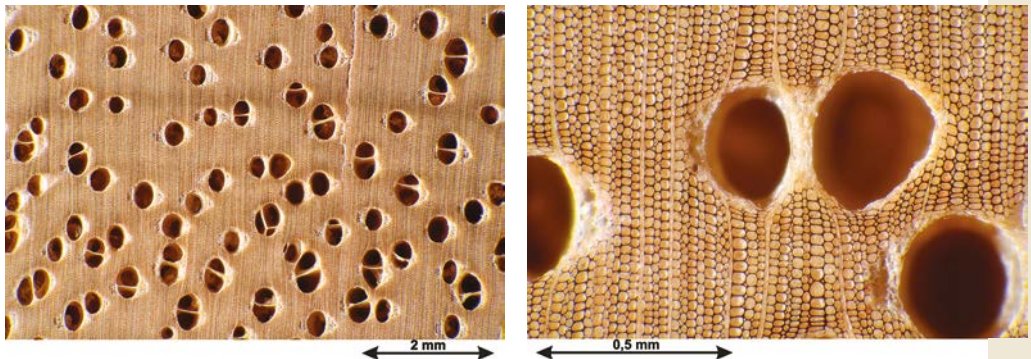
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Duabanga moluccana*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Boxes and crates
- Veneer for back or face of plywood
- Floats
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Pulp

Common names

Country	Local name
India	Lampati ramdala
Indonesia	Kalam
Malaysia	Magas, Magasawith, Phay-sung, Tagahas
Myanmar	Myaukngo
Papua New Guinea	Duabanga
Philippines	Loktob
Thailand	Linkwai, Phay
Viet Nam	Phay

Dukali / Amapa*

* Common commercial name

Family. Apocynaceae

Botanical name

Parahancornia fasciculata Benoist

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Sandé (white wood *Brosimum*) is also commercialised under the name Amapa (or Amapa doce).

Log description

Diameter. 40 to 50 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Cream white. Very thin silver figure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	2.0
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.8
Fibre saturation point	31 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	44 MPa
Static bending strength ⁽¹⁾	80 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,140 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

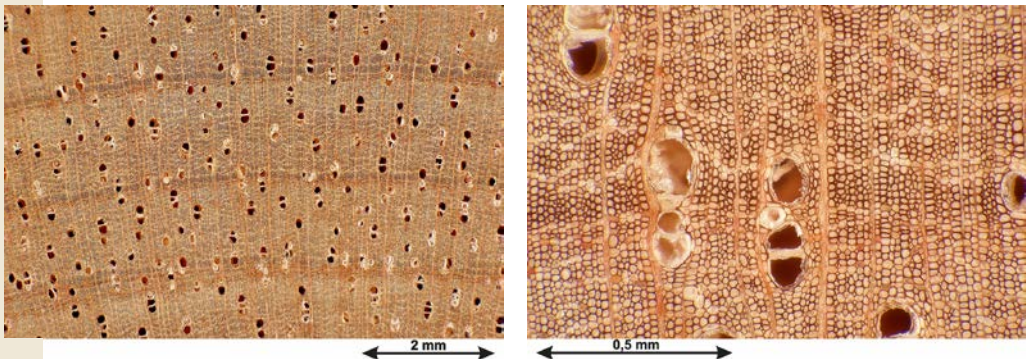
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Parahancornia fasciculata*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Rolling shutters

Common names

Country	Local name
Brazil	Amapa amargoso, Amapazinho
Guyana	Dukali
French Guiana	Mapa
Peru	Naranja podrida
Suriname	Mapa

Durian

Family. Malvaceae (Bombacaceae)

Botanical names

Coelostegia griffithii Benth.

Coelostegia p.p.

Durio zibethinus L.

Durio p.p.

Neesia p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Commercial species include 3 genera and a large number of botanical species. Properties sometimes variable between genera or species.

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood whitish, greyish to pale rose. Heartwood pink rose to grey brown, colour variable according to the species and genus, darkening to brown with reddish lustre. Marked silver figure gives wood lustrous aspect. Resin and crystalline deposits. Typical musk scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	3.1
Coefficient of volumetric shrinkage	0.38 % per %
Total tangential shrinkage (Ts):	7.2 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.7
Fibre saturation point	23 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	43 MPa
Static bending strength ⁽¹⁾	129 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 4-5 – poorly durable to not durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good

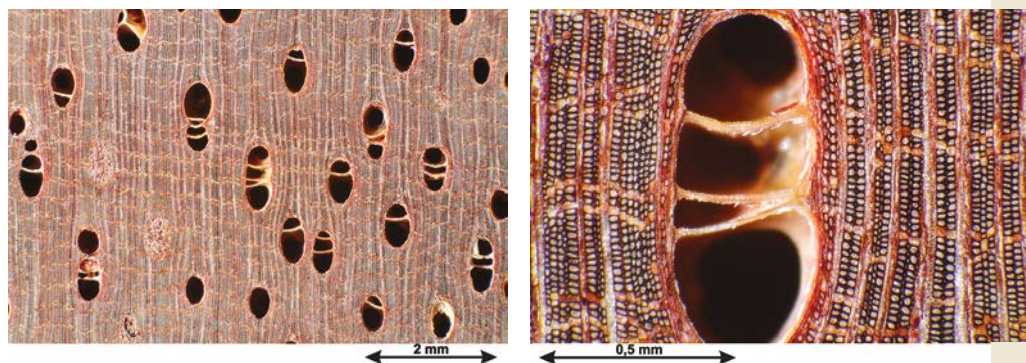
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Coelostegia griffithii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Open boats
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Built-in furniture or mobile item
- Blockboard

Notes. Needs filling before polishing.

Common names

Country	Local name
Indonesia	Durian
Malaysia	Apa apa, Bengang, Durian, Durian isa, Punggai
Myanmar	Du yin

Ébiara / Berlinia*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Berlinia bracteosa Benth.

Berlinia confusa Hoyle

Berlinia grandiflora Hutch. & Dalziel

Berlinia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 10 to 15 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Presence of purple or dark brown veins. Frequent resin canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.0
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	7.8 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	2.1
Fibre saturation point	28 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	19,460kJ/kg
Crushing strength ⁽¹⁾	57 MPa
Static bending strength ⁽¹⁾	93 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,870 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties vary widely according to the different Ebiara species.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. To reduce the risk of distortion, quartersawn drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

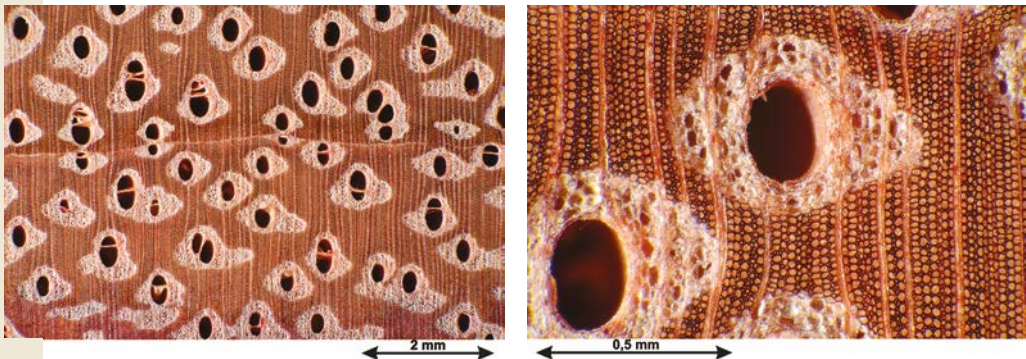
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Berlinia bracteosa*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Formwork
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling

Common names

Country	Local name
Germany	Berlinia
Angola	M'possa
Benin	Bagbé
Cameroon	Abem, Essabem
Congo	M'possa
Côte d'Ivoire	Melegba, Pocouli
Gabon	Ébiara / Berlinia
Ghana	Berlinia
Nigeria	Ekpogoi
Democratic Republic of Congo	M'possa
United Kingdom	Berlinia
Sierra Leone	Sarkpei



Small polished, stylised sculpture (Gabon).

- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Marquetry

Ékaba / Ekop*

* Common commercial name

Family. Leguminosae (Caesalpinieae)

Botanical names

Tetraberlinia bifoliolata Hauman (Syn. *Berlinia bifoliolata*)

Tetraberlinia longiracemosa Wieringa

Tetraberlinia tubmaniana J. Léonard

Tetraberlinia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Ekaba is often confused with Andoung.

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 2 to 12 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible presence of wind shakes (internal fractures in wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	3.0
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	7.8 %
Total radial shrinkage (Rs):	4.1 %
T/R anisotropy ratio	1.9
Fibre saturation point	27 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	20,410 kJ/kg
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,760 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. *T. bifoliolata* has lower physical and mechanical properties than *T. tubmaniana*.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable



Flat sawn



Quarter sawn

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Risk of discolouration of wood during drying.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. A reduced cutting angle is recommended to reduce the risk of grain tearing in the presence of interlocked grain.

Assembling

Nailing/screwing. Poor

Commercial grading

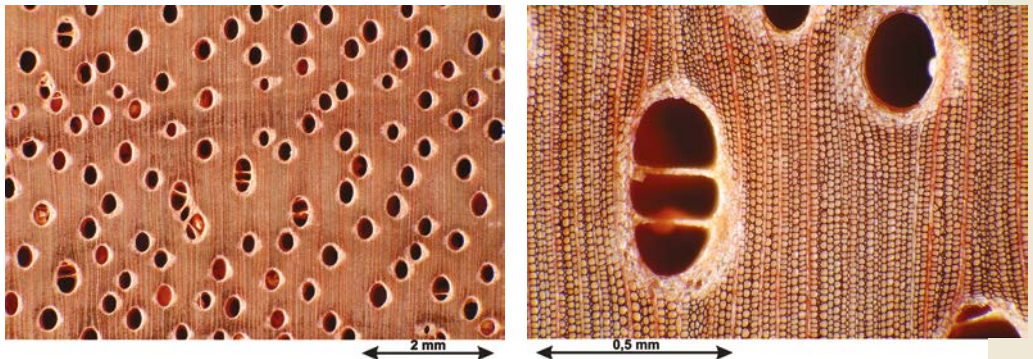
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Tetraberlinia bifoliolata*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Exterior panelling

Common names

Country	Local name
Germany	Ekop
Cameroon	Ékop-ribi
Congo	Éko-andoung
Spain	Ekaban
France	Ékaba / Ekop
Gabon	Éko-andoung
Equatorial Guinea	Ekop
Liberia	Hoh, Sikon
Netherlands	Ekop
United Kingdom	Tetraberlinia

Ékoune

Family. Myristicaceae

Botanical names

Coelocaryon botryoides Vermeesen

Coelocaryon preussii Warb.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Sometimes purplish brown veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.53
Monnin hardness ⁽¹⁾	1.9
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.8
Fibre saturation point	25 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	73 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

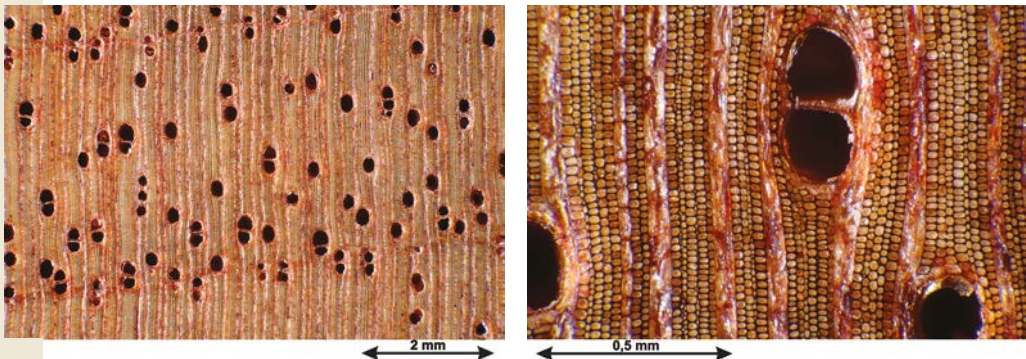
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Coelocaryon preussii*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Exterior panelling
- Marquetry

Notes. Can be used as a substitute for Okoumé for plywood.

Common names

Country	Local name
Cameroon	Nom Éteng
Congo	Kikubi-lomba
Gabon	Ékoune, Ékun
Equatorial Guinea	Ékoune, Ékun
Nigeria	Egbenrin
Central African Republic	Koloméko
Democratic Republic of Congo	Lomba-kumbi

Émien / Alstonia*

* Common commercial name

Family. Apocynaceae

Botanical names

Alstonia boonei De Wild.

Alstonia congensis Engl. (Syn. *Alstonia gillettii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Frequent brittleheart. Grain sometimes wavy. Frequent latex canals. Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.36
Monnin hardness ⁽¹⁾	0.7
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	5.2 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	32 %
Thermal conductivity (λ)	0.13 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	27 MPa
Static bending strength ⁽¹⁾	43 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,090 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Properties of Émien are similar to those of Obeche (*Triplochiton scleroxylon*).

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Very prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #2 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. The presence of latex may cause the clogging of saw blades.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

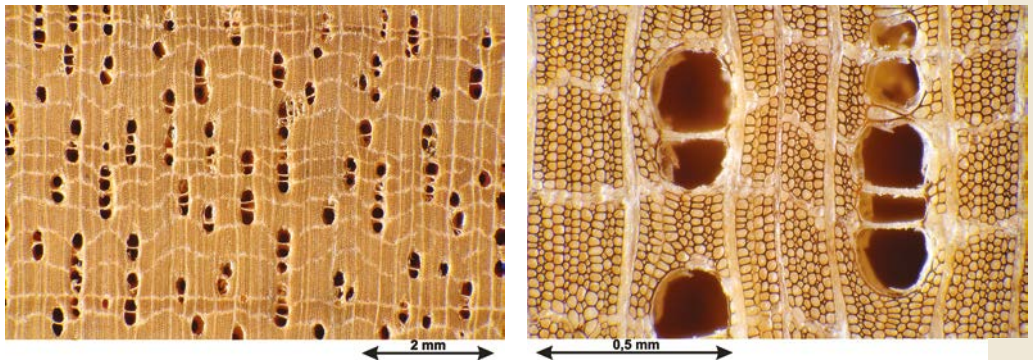
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Alstonia boonei*



- For the “Special Market”
- Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. Ungraded

Average density under 0.35.

Main end uses

- Matches
- Pencils
- Boxes and crates
- Open boats
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard

Notes. Can be used as a substitute for Obeche, but yield is often low due to latex canals.

Common names

Country	Local name
Benin	Afatin
Cameroon	Ékouk, Ékuk
Congo	Tsongoti
Côte d'Ivoire	Abale, Émien
Gabon	Ékouk, Ékuk
Ghana	Sindru, Sinduro
Equatorial Guinea	Ékouk, Ékuk
Nigeria	Ahun, Awun
Uganda	Mujwa
Central African Republic	Mogouga
Democratic Republic of Congo	Akuka
United Kingdom	Alstonia, Pattern wood, Stoolwood
Sierra Leone	Kaiwi

Essessang / Erimado*

* Common commercial name

Family. Euphorbiaceae

Botanical names

Ricinodendron heudelotii Pierre

(Syn. *Ricinodendron africanum*)

Schinziophyton rautanenii Radcl.-Sm.

(Syn. *Ricinodendron rautanenii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Marked but not frequent

Notes. Sometimes slightly wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.26
Monnin hardness ⁽¹⁾	0.8
Coefficient of volumetric shrinkage	0.21 % per %
Total tangential shrinkage (Ts):	4.8 %
Total radial shrinkage (Rs):	2.0 %
T/R anisotropy ratio	2.4
Fibre saturation point	36 %
Thermal conductivity (λ)	0.11 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	20 MPa
Static bending strength ⁽¹⁾	31 MPa
Longitudinal modulus of elasticity ⁽¹⁾	5,200 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #2 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Sawing and cutting: pronounced tendency to woolliness. Tools must always be carefully sharpened.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

SATA grading rules are infrequently applied due to specific technological properties and uses of this species.

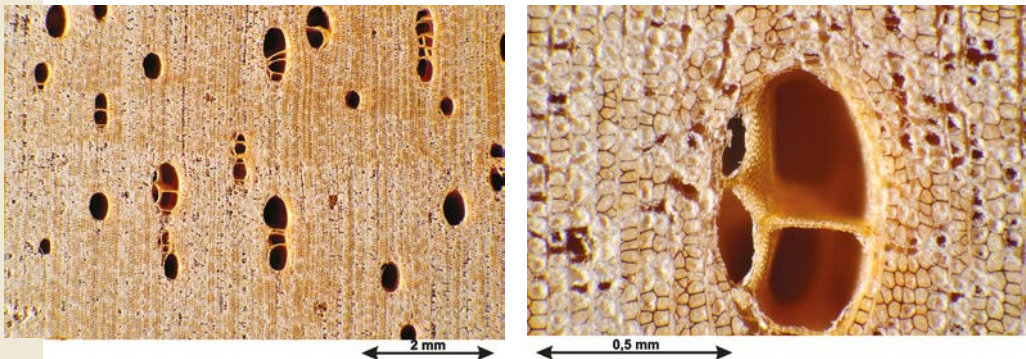
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Ricinodendron heudelotii*



Euroclass grading. Ungraded

Average density under 0.35.

Main end uses

- Boxes and crates
- Floats
- Veneer for interior of plywood
- Insulation
- Built-in furniture or mobile item
- Model building
- Moulding
- Sculpture

Notes. Quite good finish. Filling is recommended. Possible substitute for Balsa.

Common names

Country	Local name
Benin	Muawa
Cameroon	Essessang, Ézézang
Congo	Sanga-sanga
Côte d'Ivoire	Eho
France	Essessang / Erimado
Gabon	Ésésang
Ghana	Wama
Equatorial Guinea	Nsezang
Mozambique	Muawa
Nigeria	Erimado

Essia

Family. Lecythidaceae

Botanical names

Petersianthus macrocarpus Liben (Syn. *Combretodendron africanum*) (Syn. *Petersia africana*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 8 to 10 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Unpleasant odour when green. Yellowish pink to red brown with variable aspect. Grain straight or wavy.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	4.0
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	9.2 %
Total radial shrinkage (Rs):	4.7 %
T/R anisotropy ratio	2.0
Fibre saturation point	36 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	57 MPa
Static bending strength ⁽¹⁾	103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,870 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Wide sapwood sensitive to insect attacks.



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Quartersawn recommended especially for thick dimensions. Kiln drying very difficult. Drying thin dimensions is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Good

Notes. Machining more or less easy according to interlocked grain, especially in planing (tearing).

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Risks of splits with thin dimensions. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

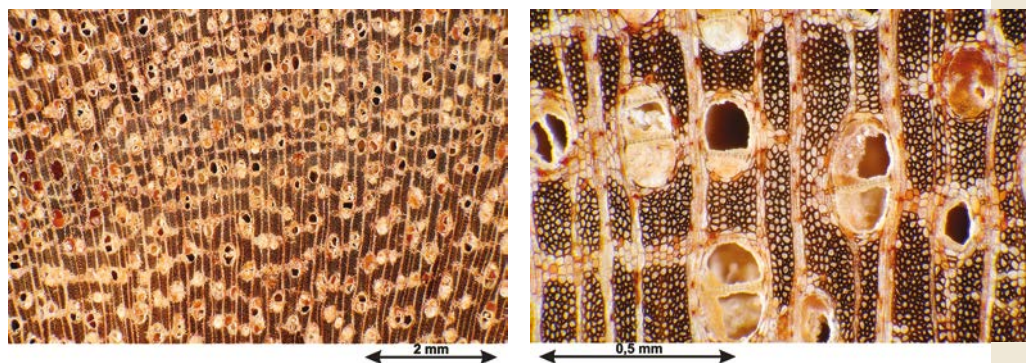
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Petersianthus macrocarpus*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Sliced veneer

Notes. Mottled, striated, veined or moiré wood are in high demand for decorative sliced veneer.

Common names

Country	Local name
Cameroon	Abing
Côte d'Ivoire	Abalé
Congo	Minzu
France	Abale
Gabon	Abin, Abing
Ghana	Esia, Essia
Nigeria	Owewe
Central African Republic	Nossoba
Democratic Republic of Congo	Bossoho, Wulo

Étimoé

Family. Leguminosae (Caesalpinaceae)

Botanical names

Copaifera mildbraedii Harms

Copaifera salikounda Heckel

Copaifera p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Presence of resin. Wood often moiré.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	26 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	68 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,560 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. *Copaifera mildbraedii* seems to have inferior properties than *C. salikounda*.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Resin can sometimes clog tools with sawing and machining.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

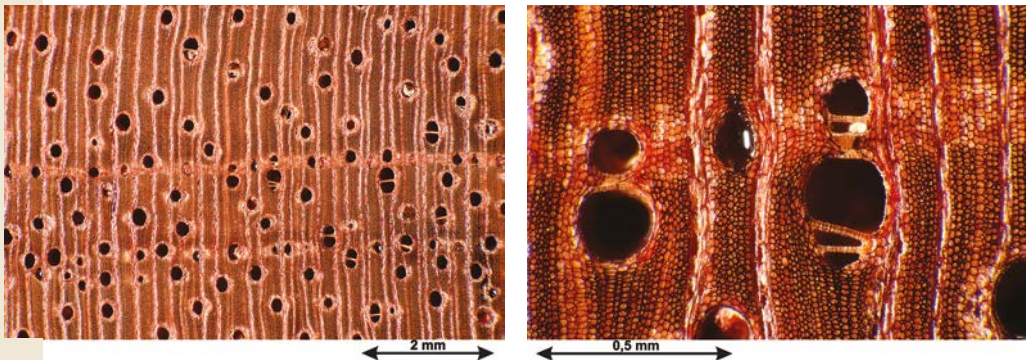
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Copaifera salikounda*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer
- Exterior panelling

Common names

Country	Local name
Benin	Akpaflo
Cameroon	Essak
Congo	Yama
Côte d'Ivoire	Étimoé
Gabon	Andem-éviné, Anzèm noir
Ghana	Entedua
Nigeria	Ovbialeke
Central African Republic	Bilombi, Yama
Democratic Republic of Congo	Bofélélé

Eucalyptus grandis

Family. Myrtaceae

Botanical name

Eucalyptus grandis W. Hill

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to Australia, *Eucalyptus grandis* has been planted in almost all tropical or sub-tropical areas of the world. Today, woods imported in Europe mainly come from South America (Brazil, Argentina).

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Pale pink to reddish brown wood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.65
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	31 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,200 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Some *Eucalyptus grandis* sold in the world today comes from young plantations. Wood often has properties inferior to the wood in natural forests. In particular, juvenile wood presents an incomplete duraminisation which explains their lower natural durability compared to the durability of more mature woods.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Like almost all *Eucalyptus*, *E.grandis* develops growth stresses which create splits or distortion in the stocks during log sawing. Appropriate sawing techniques must be used: log sawing turning, symmetrical sawing, first sawing by the heart, production of short length stocks.

Assembling

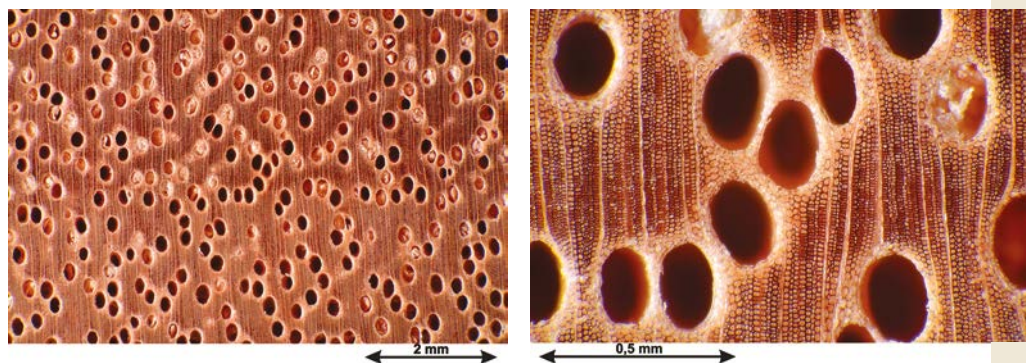
Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Eucalyptus grandis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Hammock stand – Telêmaco Borba (Paraná, Brazil).

Main end uses

- Pit props
- Framing
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Poles

Notes. In Brazil, a high percentage of *Eucalyptus grandis* production is transformed into charcoal and used by the iron and steel industry.

Common names

Country	Local name
Australia	Flooded gum, Kamarere, Rose gum
Brazil	Grandis, <i>Eucalyptus grandis</i>
France	Grandis, <i>Eucalyptus grandis</i>

European Larch

Family. Pinaceae

Botanical names

Larix decidua Mill. (Syn. *Larix europaea*)

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. High altitude species. European Larch is found in the Alp mountains and Central Europe.

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 1 to 3 cm

Buoyancy. Not applicable

Log conservation. Good

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Heartwood is pinkish brown, with reddish brown veins. The grain is usually straight but might be oblique (twisted logs).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	3.8
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	2.0
Fibre saturation point	26 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	16,360 kJ/kg
Crushing strength ⁽¹⁾	52 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. Use class 3 only covers wood components without sapwood. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Kiln drying of Larch above 70° C prevents problems linked to resin exudation on the final product.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Larch sawing is easy but clogging of saw blades due to resin must be taken into account.

Assembling

Nailing/screwing. Good but pre-boring necessary

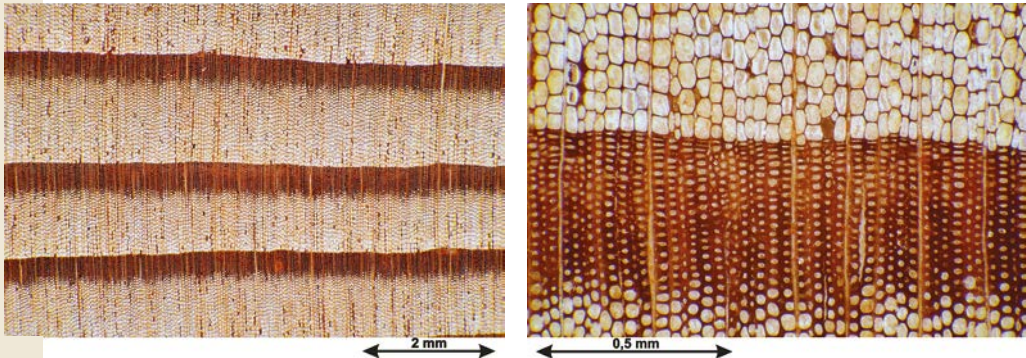
Notes. Difficult gluing due to resin. Drying at above 70° C prevents this problem.

Commercial grading

Sawn timber appearance grading

According to French standard NF EN 1611-1 (October 1999) and NF EN 1611- A1 (March 2003)

Cross sections of *Larix decidua*



Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C18, C20, C22, C24, C27 and C30 can be provided by visual grading. Strength classes C18, C24 and C27 can be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. C-s1, d0

Grading for wood cladding, according to procedures of the European standard NF EN 14915 (December 2013). Assigned according to procedures of the European standard NF EN 13501-1. Two relevant grading reports No.11/RC-40 and No.12/RC-44 prepared by the FCBA. Fields of application defined in these two reports.

Main end uses

- Shingles
- Coffins
- Heavy carpentry
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Cooperage

Common names

Country	Local name
Germany	Larche
Spain	Alerce
France	Mélèze
Italy	Larice
United Kingdom	Larch



Balcony of a mountain chalet, Hautes-Alpes (France).

Éveuss

Family. Irvingiaceae

Botanical names

Klainedoxa gabonensis Pierre

Klainedoxa trillesii Pierre

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 10 to 20 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Sapwood sometimes very wide, which affects yield with sawing. Sometimes wavy grain. Presence of light thin veins and sometimes black veining.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.06
Monnin hardness ⁽¹⁾	12.2
Coefficient of volumetric shrinkage	0.77 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	7.7 %
T/R anisotropy ratio	1.2
Fibre saturation point	25 %
Thermal conductivity (λ)	0.34 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	92 MPa
Static bending strength ⁽¹⁾	168 MPa
Longitudinal modulus of elasticity ⁽¹⁾	25,620 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Half-quarter sawn



Notes. This species is listed in the NF EN 350 standard. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Very slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Drying is very difficult.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

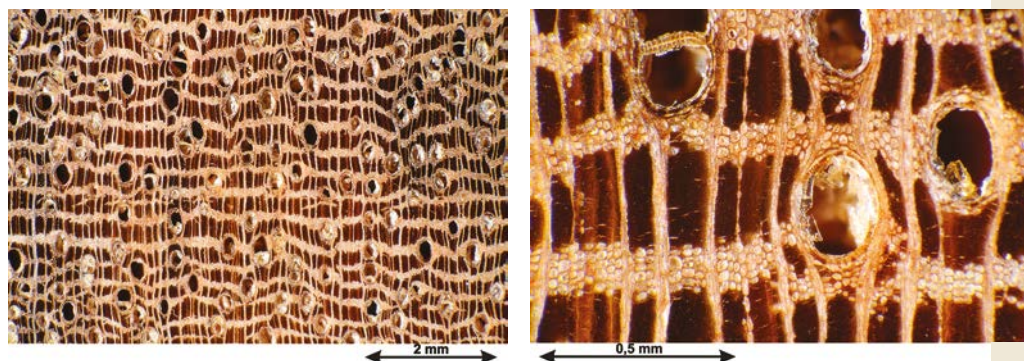
Notes. Blunting effect due to hardness. No silica. Sawing requires power.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: very important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Klainedoxa gabonensis*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Cameroon	Ngon
Congo	Kuma-kuma
Côte d'Ivoire	Kroma
Gabon	Évès, Éveuss
Ghana	Kruma
Equatorial Guinea	Eves, Eveuss
Nigeria	Odudu
Central African Republic	Oboro
Democratic Republic of Congo	Ikélé, Kuma-kuma

Éyong / White Sterculia*

* Common commercial name

Family. Malvaceae (Sterculiaceae)

Botanical names

Eribroma oblongum Pierre (Syn. *Sterculia oblonga*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 10 to 20 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood cream white to light yellow brown with white veins. Large silver figure. Oily to the touch. Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	3.7
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	10.6 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	2.3
Fibre saturation point	34 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	100 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,110 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Half-quarter sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard.

Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Risks of blue stain.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Risks of tearing in planing. Difficult to obtain a good finish. Filling is recommended.

Assembling

Nailing/screwing. Good

Notes. Risks of cracks in quartersawn boards.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

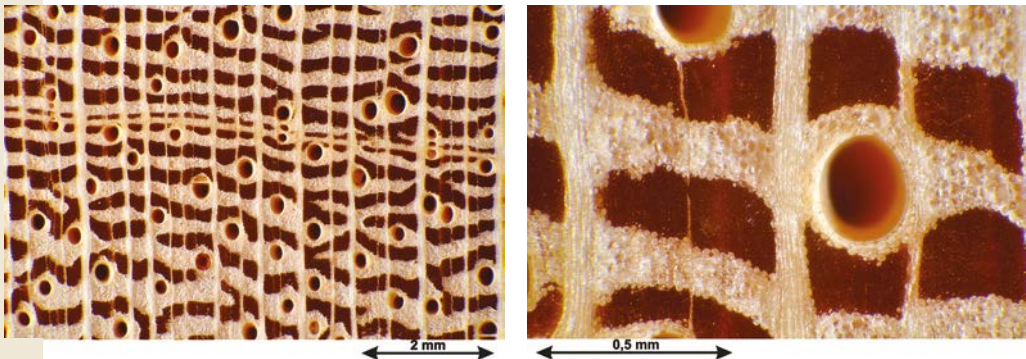
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Eribroma oblongum*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Veneer for back or face of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Common names

Country	Local name
Cameroon	Bongélé, Éyong
Congo	Kuil
Côte d'Ivoire	Bi
Gabon	N'chong, N'zong
Ghana	Ohaa
Equatorial Guinea	N'chong, N'zong
Nigeria	Okoko
Central African Republic	Bongo
United Kingdom	White sterculia, Yellow sterculia



Flat sawn



Quarter sawn

Éyoum

Family. Leguminosae (Caesalpinaceae)

Botanical names

Dialium aubrevillei Pellegr.

Dialium bipindense Harms

Dialium dinklagei Harms

Dialium pachyphyllum Harms

Dialium p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight to entangled

Interlocked grain. Marked

Notes. Light pinkish brown to brown or red brown, sometimes very dark.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.94
Monnin hardness ⁽¹⁾	10.3
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	8.7 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.8
Fibre saturation point	28 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	19,500 kJ/kg
Crushing strength ⁽¹⁾	90 MPa
Static bending strength ⁽¹⁾	162 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,700 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. Information regarding the natural durability and preservation treatment requirements correspond to phenomena observed in most species of the genus. Species of certain origins, in particular *Dialium pachyphyllum* and *Dialium aubrevillei*, show less durability (durability class 3 or 4). According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

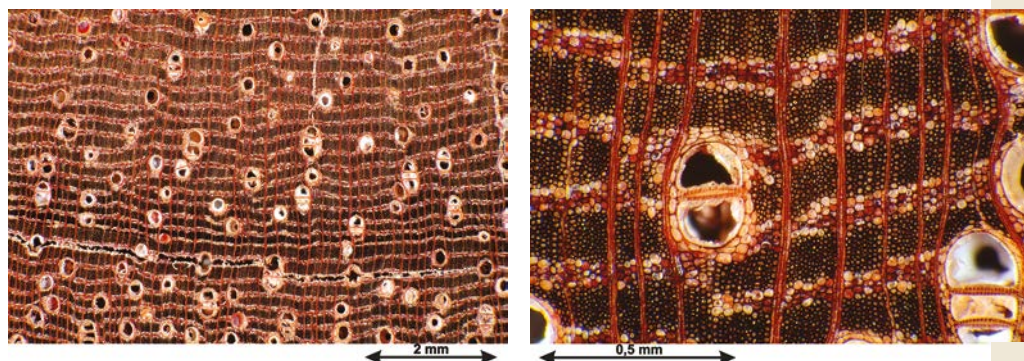
Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Dialium dinklagei*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Vehicle or container flooring
- Exterior joinery
- House framing
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Cameroon	M'fan, Mfang
Congo	Penzi
Côte d'Ivoire	Afambéou, Kofina
Gabon	Éyoum, Omvong
Guinea-Bissau	Pau veludo
Liberia	Ciania, Gbelle-flu, Gia kaba
Mozambique	Ziba
Democratic Republic of Congo	Bongola, Kasudu

Faro / Ogea*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Daniellia klainei Pierre

Daniellia ogea Rolfe

Daniellia soyauxii Rolfe

Daniellia thurifera Benn.

Daniellia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 4 to 12 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible presence of brittleheart. Sometimes greenish brown veins in heartwood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	1.9
Fibre saturation point	30 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	19,950 kJ/kg
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	66 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,550 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4-5 – poorly durable to not durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible



Flat sawn



Half-quarter sawn

Treatability. Class 2-3 - poorly to moderately permeable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. Yes

Notes. Risks of distortion (especially for flat sawn products). Risks of collapse with thick material.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Surface often fuzzy. Assembling and gluing sometimes difficult due to warping of dried veneers.

Assembling

Nailing/screwing. Good

Commercial grading

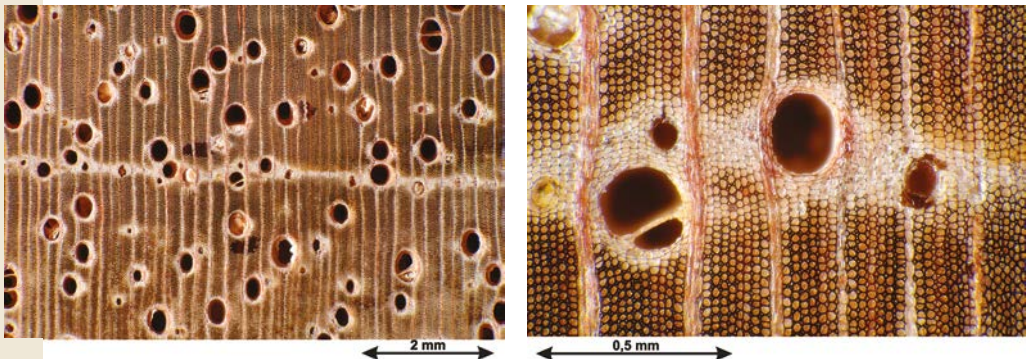
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Daniellia thurifera*



Possible grading for short-length lumbers:

choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards:

choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Sliced veneer

Common names

Country	Local name
Germany	Daniellia
Benin	Jatin
Cameroon	Nsou
Congo	Singa n'dola
Côte d'Ivoire	Faro / Ogea
Gabon	Lonlaviol
Ghana	Ogea, Shedua
Equatorial Guinea	N'su
Nigeria	Oziya
Democratic Republic of Congo	Bolengu
United Kingdom	Ogea
Sierra Leone	Gbessi



Indoor table – Café Le Piha, Bordeaux (France).



Flat sawn

Half-quarter sawn



Fava amargosa

Family. Leguminosae (Fabaceae)

Botanical names

Vatairea guianensis Aubl.

Vatairea paraensis Ducke

Vataireopsis speciosa Ducke

Vataireopsis surinamensis Lima

Vatairea p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 4 to 7 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Bright yellow when freshly sawn, becoming yellow brown to dark brown or red brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.75
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	7.8 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	23 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	18,050 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawdust may cause allergies.

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

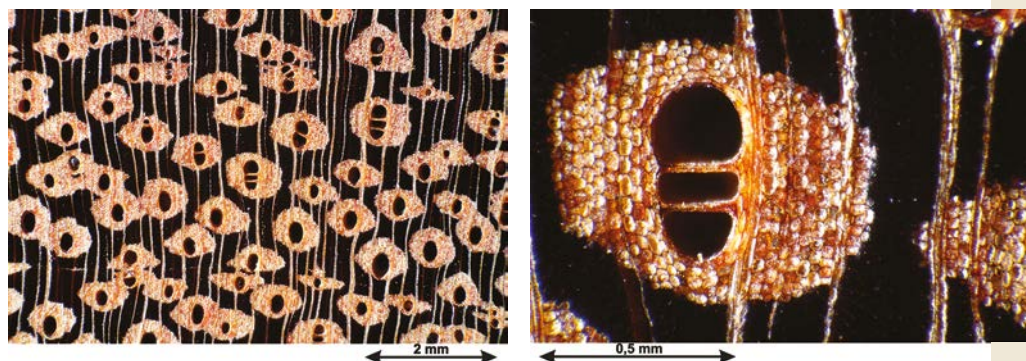
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Inkassa». Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Vatairea paraensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Formwork
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Blockboard
- Flooring
- Industrial or heavy flooring
- Sliced veneer

Notes. It is recommended to prepare surfaces and apply an undercoat, such as filling, before finishing as this species contains anti-siccatives.

Common names

Country	Local name
Brazil	Angelim amargoso, Aracui, Aracuy, Fava amarela, Fava amargosa, Faveira amarela, Faveira amargosa, Faveira bolacha
Colombia	Guerra, Maqui
France	Faveira amargosa
Guyana	Arisauro, Bastard purpleheart, Bauwaua
French Guiana	Inkassa, Yongo
Honduras	Amargo
Panama	Amargo
Peru	Mari-mari, Marupa del bajo
Suriname	Arisoeroe, Gele kabbes, Geli-kabissi

Faveira

Family. Leguminosae (Mimosaceae)

Botanical names

Parkia multijuga Benth.

Parkia nitida Miq.

Parkia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sometimes, heartwood presents very large light brown veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.47
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	2.8 %
T/R anisotropy ratio	2.5
Fibre saturation point	29 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	18,610 kJ/kg
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	67 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,510 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.



Flat sawn



Quarter sawn

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. Yes

Notes. A moderate drying schedule must be used to reduce the risk of distortion.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Fuzzy surface.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

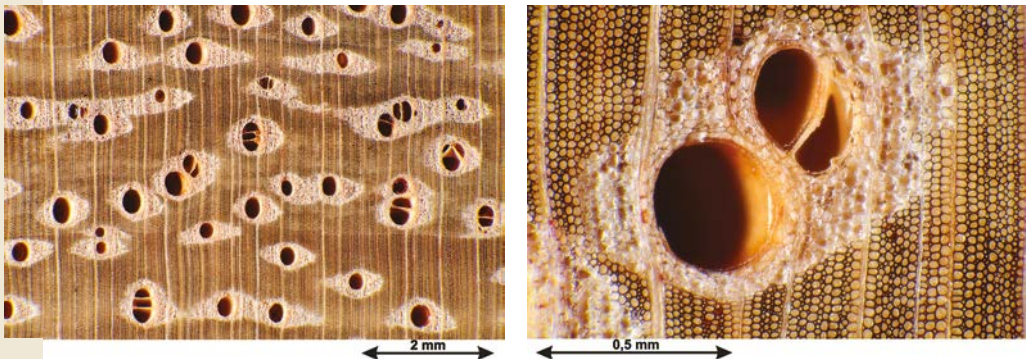
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Dodomissinga». Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Parkia pendula*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards

Common names

Country	Local name
Brazil	Fava arara tucupi, Fava bolota, Faveira, Parica, Visgueiro
Colombia	Huarango, Rayo
Ecuador	Tangama
Guyana	Black manariballi, Ipanai, Uya
French Guiana	Dodomissinga, Kouatakaman
Peru	Goma pashaco
Suriname	Kwatakama
Venezuela	Cascaron

Fir

Family. Pinaceae

Botanical names

Abies alba Mill. (Syn. *Abies pectinata*)

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. A European species, Fir appreciates cool climates with humid air. In France, Spruce (*Picea excelsa*) is often falsely called "Sapin" (*Abies alba*).

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Fir wood is creamy white, a little bit dull, sometimes slightly reddish-brown. Rings are very visible. Texture is fine to medium depending on growth speed.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.49
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	8.7 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	2.2
Fibre saturation point	29 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	19,080 kJ/kg
Crushing strength ⁽¹⁾	41 MPa
Static bending strength ⁽¹⁾	80 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2-3 - poorly to moderately permeable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Prone to blue stain. Used with sapwood. Preservation treatment is therefore imperative.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. The quality of surface depends on the grain regularity and the possible presence of knots or areas of compression wood.

Assembling

Nailing/screwing. Poor

Notes. Particularly prone to splitting: high risk of splits when nailing.

Commercial grading

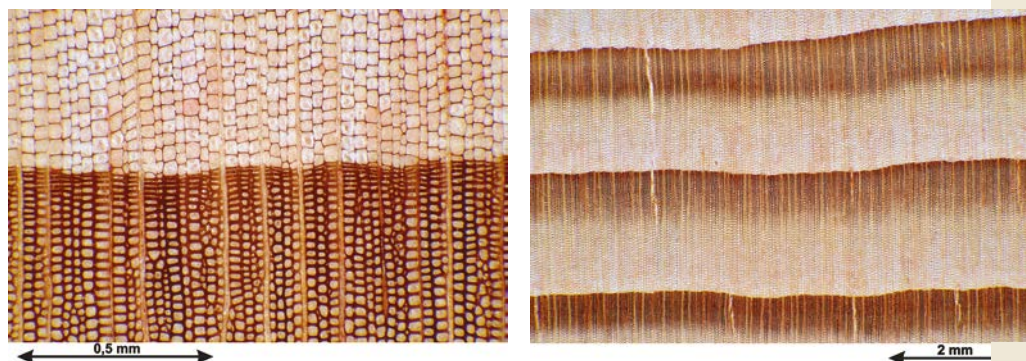
Sawn timber appearance grading

According to French standard NF EN 1611-1 (October 1999)

Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Cross sections of *Abies alba*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C14, C16, C18, C24 and C30 can be provided by visual grading. Strength classes C18, C24 and C30, however, can be provided by visual grading according to French standard NF B 52-001-1/A3 (2011).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Log chalet, Plainfaing (France).

Main end uses

- Shingles
- Pit props
- Coffins
- Framing
- Heavy carpentry
- Boxes and crates
- Musical instruments
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Fibre or particle boards
- Poles
- Pulp

Common names

Country	Local name
Germany	Tanne
Spain	Abete comun
France	Spruce
Italy	Abete
United Kingdom	Fir

Framiré / Idigbo*

* Common commercial name

Family. Combretaceae

Botanical name

Terminalia ivorensis A. Chev.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 65 to 85 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Brittleheart and possible wind shakes. More or less light yellow in colour, sometimes with greenish shades. Ribbon-like aspect due to interlocked grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	1.9
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	5.2 %
Total radial shrinkage (Rs):	3.6 %
T/R anisotropy ratio	1.4
Fibre saturation point	27 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	19,900 kJ/kg
Crushing strength ⁽¹⁾	44 MPa
Static bending strength ⁽¹⁾	71 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,350 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. In machining, risk of tearing due to interlocked grain. Sawdust may cause irritations. Filling is required to obtain a good finish.

Assembling

Nailing/screwing. Good

Notes. Wood fairly acidic: tendency to stain with gluing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

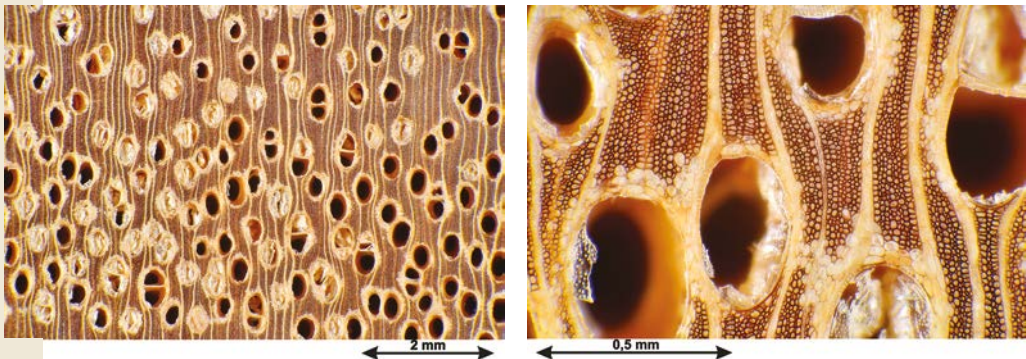
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Terminalia ivorensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Exterior panelling
- Seats
- Rolling shutters

Notes. Framire contains yellow tannins that may stain with humidity.

Common names

Country	Local name
Benin	Idigbo
Cameroon	Lidia
Côte d'Ivoire	Framiré / Idigbo
Ghana	Emeri
Liberia	Bajii
Nigeria	Black affaira, Idigbo
United Kingdom	Idigbo
Sierra Leone	Bajii



Door of built-in wardrobe, Teyran (France).



Flat sawn



Quarter sawn

Freijo / Laurel blanco*

* Common commercial name

Family. Boraginaceae

Botanical names

Cordia goeldiana Huber

Cordia trichotoma Arrab.

Cordia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood grey yellow to grey brown or golden brown sometimes with darker veins. Large silver figure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.58
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	6.3 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.5
Fibre saturation point	22 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	48 MPa
Static bending strength ⁽¹⁾	86 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,270 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 1 – treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Slight tendency to end checks with sawing.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sometimes grain tearing with sawing and machining. Sharp tools are necessary to avoid woolliness.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

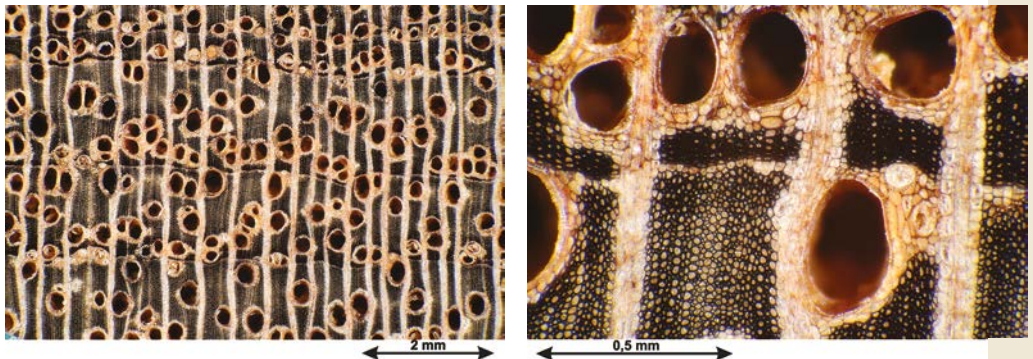
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Cordia trichotoma*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Sliced veneer
- Exterior panelling



Cupboard facade – SARL Fribois, Wambrechies (France).

Common names

Country	Local name
Brazil	Freijo, Frei-jorge
United States	Cordia wood, Jenny wood
France	Freijo / Laurel blanco
United Kingdom	Laurel blanco

Fuma / Fromager*

* Common commercial name

Family. Malvaceae (Bombacaceae)

Botanical names

Ceiba pentandra Gaertn. (Syn. *Bombax pentandrum*) (Syn. *Ceiba thoningii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The species *Ceiba pentandra* is found in Latin America under the name "Sumauma".

Log description

Diameter. 70 to 150 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Logs must be treated, extracted, sawn and dried as soon as possible after felling. Some logs are not floatable. Wood cream white to light yellow, often with greyish veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.32
Monnin hardness ⁽¹⁾	0.8
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	6.3 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	2.1
Fibre saturation point	34 %
Thermal conductivity (λ)	0.12 W/(m.K)
Lower heating value	19,090 kJ/kg
Crushing strength ⁽¹⁾	22 MPa
Static bending strength ⁽¹⁾	36 MPa
Longitudinal modulus of elasticity ⁽¹⁾	5,130 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible



Half-quarter sawn



Quarter sawn

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A rather slow drying is recommended due to the important moisture content when green.

Suggested drying schedule. Schedule #2 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or all oy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Fuzzy surface. Keep tools sharp to obtain a better finish.

Assembling

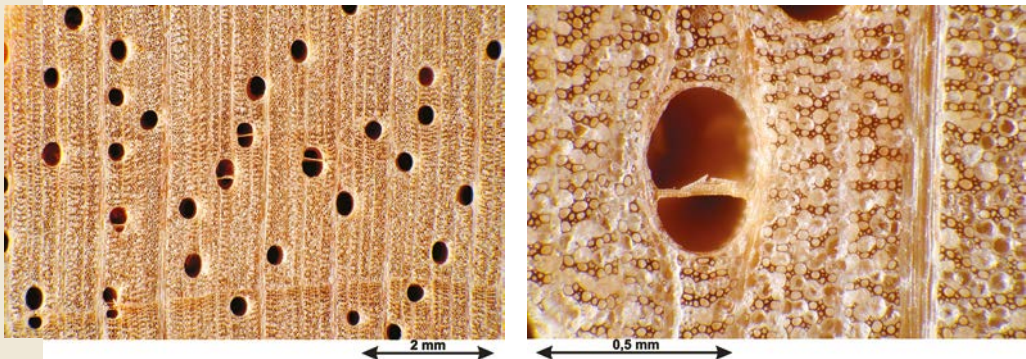
Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

SATA grading rules are infrequently applied due to specific technological properties and uses of this species.

Cross sections of *Ceiba pentandra*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. Ungraded
Average density under 0.35.

Main end uses

- Boxes and crates
- Veneer for interior of plywood
- Insulation
- Built-in furniture or mobile item
- Moulding
- Blockboard



Peeling of Fromager – Tropical wood, Adzopé (Côte d'Ivoire).

Common names

Country	Local name
Germany	Ceiba
Benin	Adjolohutin, Hutin
Cameroon	Bouma, Doum
Congo	Fuma
Côte d'Ivoire	Énia, Fromager
United States	Silk cotton-tree
France	Fromager
Gabon	Odouma
Ghana	Ceiba, Onyina
Liberia	Ghe
Nigeria	Araba, Okha
Netherlands	Kakantrie
Central African Republic	Gila
Democratic Republic of Congo	Fuma
United Kingdom	Ceiba
Sierra Leone	Banda, Ngwe

Garapa

Family. Leguminosae (Caesalpinaceae)

Botanical names

Apuleia leiocarpa J.F. Macbr. (Syn. *Apuleia molaris*)

Continent

Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Apuleia leiocarpa* var. *molaris* is found in the Amazonian forest, mainly in flooded areas. The main species, *Apuleia leiocarpa*, is found mainly in the south of Brazil, notably in the forests on the Atlantic coast, where it grows easily in cleared areas.

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 5 to 11 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Orange yellow

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Lemon yellow becoming light brown with age. Slight ribbon-like aspect, a bit moiré. Irregular interlocked grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	6.7
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.8
Fibre saturation point	22 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	63 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,880 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Garapa is listed in the NF EN 350 standard. The natural durability of this species is very variable. In some cases, this variability can be observed inside the same piece of wood. This species cannot be used without appropriate preservation treatment for end-uses under use class 3. One exception is windows, less exposed than other parts of a structure (entrance doors, shutters, etc.). This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high silica content. However, its use is not recommended in the case of strong structural constraints, due to its medium mechanical properties. It is best suited for end uses like shipbuilding.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

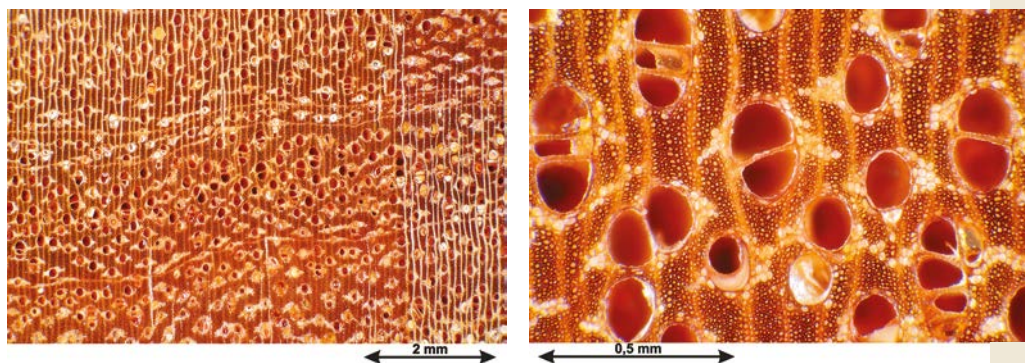
Suitability for slicing. Not recommended or without interest

Notes. High silica content makes slicing complicated. The feed rate and cutting angle should be reduced in machining operations.

Assembling

Nailing/screwing. Good but pre-boring necessary

Cross sections of *Apuleia leiocarpa*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Heavy carpentry
- Formwork
- Shipbuilding
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Industrial or heavy flooring
- Marquetry
- Cooperage
- Hydraulic works (seawater)

Notes. Easy finish but filling is recommended.

Common names

Country	Local name
Argentina	Ibira père
Bolivia	Almendrillo, Amarillo
Brazil	Amarelao, Barajuba, Ferro, Garapa, Gema-de-ovo, Grapia, Jatai-amarelo, Muirajuba, Muirataua
Colombia	Cobre
Paraguay	Grapia, Yvira-père
Peru	Ana
Venezuela	Gateado, Mapurite



Veneer on desks and flooring in Garapa, meeting room at City Hall, Montpellier (France).

Geronggang

Family. Hypericaceae

Botanical names

Cratoxylum arborescens Blume

Cratoxylum glaucum Korth.

Cratoxylum p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 90 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark red

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Risk of splitting during felling (growth stress).

Brittleheart. Wood red brown to dark red. Lustrous aspect.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.2
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	2.2
Fibre saturation point	31 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	37 MPa
Static bending strength ⁽¹⁾	67 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,830 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Wood sometimes has a blunting effect. Surface of some woods rough due to irregular grain. Veneers tend to tear.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

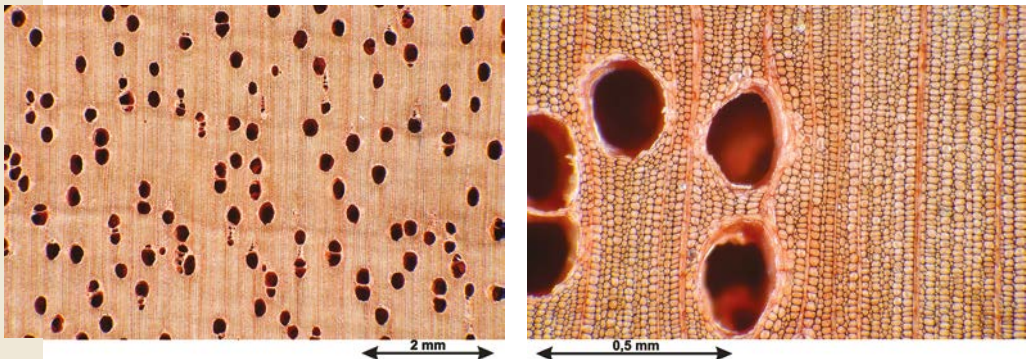
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Cratoxylum arborescens*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards

Common names

Country	Local name
Indonesia	Geronggang, Mapat, Mulu, Sulunus
Malaysia	Geronggang, Gonggang, Serungan



Flat sawn

Quarter sawn



Gerutu

Family. Dipterocarpaceae

Botanical names

Parashorea densiflora Slooten & Symington

Parashorea lucida Kurz

Parashorea smythiesii Wyatt-Sm.

Parashorea p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 130 cm

Thickness of sapwood. 6 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood darkens in light. Presence of solidified white resin canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	3.4
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	2.1
Fibre saturation point	26 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	18,950 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,710 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Specific gravity varies from 0.60 to 0.80.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of checks with thick material.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Risk of grain tearing. Keep tools sharp to obtain a good surface.

Assembling

Nailing/screwing. Good

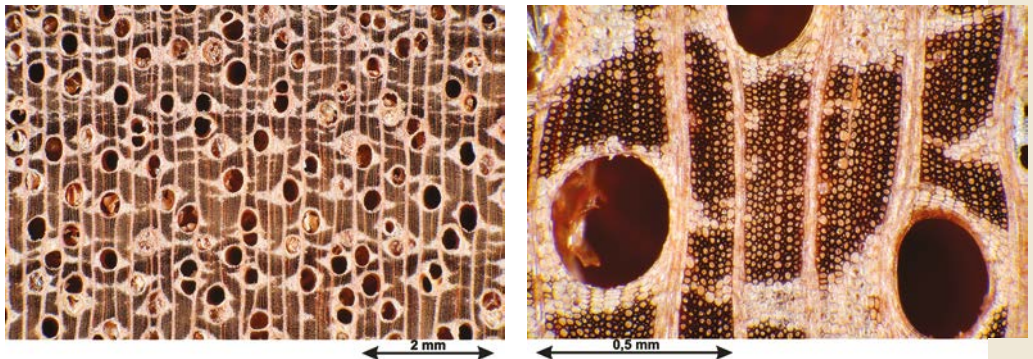
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Parashorea densiflora*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Common names

Country	Local name
India	Tavoy wood
Indonesia	White meranti
Laos	Mai hao
Malaysia	Gerutu, Gerutu pasir, Heavy white seraya, Meranti gerutu, Meruyun, Urat mata batu, Urat mata bukit, Urat mata daun kecil
Thailand	Khai khieo
Viet Nam	Cho-chi

Notes. Use of the name “White Meranti” is recommended for the species of the genus *Shorea* subgen. *Anthoshorea*.

Ghéombi

Family. Leguminosae (Caesalpinaceae)

Botanical name

Sindoropsis letestui J. Léonard (Syn. *Copaifera letestui*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 8 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pink brown with cooper glints, darkening in the light. Possible presence of wind shakes (internal fractures in wood). Resin canals, mainly in sapwood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	5.4
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.8
Fibre saturation point	22 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	61 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,640 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sometimes clogging of sawblades and tools due to resin. Irregular grain may cause a fuzzy surface in planing.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

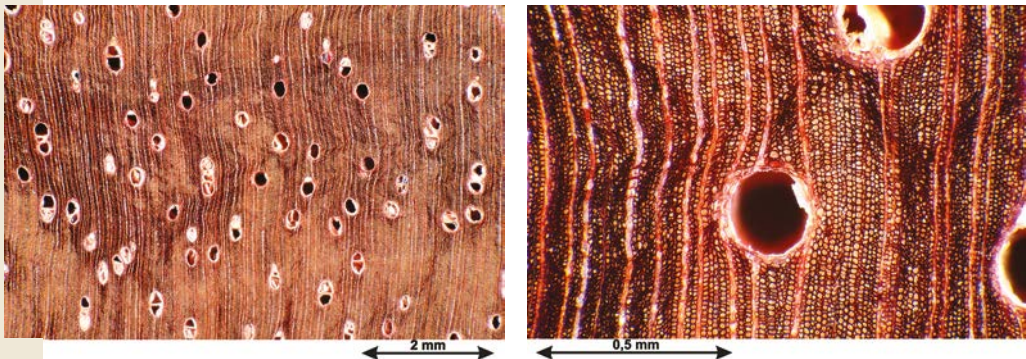
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Sindoropsis letestui*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Notes. Low yield due to resin canals and wide sapwood.

Common names

Country	Local name
Cameroon	Lumbandjii
Gabon	Ghéombi, Ngom

Giam

Family. Dipterocarpaceae

Botanical names

Hopea ferrea Laness.

Hopea forbesii Slooten

Hopea helferi Brandis

Hopea nutans Ridl.

Hopea p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. "Giam" includes the *Hopea* species with high specific gravity. *Hopea* species with light specific gravity are grouped under the name Merawan.

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellowish white to light brown. Heartwood yellow brown with an olive green lustre when fresh, darkening to red/chocolate brown, partly strong purple. Concentric rows of light-coloured resin.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.89
Monnin hardness ⁽¹⁾	7.1
Coefficient of volumetric shrinkage	0.49 % per %
Total tangential shrinkage (Ts):	9.3 %
Total radial shrinkage (Rs):	6.5 %
T/R anisotropy ratio	1.4
Fibre saturation point	21 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

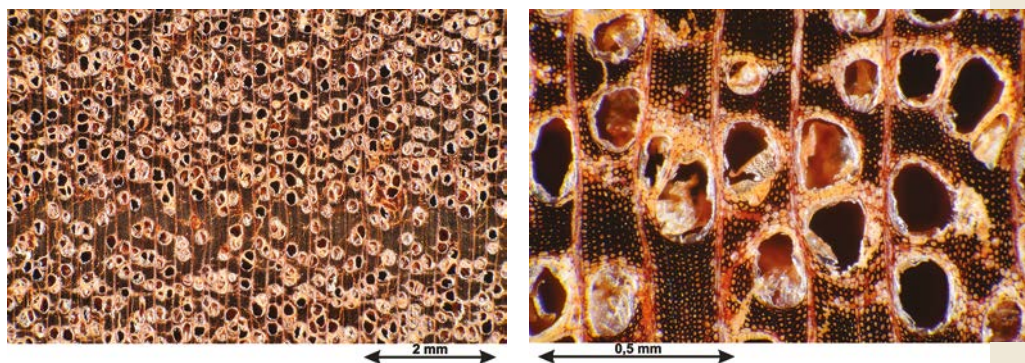
Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Hopea forbesii*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Shipbuilding
- Vehicle or container flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Cooperage
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Common names

Country	Local name
Cambodia	Koki thmor
Laos	Khèn hin
Malaysia	Giam, Selangan-batu
Myanmar	Thingan-net
Thailand	Takhian

Goiabao

Family. Sapotaceae

Botanical name

Chrysophyllum lucentifolium Cronquist

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 45 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	7.7
Coefficient of volumetric shrinkage	0.65 % per %
Total tangential shrinkage (Ts):	11.6 %
Total radial shrinkage (Rs):	6.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	18,940 kJ/kg
Crushing strength ⁽¹⁾	79 MPa
Static bending strength ⁽¹⁾	145 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment



Flat sawn



Quarter sawn

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tendency to split; pre-boring necessary. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

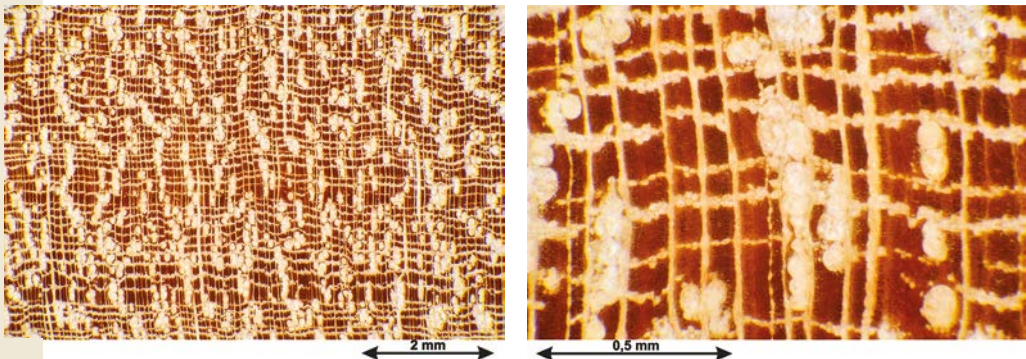
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cros sections of *Chrysophyllum lucentifolium*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Panelling
- Tool handles (resilient woods)
- Interior joinery
- Flooring
- Sliced veneer

Common names

Country	Local name
Brazil	Abiurana, Abiurana amarela, Abiu casca, Abiurana goiaba, Goiabao, Goyabao



Veneered interior door – Canoinhas, Santa Catarina (Brazil).



Flat sawn



Quarter sawn

Gombé

Family. Leguminosae (Caesalpiniaceae)

Botanical names

Didelotia africana Baill.

Didelotia brevipaniculata J. Léonard

Didelotia idae Oldeman & al.

Didelotia letouzeyi Pellegr.

Didelotia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pink orangey

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood whitish to yellowish. Wood sometimes pink orangey with sometimes greenish brown veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	2.8
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	8.6 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.9
Fibre saturation point	32 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	18,640 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,940 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Variable resistance to decay, from poor to medium.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Keep cutters sharp to obtain a good finish in the presence of interlocked grain.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

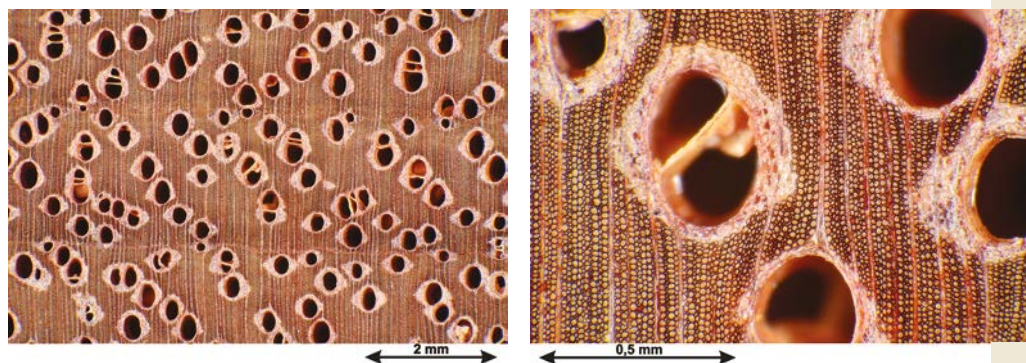
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Didelotia idae*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Coffins
- Framing
- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Closures and shutters
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Sliced veneer
- Seats

Notes. Sometimes inappropriately marketed as Naga, Meblo or Andoung. Substitute for Sapele and Nemesu.

Common names

Country	Local name
Cameroon	Ékop-gombé, Gombé
Côte d'Ivoire	Broutou, Toubaouaté
Gabon	Angok, Towé
Liberia	Bondu
Sierra Leone	Timba



Mouldings – Compagnie des bois du Gabon (CBG), Port-Gentil (Gabon).

Gommier

Family. Burseraceae

Botanical names

Dacryodes excelsa Vahl (Syn. *Dacryodes hexandra*)

Dacryodes occidentalis Cuatrec.

Dacryodes olivifera Cuatrec.

Dacryodes peruviana H.J. Lam

Dacryodes p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Often confused with Kurokaï / Breu (*Protium* p.p.).

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish white

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Marked but not frequent

Notes. Wood cream white or pinkish white. Irregular interlocked grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.61
Monnin hardness ⁽¹⁾	3.1
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.6
Fibre saturation point	29 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	18,580 kJ/kg
Crushing strength ⁽¹⁾	51 MPa
Static bending strength ⁽¹⁾	92 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,320 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sawing and machining difficulties due to highly interlocked grain. Fairly high to high blunting effect due to silica content.

Assembling

Nailing/screwing. Good

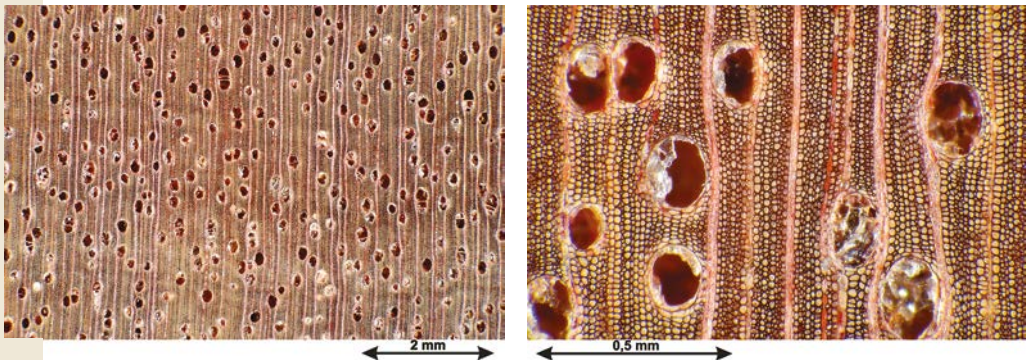
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Dacryodes olivifera*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Boxes and crates
- Open boats
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Sliced veneer

Common names

Country	Local name
Antilles	Gommier, Gommier blanc, Gommier de montagne
Ecuador	Anime, Copal
Puerto Rico	Tabonuco

Greenheart

Family. Lauraceae

Botanical names

Chlorocardium rodiei Rohwer, H.G. Richt. & van der Werff
(Syn. *Ocotea rodiei*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Slightly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood yellow brown to dark olive, with sometimes irregular darker veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.97
Monnin hardness ⁽¹⁾	19.8
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	7.5 %
T/R anisotropy ratio	1.1
Fibre saturation point	40 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	20,420 kJ/kg
Crushing strength ⁽¹⁾	98 MPa
Static bending strength ⁽¹⁾	217 MPa
Longitudinal modulus of elasticity ⁽¹⁾	30,400 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Half-quarter sawn



Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Sawdust may cause allergies.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: very important that gluing be performed in compliance with the code of practice and instructions for the glue used.

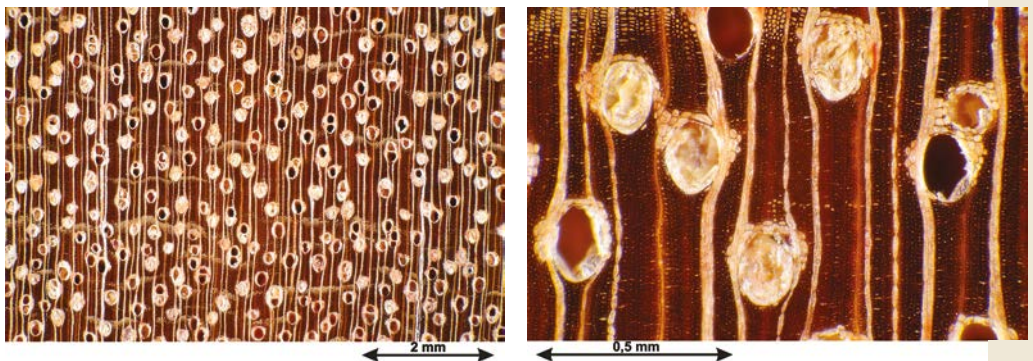
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Chlorocardium rodiei*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes D50 and D70 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Shipbuilding
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Cooperage
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. Though infrequently used in France, Greenheart is one of the most suitable species for end uses submerged in salt water, sea water or brackish water. Species is resistant to acids. Greenheart is also used for billiard cues.

Common names

Country	Local name
Brazil	Bibiru, Itauba branca
Guyana	Bibiru, Demerara, Greenheart
Suriname	Beeberoe, Groenhart, Sipiroe
Venezuela	Viruviru

Notes. In Suriname, the name Greenheart is used for Ipê square-edged timber and baulks.



Pergola – Made by Woods Direct International LLC, Perez Art Museum, Miami (United States).

Grenadillo

Family. Leguminosae (Fabaceae)

Botanical name

Dalbergia melanoxylon Guill. & Perr.

Continent. Africa

CITES (Washington Convention of 2017)

Grenadillo is listed in CITES Appendix II

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Black

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Light yellow sapwood. Heartwood dark purple-brown with black streaks. Typical rose scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.29
Monnin hardness ⁽¹⁾	22.1
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	4.8 %
Total radial shrinkage (Rs):	2.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	25 %
Thermal conductivity (λ)	0.40 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	72 MPa
Static bending strength ⁽¹⁾	162 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,250 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Quarter sawn

Notes. This species naturally covers the use class 5 (end uses submerged in salt water, sea water or brackish water) due to its pronounced hardness. However this characteristic is of little interest for this precious species.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

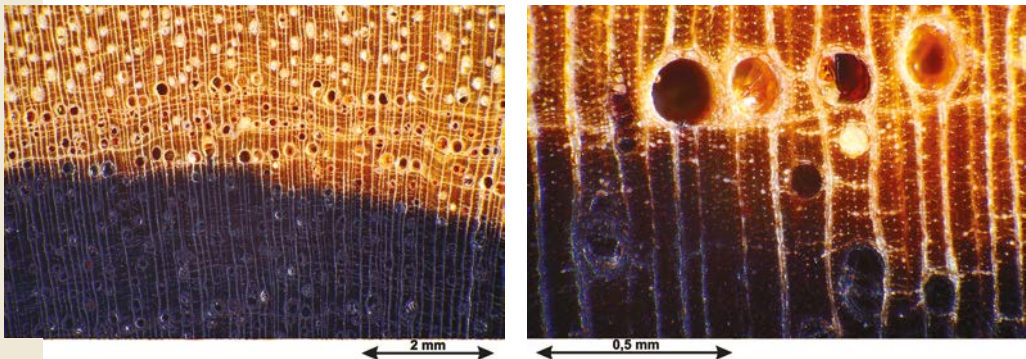
Notes. Very high specific gravity: very important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Cross sections of *Dalbergia melanoxylon*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Clarinet components, Montpellier (France).

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Wind instruments (especially clarinets)
- Tool handles (resilient woods)
- Sculpture
- Marquetry

Notes. End uses similar to those of Ebony, to which it is sometimes considered superior as less likely to split.

Common names

Country	Local name
South Africa	Ebbehout, Driedoring, Mokelete, Sebrahout, Swartdriedoring, Umbambangwe
Ethiopia	Zebe, Zobbi
Kenya	Kikwaju, Mpingo, Poyi
Mali	Farakalay
Mozambique	Ebène du Mozambique, Grenadille d'Afrique, Grenadille du Mozambique, Grenadillo, Pau preto
Uganda	Motangu
Democratic Republic of Congo	Kafundula
Senegal	Dialambame, Ébène
Chad	Tabum
Zambia	Chinsale, Kasalusalu, Mfwankomo, Mkelete, Mkumudwe, Msalu, Mukelete, Musonkomo
Zimbabwe	Murwiti, Pulpulu

Guarea, Scented* / Bossé clair

* Common commercial name

Family. Meliaceae

Botanical names

Guarea cedrata Pellegr.

Guarea laurentii De Wild.

Guarea p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Irregular or wavy grain. Pinkish brown. Slightly moiré. *G. cedrata* has a cedar scent and tends to resin exudations.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.63
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	4.1 %
T/R anisotropy ratio	1.7
Fibre saturation point	31 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	19,810 kJ/kg
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	95 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,650 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible



Flat sawn



Quarter sawn

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Variable durability according to the species. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Tendency to resin exudation for *G.cedrata* with a possible influence on the appearance of dried timber.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

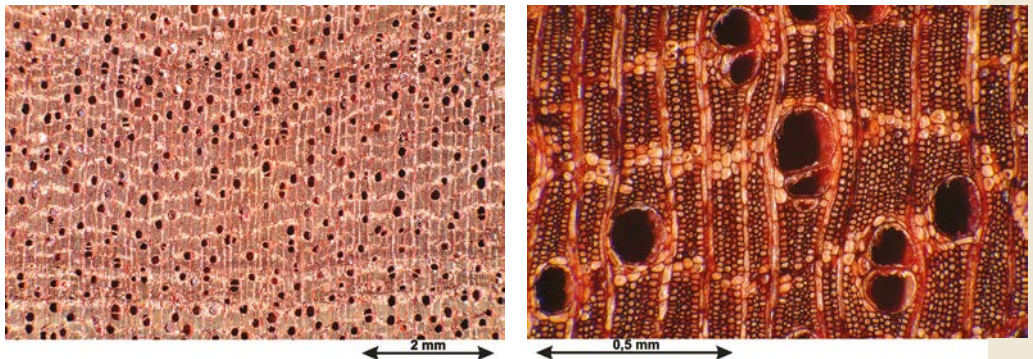
Notes. The silica content of *G.cedrata* can be high to very high. Sawdust is an irritant.

Assembling

Nailing/screwing. Good

Notes. Gluing *G. cedrata* may be difficult due to resin exudations.

Cross sections of *Guarea cedrata*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cigar boxes
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Rolling shutters

Notes. Filling is recommended to obtain a better finish. Resin exudations may be an inconvenient for some uses.

Common names

Country	Local name
Germany	Bosse, Diambi
Cameroon	Ebangbemwa
Côte d'Ivoire	Bossé clair
Gabon	Ossoung
Ghana	Kwabohoro
Nigeria	Obobo nofua
Central African Republic	N'zombou
Democratic Republic of Congo	Bosasa, Diambi
United Kingdom	Scented guarea

Guarea, Black* / Bossé foncé

* Common commercial name

Family. Meliaceae

Botanical name

Guarea thompsonii Sprague & Hutch.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Orange brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Irregular grain but straighter than Scented Guarea. Slightly moiré.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	5.3
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.6
Fibre saturation point	26 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	18,770 kJ/kg
Crushing strength ⁽¹⁾	66 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sawdust is an irritant.

Assembling

Nailing/screwing. Good

Notes. Pre-boring may be necessary due to wood hardness.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

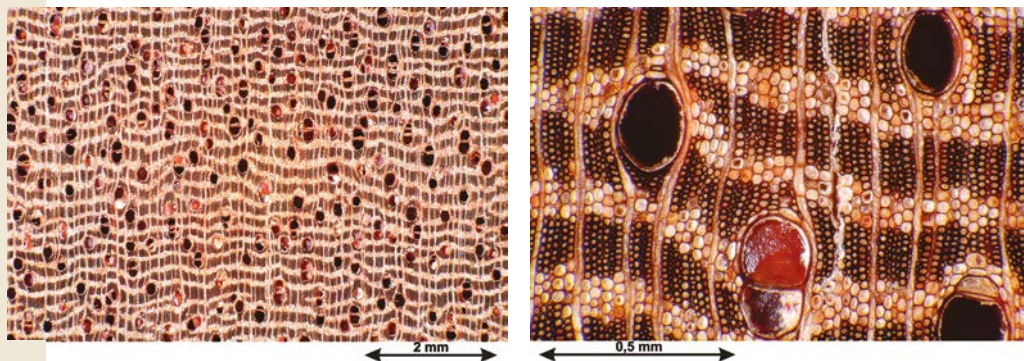
- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Guarea thompsonii*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cigar boxes
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Rolling shutters

Notes. Filling is recommended to obtain a better finish.

Common names

Country	Local name
Germany	Bosse, Diambi
Côte d'Ivoire	Mutigbanaye
Gabon	Ossoung
Ghana	Guarea
Kenya	Bolon
Nigeria	Obobo nekwi
Central African Republic	N'zombou
Democratic Republic of Congo	Diambi
United Kingdom	Black guarea



Flat sawn



Quarter sawn

Guariúba

Family. Moraceae

Botanical name

Clarisia racemosa Ruiz & Pav.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Marked but not frequent

Notes. Yellow wood becoming lustrous brown with light. Ribbon-like aspect on quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.69
Monnin hardness ⁽¹⁾	4.6
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	3.1 %
T/R anisotropy ratio	2.1
Fibre saturation point	22 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	19,210 kJ/kg
Crushing strength ⁽¹⁾	68 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of end checks during kiln drying.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Surface of some woods sometimes rough due to interlocked grain. It is advised to keep tools sharp.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

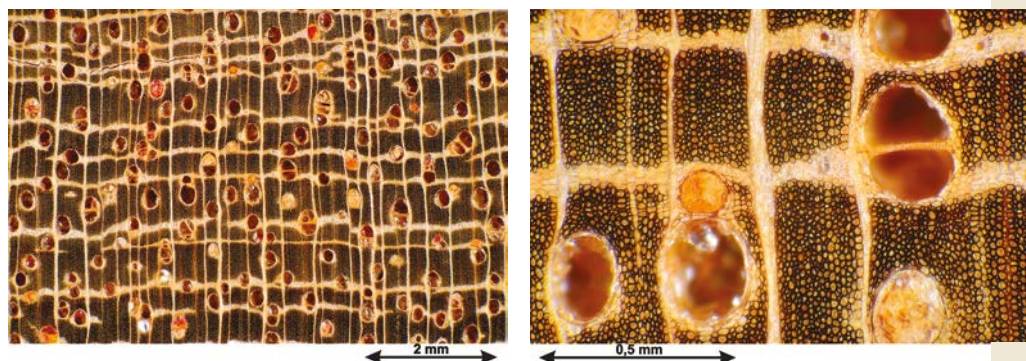
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Cross sections of *Clarisia racemosa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Cabinetry (high-end furniture)
- Open boats
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Panelling
- Glued Laminated
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Notes. Can be used as a substitute for Maple, Birch and Boxwood.

Common names

Country	Local name
Bolivia	Murure
Brazil	Oiticica amarela, Oiticica da mata, Guariúba
Colombia	Aji, Guariuba
Ecuador	Mata palo, Moral bobo, Pituca
Peru	Capinuri, Guariuba, Murere, Turupay amarillo



Deck – Ebata Produtos Florestais Ltda, Bélem (Pará, Brazil).

Guatambù

Family. Rutaceae

Botanical name

Balfourodendron riedelianum Engl.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.82
Monnin hardness ⁽¹⁾	7.3
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	8.6 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.8
Fibre saturation point	24 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	131 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,850 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment



Flat sawn

Half-quarter sawn



In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Kiln drying must be handled slowly to limit the risk of end checks.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

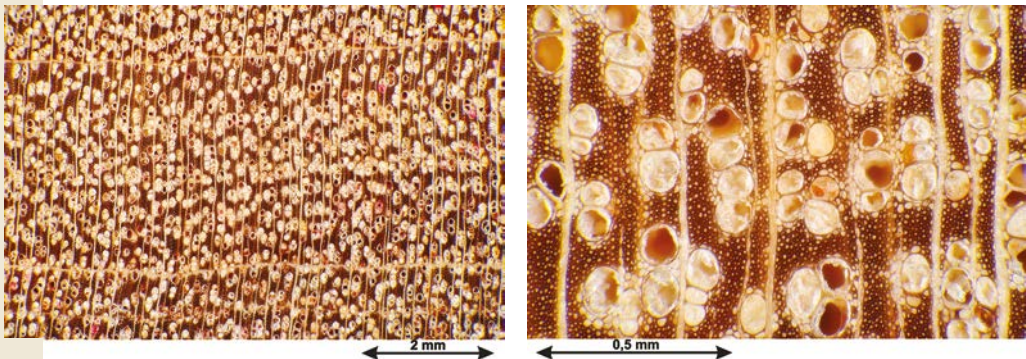
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Balfourodendron riedelianum*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Substitute for European Boxwood (*Buxus sempervirens*).

Common names

Country	Local name
Argentina	Guatambù
Brazil	Guatambù, Pau marfim
Paraguay	Guatambù blanco

Haldu

Family. Rubiaceae

Botanical names

Adinauclea fagifolia Ridsdale (Syn. *Adina fagifolia*)

Haldina cordifolia Ridsdale (Syn. *Adina cordifolia*)

Pertusadina eurhyncha Ridsdale (Syn. *Adina rubescens*)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. n.d.

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Very wide sapwood. Yellow wood darkening to yellow brown with age. Lustrous surface.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.5
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	3.4 %
T/R anisotropy ratio	2.0
Fibre saturation point	23 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,770 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Tends to split during air drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Irritant sawdust.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

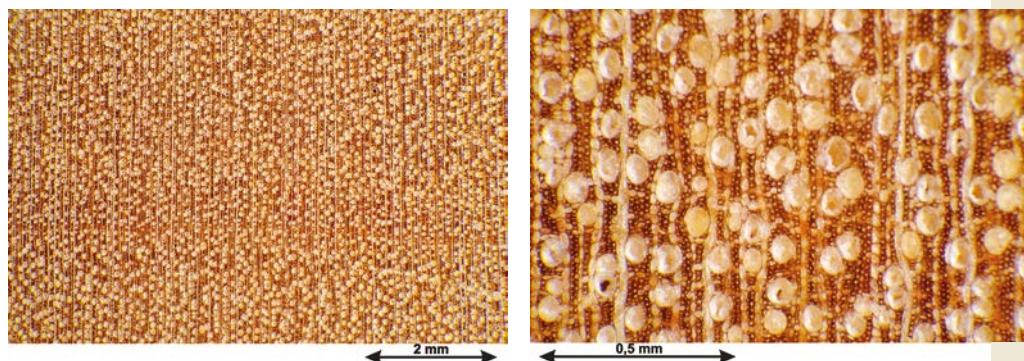
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Adinauclea fagifolia*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cigar boxes
- Framing
- Pencils
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Cooperage

Notes. Resistant to acids.

Common names

Country	Local name
Cambodia	Kwao
India	Haldu
Indonesia	Lasi
Malaysia	Meraga
Myanmar	Hnaw
Philippines	Adina
Sri Lanka	Kolon
Thailand	Kwao
Viet Nam	Gao-vang

Hevea / Rubberwood*

* Common commercial name

Family. Euphorbiaceae

Botanical name

Hevea brasiliensis Muell. Arg.

Continent. Africa, Latin America, Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to the Amazonian forest, Hevea was widely planted in South East Asia and later in Africa. Rubberwood is the name used in all South East Asia.

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Logs must be treated, extracted and sawn as soon as possible after felling. Cream white wood becoming light brown.

Physical and mechanical properties

Property	Mean value
Density(1)	0.65
Monnin hardness(1)	3.0
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	5.6 %
Total radial shrinkage (Rs):	2.2 %
T/R anisotropy ratio	2.5
Fibre saturation point	24 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	17,850 kJ/kg
Crushing strength ⁽¹⁾	51 MPa
Static bending strength ⁽¹⁾	82 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,760 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

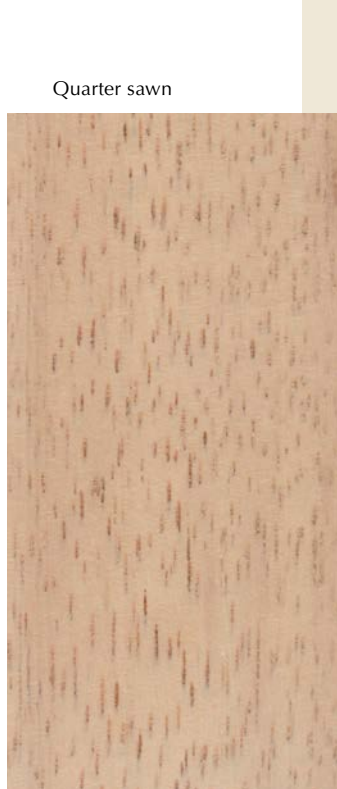
Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Careful piling, top weighting of the stacks and end-coating are recommended to avoid distortions and cracks.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Presence of internal stresses. Latex tends to clog saw teeth.

Assembling

Nailing/screwing. Good but pre-boring necessary

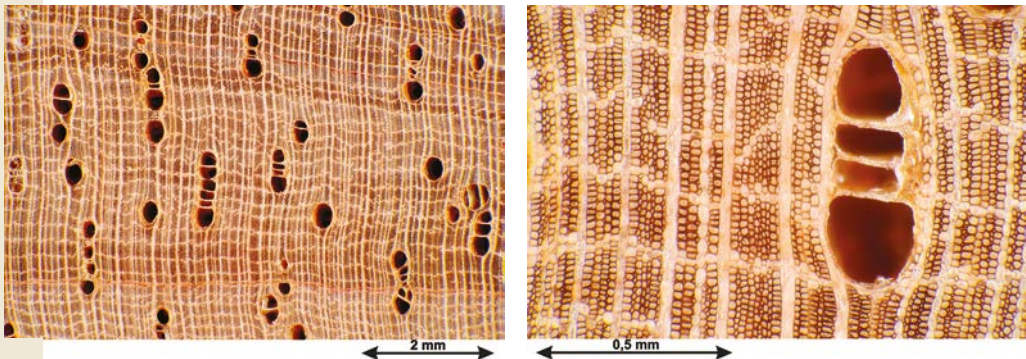
Notes. Tends to split with nailing.

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Hevea brasiliensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Stairs (inside)
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Flooring
- Sliced veneer
- Pulp

Notes. Stains well.

Common names

Country	Local name
Brazil	Hevea, Mapalapa, Seringa, Seringueira
United States	Rubber wood
France	Hévéa
Guyana	Hatti
Malaysia	Hevea wood
Peru	Jeve, Shirenga
United Kingdom	Para rubber tree
Thailand	Rubber tree
Venezuela	Arbol de caucho



Chair in rubber wood blockboard – South East Wood Co Ltd, Klaeng District, Rayong (Thailand).



Flat sawn

Quarter sawn



Iatandza

Family. Leguminosae (Mimosaceae)

Botanical names

Albizia angolensis Welw.

Albizia antunesiana Harms

Albizia ferruginea Benth.

Albizia glaberrima Benth.

Albizia versicolor Welw.

Albizia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Heartwood yellow brown to dark red brown, with golden glints. Grain sometimes very interlocked.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	3.4
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	4.9 %
Total radial shrinkage (Rs):	2.8 %
T/R anisotropy ratio	1.8
Fibre saturation point	24 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	18,870 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	81 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of distortion in case of highly interlocked grain.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Irritant sawdust.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

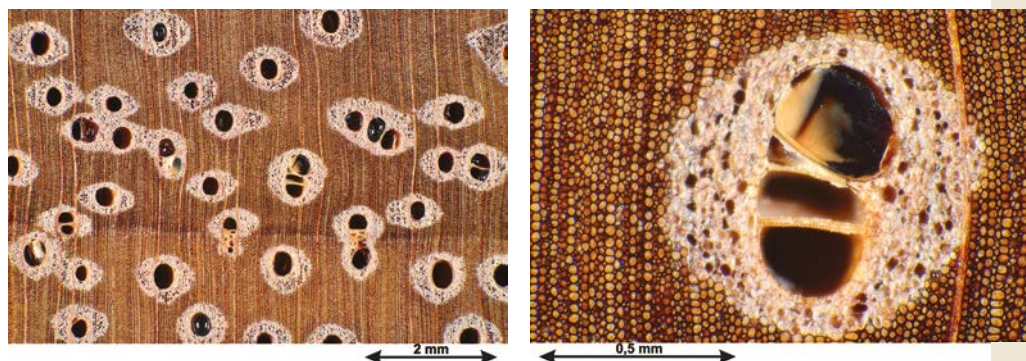
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Albizia ferruginea*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Formwork
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Notes. Filling is required to obtain a good finish.

Common names

Country	Local name
Angola	Zanzangue
Benin	Agla nyinfun
Cameroon	Évouvous
Congo	Sifou-sifou
Côte d'Ivoire	Yatandza
France	Iatandza
Ghana	Aviemfo-samina, Okuro
Mozambique	Tanga-Tanga
Nigeria	Ayinre-ogo
Uganda	Mugavu, Nongo
Democratic Republic of Congo	Elongwamba, Okuru
United Kingdom	West African albizia



Flooring – by Brenco Exotic Woods (United States).

Idéwa

Family. Leguminosae (Fabaceae)

Botanical name

Haplormosia monophylla Harms

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Light yellow sapwood. Heartwood yellowish brown to chocolate brown. Thin silver figure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	8.0
Coefficient of volumetric shrinkage	0.63 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	2.9 %
T/R anisotropy ratio	2.4
Fibre saturation point	21 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	133 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,910 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (end uses submerged in salt water, sea water or brackish water) due to its



Flat sawn

Quarter sawn



pronounced hardness. However this characteristic is of little interest for this semi-precious species.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Difficulties in machining due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

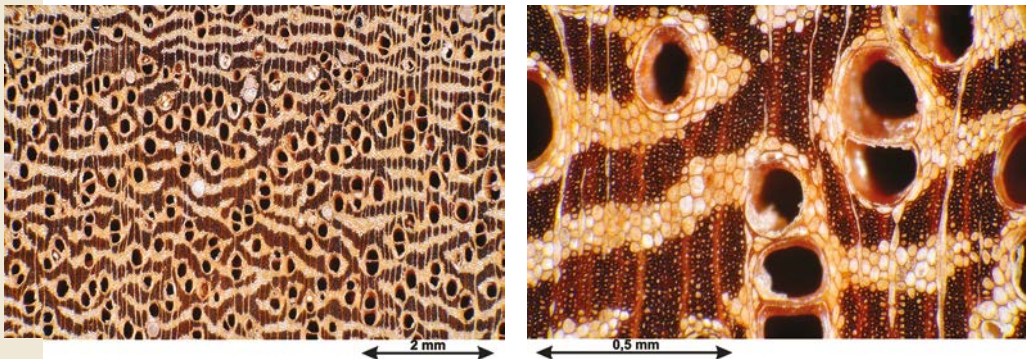
• For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Haplormosia monophylla*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Substitute for Afrormosia and Rosewood.

Common names

Country	Local name
Côte d'Ivoire	Dinankrohia, Lame
Gabon	Idéwa
Liberia	Black gum
Nigeria	Akoti



Restaurant on the edge of Fernan Vaz lagoon, Omboué (Gabon).

Igaganga

Family. Burseraceae

Botanical name

Dacryodes igaganga Aubrév. & Pellegr.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood yellow to orangey brown, more or less deep. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.61
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	7.8 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	1.6
Fibre saturation point	29 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	18,370 kJ/kg
Crushing strength ⁽¹⁾	57 MPa
Static bending strength ⁽¹⁾	95 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Equivalent to Okoumé for peeling. Quite difficult to saw due to silica content.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

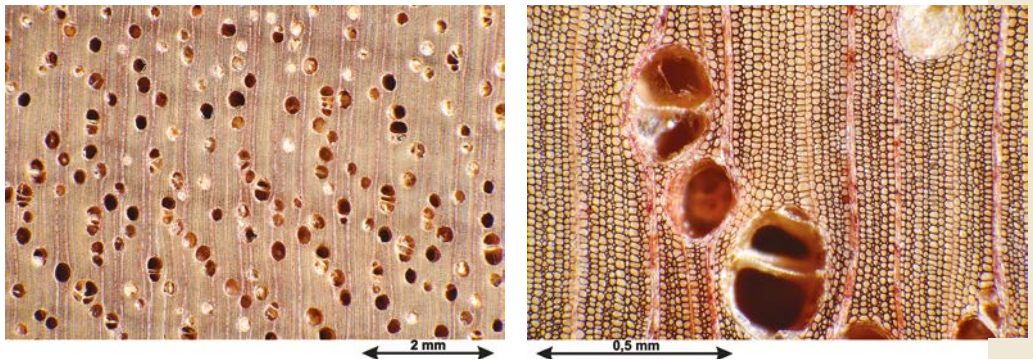
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Dacryodes igaganga*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Flooring
- Sliced veneer
- Marquetry

Common names

Country	Local name
Cameroon	Assas, Bamisa, Beuhago, Boso, Mokoba
Gabon	Igaganga
Nigeria	Ibagho, Onumu, Orumu

Ilomba

Family. Myristicaceae

Botanical names

Pycnanthus angolensis Warb. (Syn. *Pycnanthus kombo*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Possible presence of brittleheart. Strong tendency to split. Wood pinkish brown to light brown.

Physical and mechanical properties

Property	Mean value
Density(1)	0.49
Monnin hardness(1)	1.4
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	8.6 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.9
Fibre saturation point	33 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	18,030 kJ/kg
Crushing strength(1)	38 MPa
Static bending strength(1)	63 MPa
Longitudinal modulus of elasticity(1)	10,130 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Drying very difficult for thicknesses > 54 mm.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Quartersawn is recommended in order to reduce the risk of distortion during drying.

Assembling

Nailing/screwing. Poor

Notes. Tends to split with nailing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

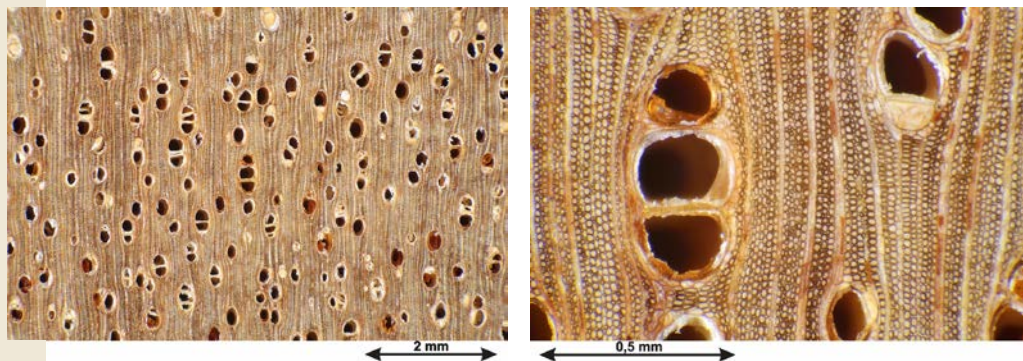
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Pycnanthus angolensis*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Pencils
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Exterior panelling
- Rolling shutters

Common names

Country	Local name
Angola	Ilomba
Benin	Jaja
Cameroon	Éteng
Congo	Ilomba
Côte d'Ivoire	Walélé
Gabon	Éteng
Ghana	Otie
Equatorial Guinea	Calabo
Nigeria	Akomu
Central African Republic	Gélé
Democratic Republic of Congo	Ilomba, Lejonclo, Lifondo, Lolako
United Kingdom	Pycnantus
Sierra Leone	Kpoyei



Flat sawn



Quarter sawn

Imbuia

Family. Lauraceae

Botanical names

Ocotea porosa Barroso (Syn. *Phoebe porosa*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood yellow brown to dark brown with irregular, thin darker veins. Pleasant scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	4.9
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	3.3 %
T/R anisotropy ratio	2.1
Fibre saturation point	25 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	19,830 kJ/kg
Crushing strength ⁽¹⁾	49 MPa
Static bending strength ⁽¹⁾	84 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,260 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. Slow drying recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sawdust may cause dermatitis.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

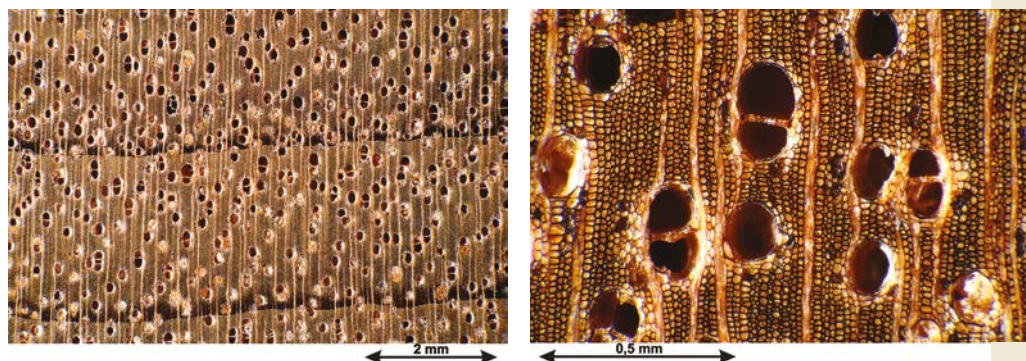
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Ocotea porosa*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer
- Exterior panelling

Notes. Can be used as a substitute for European walnut (*Juglans regia*). This species is most often reserved for deluxe end uses.

Common names

Country	Local name
Brazil	Canela, Canela imbuia, Embuia, Imbuia
United States	Brazilian walnut
United Kingdom	Brazilian walnut

Inga

Family. Leguminosae (Mimosaceae)

Botanical names

Inga alba Willd.

Inga pezizifera Benth.

Inga p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The genus *Inga* is composed of a large number of species with variable properties.

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Light pinkish brown to red brown. Grain sometimes wavy.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	3.4 %
T/R anisotropy ratio	2.0
Fibre saturation point	29 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	18,870 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible



Half-quarter sawn

Quarter sawn



Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good

Notes. Tendency to woolliness.

Commercial grading

Sawn timber appearance grading

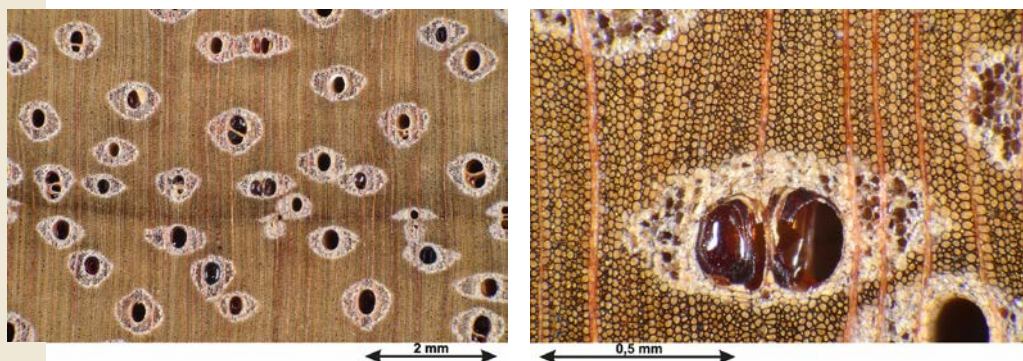
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is Bougouni». Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Inga alba*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for interior of plywood
- Glued Laminated
- Interior joinery
- House framing
- Flooring

Notes. Filling is recommended.

Common names

Country	Local name
Argentina	Inga
Brazil	Inga, Inga-chi-chi, Inga-chi-chica, Ingazeira
Guyana	Kurang, Kwari, Kwariye, Kwarye, Maporokon, Yokar
French Guiana	Bois pagode, Bougouni, Lebi oueko, Oueko
Inga	Shimbillo
Suriname	Aboonkini, Prokonie
Venezuela	Bunzquillo, Guamo



Flat sawn



Quarter sawn

Ipê

Family. Bignoniaceae

Botanical names

Handroanthus heptaphyllus Mattos (Syn. *Tabebuia heptaphylla*)

Handroanthus impetiginosus Mattos (Syn. *Tabebuia impetiginosa*)

Handroanthus serratifolius S.O. Grose (Syn. *Tabebuia serratifolia*)

Handroanthus p.p. (Syn. *Tabebuia* p.p.)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Woods called Ipê belong actually to *Handroanthus* genus. They were previously classified in the *Tabebuia* genus (when specific gravity is over 0.85).

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 3 to 9 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Some species have a medium texture. Sometimes yellowish brown to dark olive brown, sometimes with thin veins. Canals contain a greenish yellow deposit (lapachol).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.04
Monnin hardness ⁽¹⁾	14.6
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	6.4 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.3
Fibre saturation point	20 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	20,300 kJ/kg
Crushing strength ⁽¹⁾	95 MPa
Static bending strength ⁽¹⁾	166 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,760 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Slow kiln drying is recommended to reduce defects, especially with thick boards.

Suggested drying schedule. Schedule #9 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

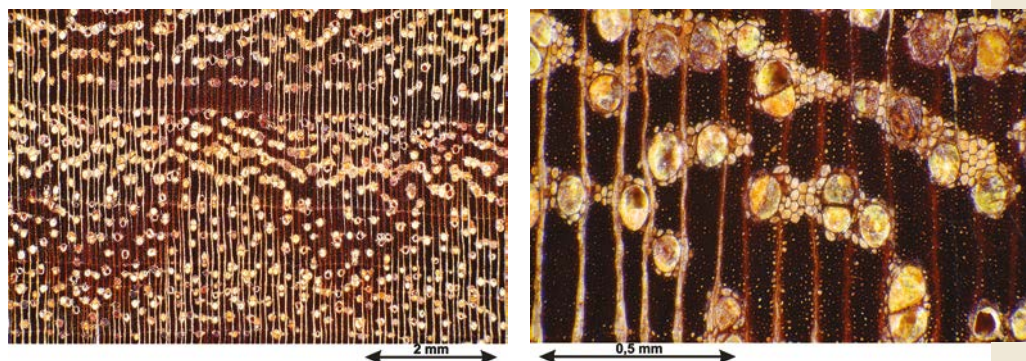
Notes. Sawdust can cause dermatitis. Some difficulties due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Handroanthus impetiginosa*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Ebène verte". Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D50 can be provided by visual grading. According to French standard NF B 52-001-1/A2 (2015), strength class D70 can be provided by visual grading for Ipê from French Guiana (locally known as Ébène verte).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Grading for solid wood, according to requirements of European standard NF EN 14081-1 (April 2016): structural graded timber with a minimal thickness of 22 mm. Assigned according to procedures of the standard NF EN 13501-1. Assigned according to procedures of the European grading report No. RA05-0238B prepared by CSTB.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Musical instruments
- Tool handles (resilient woods)
- Built-in furniture or mobile item
- Moulding
- Industrial or heavy flooring
- Stakes
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
Argentina	Lapacho
Bolivia	Ipê, Lapacho, Tajibo
Brazil	Ipê, Ipê roxo, Pau d'arco
Colombia	Canaguatè, Polvillo, Roble morado
Ecuador	Guayacán
Guyana	Hakia, Ironwood
French Guiana	Ébène verte, Ipê
Paraguay	Lapacho negro
Peru	Ebano verde, Tahuari
Suriname	Groenhart
Trinidad and Tobago	Puy, Yellow poui
Venezuela	Acapro, Araganey, Puy



Decking on the belvedere of Mont Saint-Clair, Sète (France).

Iroko

Family. Moraceae

Botanical names

Milicia excelsa C.C. Berg (Syn. *Chlorophora excelsa*)

Milicia regia C.C. Berg (Syn. *Chlorophora regia*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Yellow brown to more or less dark brown, with golden glints. Ribbon-like aspect on quartersawn, darker veins on slab. Possible presence of very hard white calcium carbonate deposits, sometimes surrounded by a darker colour.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	4.1
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	5.4 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	1.5
Fibre saturation point	23 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	19,900 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	87 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,840 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water). Heartwood does not cover use class 4 required for end uses in contact with permanent humidity (example: contact with ground). On the other hand, this species can be used outside without any treatment if the construction is well-drained and does not have a water trap. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Calcium carbonate deposits in some logs severely damage tools. Very irritant sawdust. Risk of tearing (interlocked grain).

Assembling

Nailing/screwing. Good

Commercial grading

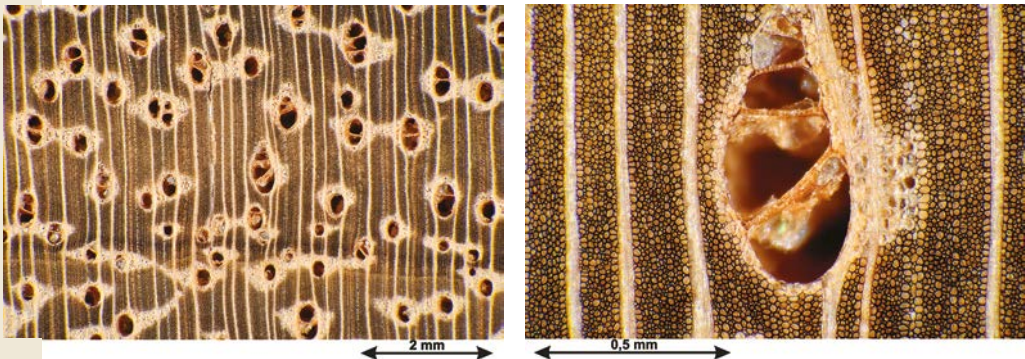
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Milicia excelsa*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D40 can be provided by visual grading. Strength class D30 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Cooperage

Notes. Filling is recommended. Wood sometimes resistant to wood finish product. Iroko contains a non-saturated phenolic compound: chlorophorin, a powerful anti-oxidant. Paints or varnishes free of siccative oil are therefore used for finishing. These synthetic, resin-based paints and varnishes (such as vinyl paints and polyurethane varnishes) can also be used as an undercoat.

Common names

Country	Local name
Angola	Moreira
Belgium	Kambala
Benin	Lokotin
Cameroon	Abang
Congo	Kambala
Côte d'Ivoire	Iroko
Gabon	Abang, Mandji
Ghana	Odoum
Guinea	Simmé



Glued laminated framework, Jean-Marie Tjibaou Cultural Centre – Nouméa (New Caledonia).

Country	Local name
Equatorial Guinea	Abang
Liberia	Semli
Mozambique	Mufula, Tule
Nigeria	Rokko
Central African Republic	Bangui
Democratic Republic of Congo	Kambala, Lusanga, Mokongo, Moloundou
Sierra Leone	Semli



Flat sawn



Quarter sawn

Itaúba

Family. Lauraceae

Botanical names

Mezilaurus ita-uba Taub.

Mezilaurus lindaviana Schwake & Mez

Mezilaurus navalium Taub.

Mezilaurus p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 80 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Oily aspect. Colour varies from yellow brown to dark lustrous brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.86
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	9.7 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	2.6
Fibre saturation point	27 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	19,880 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	125 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,020 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. The possible presence of few demarcated sapwood may have an influence on the expected durability. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its repulsive extract content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Must be dried slowly to reduce defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

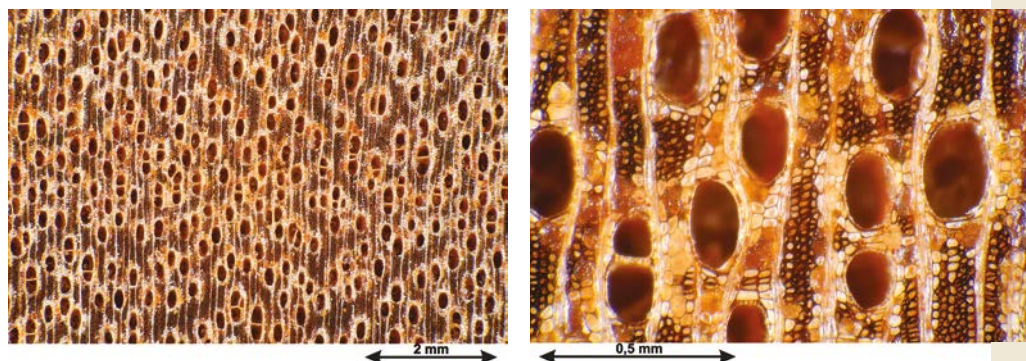
Notes. Difficulties due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Mezilaurus ita-uba*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.



Deck slabs – Ebata Produtos Florestais Ltda, Bélem (Pará, Brazil).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shingles
- Heavy carpentry
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Open boats
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Seats
- Hydraulic works (seawater)
- Sleepers

Common names

Country	Local name
Brazil	Itaúba, Louro Itaúba
French Guiana	Taoub, Taoub jaune
Suriname	Kaneelhout

Izombé

Family. Ochnaceae

Botanical name

Testulea gabonensis Pellegr.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood yellow brown to orange yellow.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	5.2
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	1.8
Fibre saturation point	25 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	20,340 kJ/kg
Crushing strength ⁽¹⁾	61 MPa
Static bending strength ⁽¹⁾	100 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,090 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to the European



Half-quarter sawn



Quarter sawn

standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Difficulties possible in planing due to interlocked grain.

Assembling

Nailing/screwing. Good

Notes. Pre-boring sometimes necessary, in particular for small pieces.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

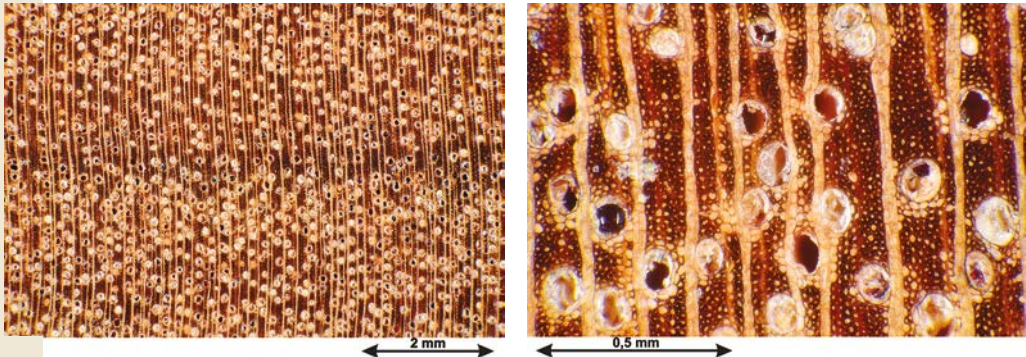
• For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Testulea gabonensis*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Sculpture

Notes. This wood must be machined with a moisture content inferior to the one usually indicated for the forecasted end use.

Common names

Country	Local name
Cameroon	Roné
Congo	N'gwaki
Gabon	Aké, Akéwé, Izombé, N'komi



Classroom furniture – Gorilla In & Out Furniture, Libreville (Gabon)



Flat sawn

Half-quarter sawn



Jacareúba

Family. Calophyllaceae (Clusiaceae)

Botanical name

Calophyllum brasiliense Cambess.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 100 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Heartwood is pink light brown with thin darker veins. Occasional presence of resin.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.65
Monnin hardness ⁽¹⁾	3.0
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	8.1 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.5
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	94 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,840 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. Poorly to moderately resistant to termites. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended to reduce the risk of defects.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties with sawing and machining due to interlocked grain. Resin can sometimes clog tools.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

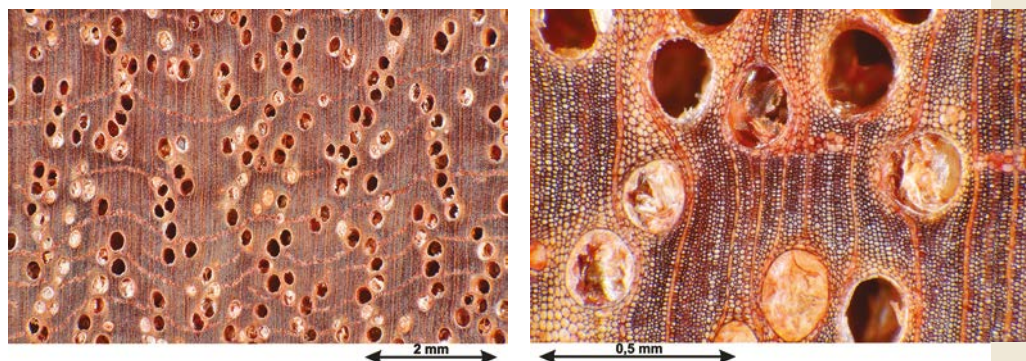
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Calophyllum brasiliense*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Ship building (planking and deck)
- Boxes and crates
- Open boats
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Cooperage

Notes. Filling is recommended to obtain a better finish. Some uses mentioned call for a slight interlocked grain.

Common names

Country	Local name
Argentina	Jacareuba
Belize	Santa maria
Bolivia	Balsa maria
Brazil	Cedro do pantano, Guanandi, Jacareúba
Colombia	Aceite mario, Aceite cachicamo, Mario
Ecuador	Bella maria, Maria
Guyana	Kurahara
Honduras	Santa maria
Jamaica	Santa maria
Peru	Alfaro, Jacareuba, Lagarto-caspi
Suriname	Kurahara
Venezuela	Cachicamo, Palo maria

Jarrah

Family. Myrtaceae

Botanical name

Eucalyptus marginata Donn

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Jarrah commercialised today no longer comes from primary forests. It only comes from regrowth forests (Australia) or plantations (South Africa, especially).

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Narrow sapwood. Wood red brown to dark brown, sometimes interlocked, wavy or curly.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.82
Monnin hardness ⁽¹⁾	9.3
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	10.5 %
Total radial shrinkage (Rs):	6.4 %
T/R anisotropy ratio	1.6
Fibre saturation point	34 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	81 MPa
Static bending strength ⁽¹⁾	101 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,090 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties of Jarrah vary greatly according to trees age and growth conditions.

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable



Flat sawn



Half-quarter sawn

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used. Resistance to termites varies widely depending on the origin of the wood (e.g. natural forest or plantation).

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. (Air) drying must be done very slowly. Drying by dehumidification is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

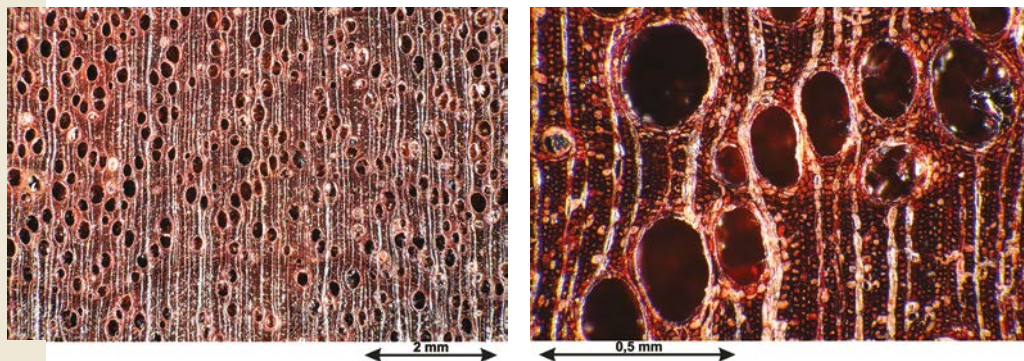
Notes. Sawing and machining difficulties in the presence of interlocked grain. Reducing the cutting angle to 15° is recommended to avoid tearing.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Eucalyptus marginata*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Glued Laminated
- Moulding
- Flooring

Common names

Country	Local name
Australia	Jarrah



Interior staircase in glued laminated timber – by Les Bois du Pacifique, Nouméa (New Caledonia).

- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Hydraulic works (fresh water)
- Sleepers

Jatobá / Algarrobo*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Hymenaea courbaril L.

Hymenaea intermedia Ducke

Hymenaea oblongifolia Huber (Syn. *Hymenaea davisii*)

Hymenaea p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 3 to 12 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood has slight internal stresses. Colour can vary from purple brown or orangey brown to red brown with some veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.94
Monnin hardness ⁽¹⁾	10.5
Coefficient of volumetric shrinkage	0.59 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	1.9
Fibre saturation point	23 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	18,920 kJ/kg
Crushing strength ⁽¹⁾	97 MPa
Static bending strength ⁽¹⁾	160 MPa
Longitudinal modulus of elasticity ⁽¹⁾	23,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. *Hymenaea intermedia* and *H. parvifolia* are the heaviest and resistant species.

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Variable resistance to decay and termites depending on species. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Initial air drying under cover is recommended prior to kiln drying. More or less risk of splits depending on specific gravity.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

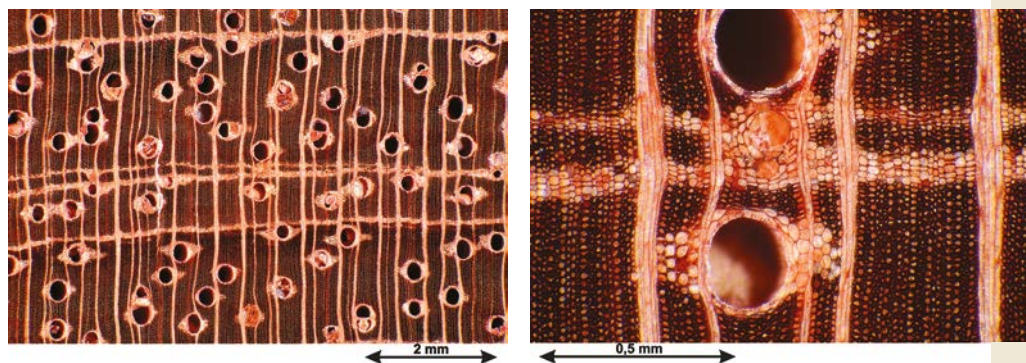
Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Hymenaea courbaril*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is Courbaril». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D50 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Musical instruments
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Exterior panelling
- Sculpture
- Marquetry
- Cooperage

Notes. End uses in permanently humid conditions (water or ground contact) are possible with species with very good durability.

Common names

Country	Local name
Brazil	Jatai, Jatobá, Jutai, Jutai açu, Jutai roxo
Colombia	Algarrobo
France	Courbaril, Jatoba
Guadeloupe	Copalier
Guyana	Locust
French Guiana	Courbaril
Honduras	Guapinol
Peru	Azucar-huayo, Yutubanco
United Kingdom	Locust
Suriname	Rode lokus
Venezuela	Algarrobo



Office fittings – from Atelier 7 ébénisterie, Eke (Belgium).

Jelutong

Family. Apocynaceae

Botanical names

Dyera costulata Hook. f.

Dyera polyphylla Steenis

Dyera p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Brittleheart. Wood cream white to light yellow. Frequent presence of large latex canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.6
Coefficient of volumetric shrinkage	0.35 % per %
Total tangential shrinkage (Ts):	5.5 %
Total radial shrinkage (Rs):	2.3 %
T/R anisotropy ratio	2.4
Fibre saturation point	22 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	27 MPa
Static bending strength ⁽¹⁾	45 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,040 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn



Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of surface checks due to latex canals. Risk of blue stain. Pocket moisture in thick material.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Latex may clog saw teeth. Keep tools sharp to obtain a good surface.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

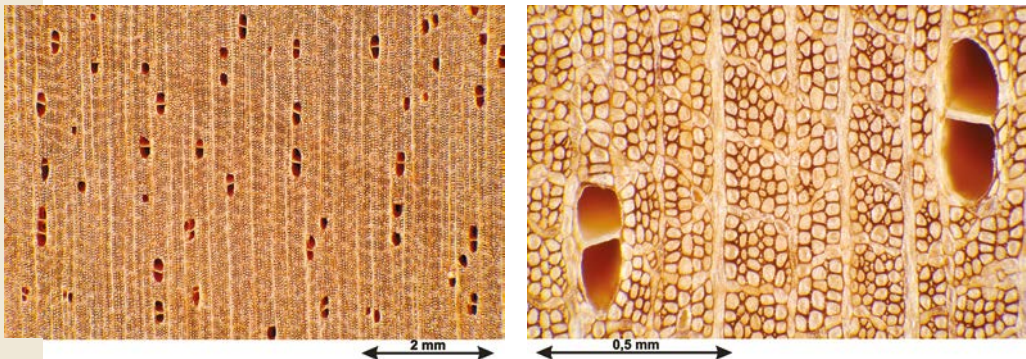
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Dyera costulata*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Pencils
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Sliced veneer
- Sculpture

Notes. Can be used as a substitute for Obeche and Poplar.

Common names

Country	Local name
Indonesia	Djelutong, Jelutong, Melabuwai
Malaysia	Andjaroetoeng, Jelutong, Jelutong bukit, Jelutong paya, Letoeng, Pantoeng

Jequitiba

Family. Lecythidaceae

Botanical names

Allantoma integrifolia S.A. Mori

Cariniana estrellensis Kuntze

Cariniana legalis Kuntze (Syn. *Cariniana brasiliensis*)

Cariniana p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. 1 to 3 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Wood light brown to pinkish brown. Possible presence of lined up traumatic canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	3.6
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	5.3 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	1.1
Fibre saturation point	24 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	18,840 kJ/kg
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	84 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,330 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Blunting effect normal or quite high due to silica content. Tendency to woolliness.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

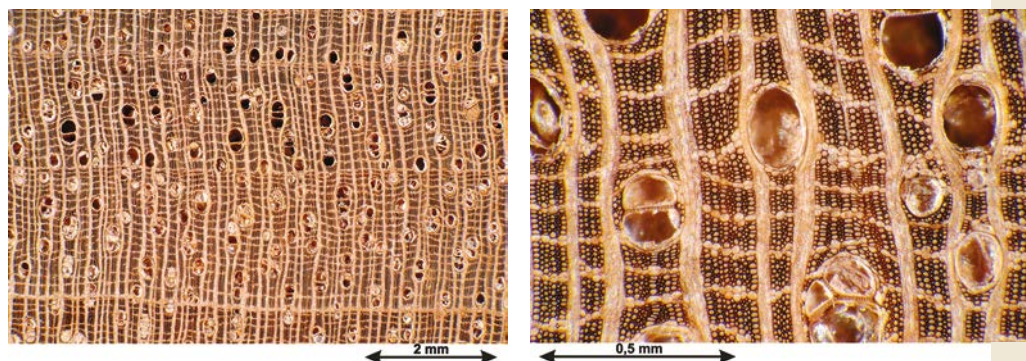
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Cariniana estrellensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Formwork
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer

Common names

Country	Local name
Bolivia	Yesquero
Brazil	Estopeiro, Jequitiba, Jequitiba branco, Jequitiba rosa, Jequitiba vermelho

Kanda brun

Family. Lauraceae

Botanical names

Beilschmiedia congolana Robyns & R. Wilczek

Beilschmiedia corbisieri Robyns & R. Wilczek

Beilschmiedia letouzeyi Robyns & R. Wilczek

Beilschmiedia oblongifolia Robyns & R. Wilczek

Beilschmiedia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Heartwood pink brown to red brown, orange-brown, less often dark brown. Colour is variable depending on the species.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.67
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.0 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	1.9
Fibre saturation point	26 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	60 MPa
Static bending strength ⁽¹⁾	103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,040 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable



Half-quarter sawn

Quarter sawn



Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

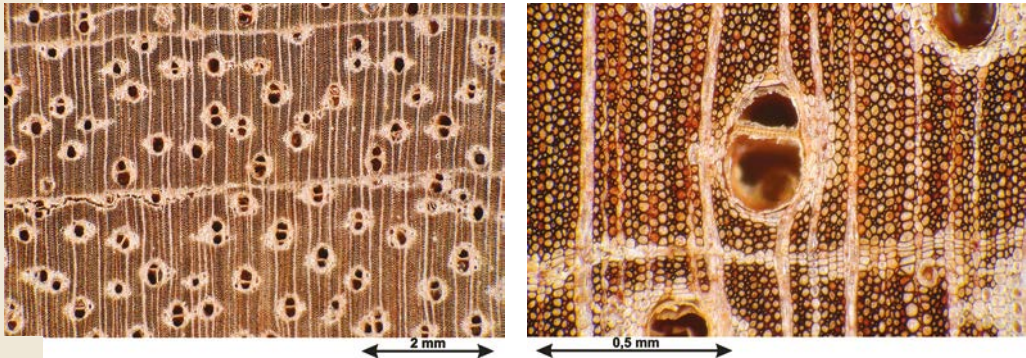
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Beilschmiedia congolana*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Seats

Common names

Country	Local name
Cameroon	Kanda, Kanda brun
Gabon	Nkonengu
Central African Republic	Bonzale
Democratic Republic of Congo	Bonzale
Tanzania	Mfimbo



Flat sawn

Quarter sawn



Kanda rose

Family. Lauraceae

Botanical names

Beilschmiedia gaboonensis Benth. & Hook.

Beilschmiedia grandifolia Robyns & R. Wilczek

Beilschmiedia hutchinsoniana Robyns & R. Wilczek

Beilschmiedia mannii Benth. & Hook.

Beilschmiedia obscura A. Chev.

Beilschmiedia p.p. e)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood greenish brown to olive brown, or even dark red brown depending on species.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	3.7
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	2.0
Fibre saturation point	29 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

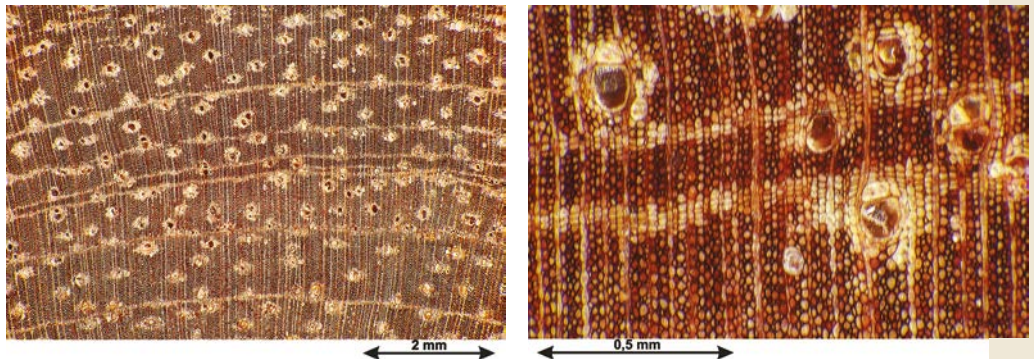
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Beilschmiedia mannii*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Seats

Common names

Country	Local name
Cameroon	Kanda, Kanda rose
Côte d'Ivoire	Atiokouo, Bitéhi
Gabon	Nkonengu
Democratic Republic of Congo	Bonzale
Tanzania	Mfimbo

Kapokier

Family. Malvaceae (Bombacaceae)

Botanical names

Bombax buonopozense P. Beauv. (Syn. *Bombax flammeum*)

Bombax costatum Pellegr. & Vuillet

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Logs must be treated, extracted, sawn and dried as soon as possible after felling. Whitish to pinkish gray. Silver figure medium to large.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.41
Monnin hardness ⁽¹⁾	1.1
Coefficient of volumetric shrinkage	0.32 % per %
Total tangential shrinkage (Ts):	5.4 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	1.8
Fibre saturation point	26 %
Thermal conductivity (λ)	0.15 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	27 MPa
Static bending strength ⁽¹⁾	46 MPa
Longitudinal modulus of elasticity ⁽¹⁾	6,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Very prone to blue stain.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

SATA grading rules are infrequently applied due to specific technological properties and uses of this species.

Fire safety

Conventional French grading

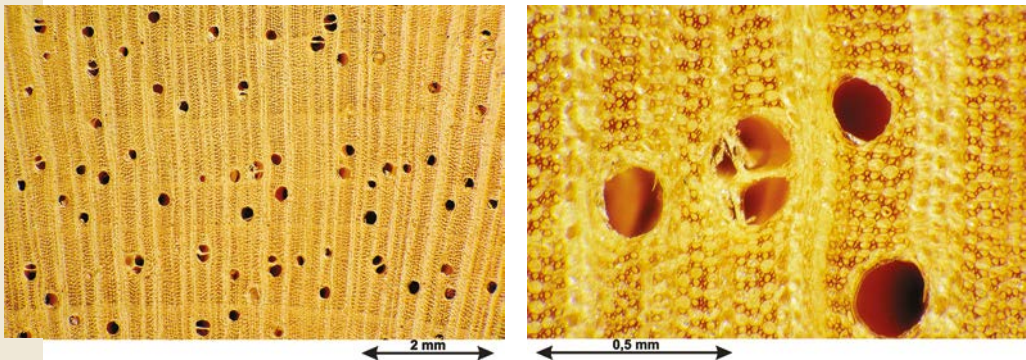
Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Cross sections of *Bombax costatum*



Main end uses

- Matches
- Boxes and crates
- Floats
- Veneer for interior of plywood
- Insulation
- Built-in furniture or mobile item
- Moulding
- Blockboard

Notes. End uses similar to those of Fromager.

Common names

Country	Local name
Cameroon	Esodoum
Congo	Kapokier
Côte d'Ivoire	Kapokier, Oba
Nigeria	Kouria



Flat sawn



Quarter sawn

Kapur

Family. Dipterocarpaceae

Botanical names

Dryobalanops beccarii Dyer (Syn. *Dryobalanops oocarpa*)

Dryobalanops fusca Slooten

Dryobalanops lanceolata Burck

Dryobalanops oblongifolia Dyer

Dryobalanops rappa Becc.

Dryobalanops sumatrensis Kosterm.

(Syn. *Dryobalanops aromatica*)

Dryobalanops p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Brittleheart. Wood colour varies from red brown to pink brown. Camphor smell. Presence of thin resin veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	4.1
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	9.1 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	2.0
Fibre saturation point	26 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,640 kJ/kg
Crushing strength ⁽¹⁾	60 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,150 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. After felling, logs are very sensitive to black holes. Medium resistance to decay in tropical climates. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Possible resin exsudation during kiln drying.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

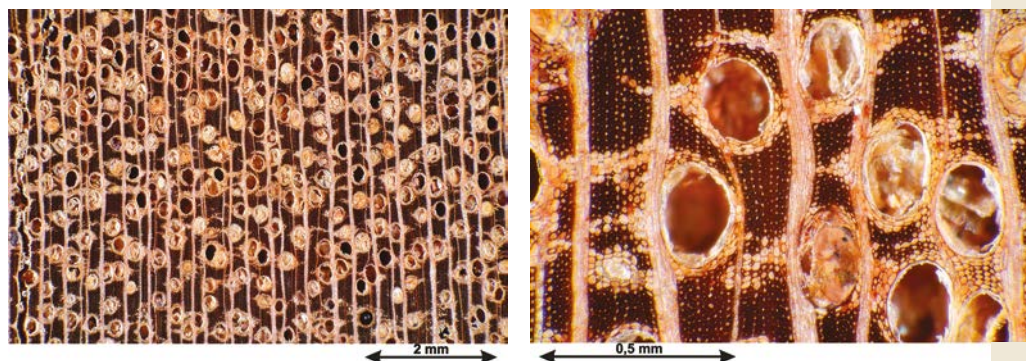
Notes. Normal to significant blunting effect.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Possible oxydation in contact with iron. Resin exudations should be taken into account when gluing.

Cross sections of *Dryobalanops oblongifolia*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D60 can be provided by visual grading.



Flooring in the Salle des Rencontres of the city council building, Montpellier, (France).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shingles
- Heavy carpentry
- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Notes. Stains runoff water.

Common names

Country	Local name
Indonesia	Kapur, Kapur empedu, Kapur kayatan, Kapur singkel, Kapur sintuk, Kapur tanduk, Petanang
Malaysia	Borneo camphorwood, Kapur kejatan, Keladan, Paigie, Swamp kapur

Karri

Family. Myrtaceae

Botanical name

Eucalyptus diversicolor F. Muell.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Karri commercialised today no longer comes from primary forests. It only comes from regrowth forests (Australia) or plantations (South Africa, especially).

Log description

Diameter. 80 to 200 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. The range of mentioned diameters corresponds to wood from natural forests. Woods from secondary forests and plantations are smaller in diameter.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.90
Monnin hardness ⁽¹⁾	7.3
Coefficient of volumetric shrinkage	0.67 % per %
Total tangential shrinkage (Ts):	11.2 %
Total radial shrinkage (Rs):	7.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	28 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	71 MPa
Static bending strength ⁽¹⁾	119 MPa
Longitudinal modulus of elasticity ⁽¹⁾	23,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hard wood. Physical and mechanical properties of Karri vary greatly according to trees age and growth conditions.

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Half-quarter sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

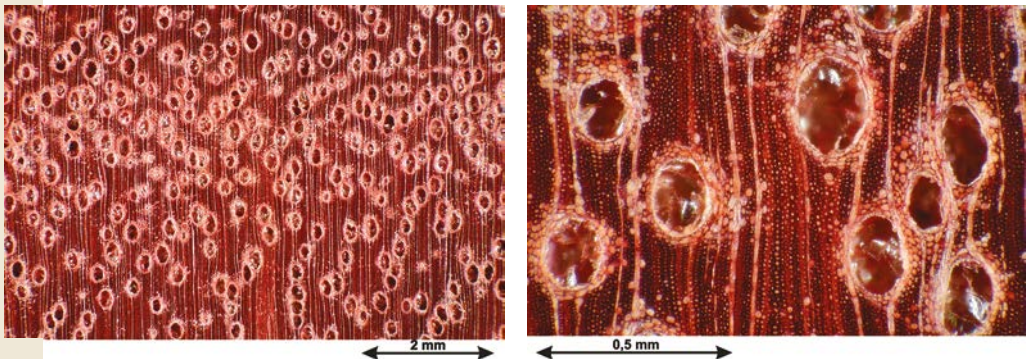
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Eucalyptus diversicolor*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Glued Laminated
- Moulding
- Flooring
- Industrial or heavy flooring
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Common names

Country	Local name
Australia	Karri



Quarter sawn

Half-quarter sawn



Kasai

Family. Sapindaceae

Botanical names

Pometia pinnata J.R. Forst. & G. Forst. (Syn. *Pometia tomentosa*)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light red becoming red brown with light. Lustrous aspect. Sometimes wavy grain. Presence of brownish resin.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	5.4
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	6.9 %
T/R anisotropy ratio	1.4
Fibre saturation point	30 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	114 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,330 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Some difficulties due to interlocked or wavy grain. Planed surface sometimes rough. Sawdust is an irritant. Steaming recommended before peeling.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

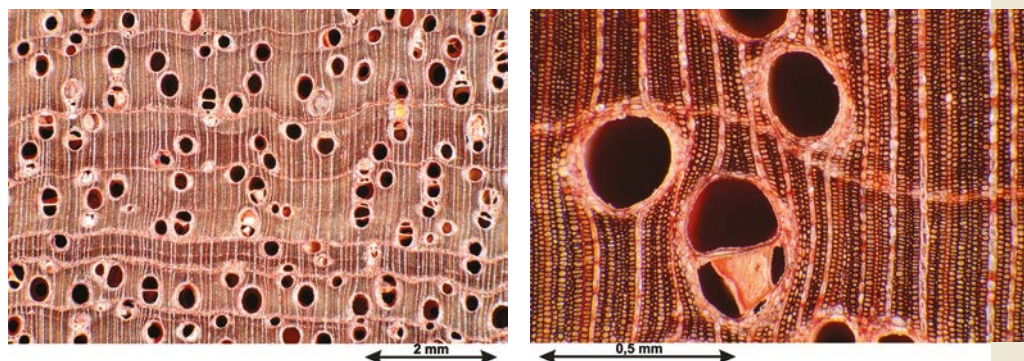
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Pometia pinnata*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Cooperage

Notes. Can be used for exterior joinery with proper treatment. Filling is recommended to obtain a better finish.

Common names

Country	Local name
Îles Salomon	Taun
Indonesia	Matoa
Malaysia	Kasai, Sibü
Papua New Guinea	Taun
Philippines	Agupanga, Malugai, Tungau
Viet Nam	Truong

Kauri

Family. Araucariaceae

Botanical name

Agathis p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 8 to 11 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Wood cream white or light yellow, often with pink reflections, turns golden brown when exposed to air. Moiré aspect.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.53
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	1.5
Fibre saturation point	30 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	19,110 kJ/kg
Crushing strength ⁽¹⁾	43 MPa
Static bending strength ⁽¹⁾	76 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,240 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. Moderate to good amenability to preservation treatment. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of blue stain.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Planed surfaces are glossy.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

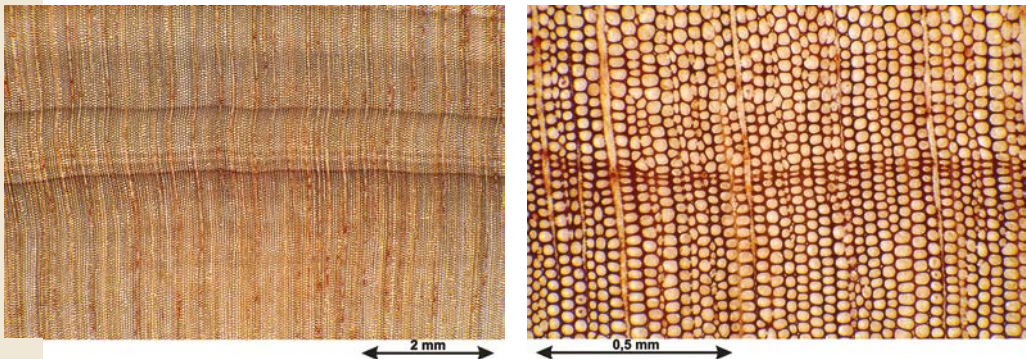
Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Cross sections of *Agathis robusta*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Shingles
- Framing
- Cabinetry (high-end furniture)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer
- Marquetry
- Cooperage

Notes. Similar in aspect to Cherry wood (*Cerasus avium*). Stains well.



Interior door – Scierie Mathieu (Société d'exploitation forestière Pierre Mathieu), Sarraméa (New Caledonia).

Common names

Country	Local name
Australia	Kauri
Indonesia	Agathis, Damar bintang, Damar kapas, Damar pilau, Damar sigi
Malaysia	Bendang, Bindang, Damar minyak, Kauri, Menghilan
New Caledonia	Kaori
Papua New Guinea	Kauri pine
Philippines	Almaciga
Vanuatu	Damar miniak



Flat sawn

Quarter sawn



Kedondong

Family. Burseraceae

Botanical names

Canarium euphyllum Kurz

Canarium strictum Roxb.

Canarium p.p.

Dacryodes costata H.J. Lam

Garuga p.p.

Protium p.p.

Santiria p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Other genera of this family – *Scutinanthe* and *Triomma* – are also commercialised under the name Kedondong.

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Variable colour depending on the species. Lustrous surface. Grain irregular to wavy; sometimes highly interlocked grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.63
Monnin hardness ⁽¹⁾	3.3
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.5
Fibre saturation point	26 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	63 MPa
Static bending strength ⁽¹⁾	70 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,790 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties of Kedondong vary widely depending on the species.

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

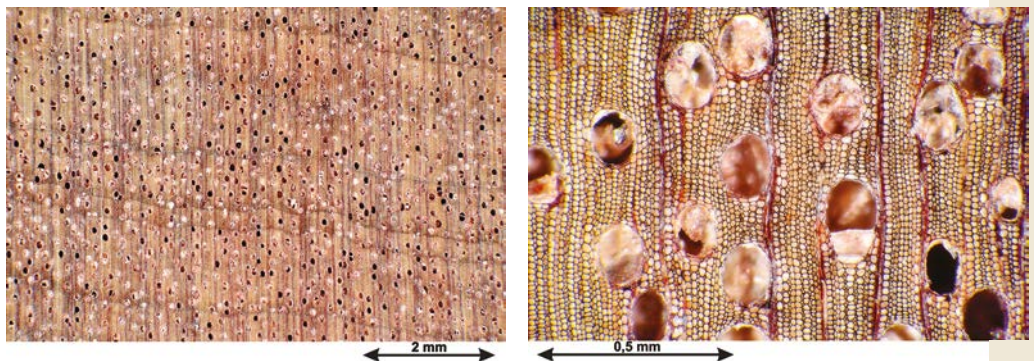
Suitability for slicing. Good

Notes. Wood more or less difficult to machine (interlocked grain, fibrous wood). Some species are siliceous. *Canarium* and *Santiria* are the most suitable for peeling.

Assembling

Nailing/screwing. Good

Cross sections of *Protium* sp.



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Sliced veneer

Common names

Country	Local name
Andaman Islands	Kedondong, Dhup
India	Dhuwhite, Halabalagi, Karivembu, Karrevembu, Karuvembu Kosramba
Indonesia	Kenari, Kiharpan, Murtenga, White dhup
Malaysia	Kedondong, Upi
Myanmar	Thadi
Philippines	Dulit, Pili
Thailand	Ma-kerm
Viet Nam	Cham

Kékélé

Family. Ulmaceae

Botanical name

Holoptelea grandis Mildbr.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 110 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood cream white to light yellow.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.65
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.9
Fibre saturation point	26 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	60 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,960 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sometimes difficulties due to interlocked grain.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

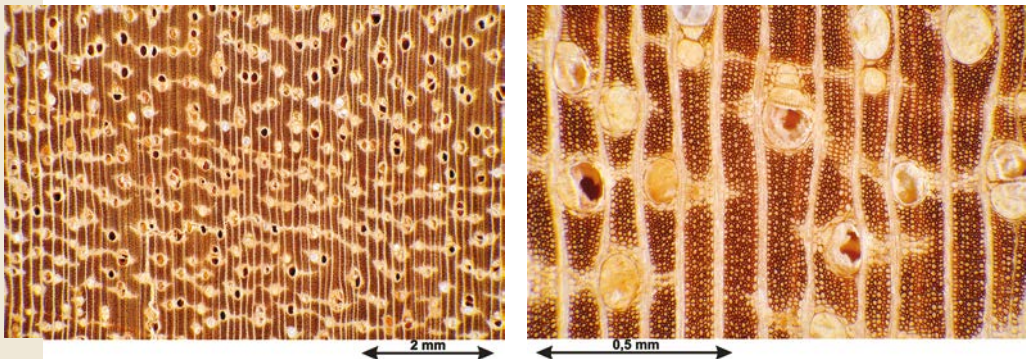
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Holoptelea grandis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer

Common names

Country	Local name
Benin	Sayo
Cameroon	Avep-élé
Congo	Mbosso
Côte d'Ivoire	Kékélé
Ghana	Onakwa
Nigeria	Olazo
Uganda	Mumuli
Central African Republic	Gomboul
Democratic Republic of Congo	Nemba-mbobolo



Half-quarter sawn



Quarter sawn

Kelat

Family. Myrtaceae

Botanical name

Syzygium p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 90 cm

Thickness of sapwood. 1 to 4 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood golden brown, greyish brown or brown with pink or purplish glints. Irregular or wavy grain. Resin deposits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.86
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.62 % per %
Total tangential shrinkage (Ts):	8.7 %
Total radial shrinkage (Rs):	5.3 %
T/R anisotropy ratio	1.6
Fibre saturation point	33 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	19,180 kJ/kg
Crushing strength ⁽¹⁾	73 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties of this wood vary depending on the species.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Resistance to decay moderate to good according to the species.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Top weighting of the piles and end-coating are recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

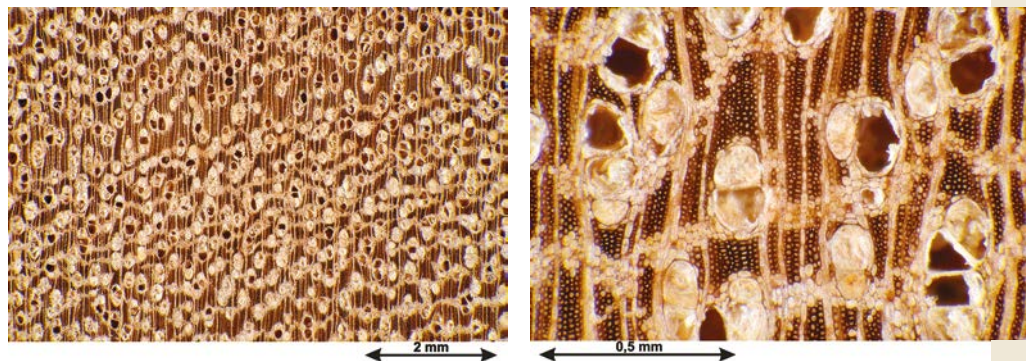
According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Cross sections of *Syzygium gustavioides*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Vehicle or container flooring
- Musical instruments
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring

Common names

Country	Local name
India	Jaman
Indonesia	Jaman, Jambu, Jamun, Meralu, Nir-naval
Malaysia	Black kelat, Common kelat, Kelat, Obar
Myanmar	Thabye
Papua New Guinea	Water gum
Philippines	Makasim
Thailand	Chomphu
Viet Nam	Plong, Tram

Keledang

Family. Moraceae

Botanical names

Artocarpus anisophyllus Miq.

Artocarpus integer Merr.

Artocarpus lakoocha Roxb.

Artocarpus lanceifolius Roxb.

Artocarpus lowii King

Artocarpus teysmannii Miq.

Artocarpus p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Keledang is the commercial name for heavy varieties of *Artocarpus* and Terap the commercial name for light *Artocarpus*.

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Wood orangey yellow brown darkening to golden brown. Lustrous and ribbon-like aspect. Frequent white deposits in the pores.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	5.5 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	1.8
Fibre saturation point	30 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	17,910 kJ/kg
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Quarter sawn



Notes. Medium hardness.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Difficulties during sawing due to hard deposits in the pores, interlocked grain and tension wood. Fibrous surface. Filling is recommended.

Assembling

Nailing/screwing. Poor

Cross sections of *Artocarpus anisophyllus*



Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Luxury coffins (in Malaysia)
- Framing
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring

Common names

Country	Local name
India	Aini, Anjili, Ayini, Pilapalam, Pilava, Plave chetti, Terap
Indonesia	Bsang, Keledang babi, Selangking, Tamgang, Terap,
Malaysia	Lakuch, Keledang, Pudau, Selangking, Simar Naka
Myanmar	Myauklok
Papua New Guinea	Kapiag
Philippines	Antipolo, Anubing, Kalulot, Malakubi
United Kingdom	Jackwood
Thailand	Had, Ka-ok, Khanun-pa
Viet Nam	Mit-nai

Kembang Semangkok

Family. Malvaceae (Sterculiaceae)

Botanical names

Scaphium linearicarpum Pierre

Scaphium macropodum Beumee

Scaphium scaphigerum G. Planch.

Scaphium p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood light yellow to light brown, with large silver figure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.67
Monnin hardness ⁽¹⁾	3.9
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.9
Fibre saturation point	26 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,710 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

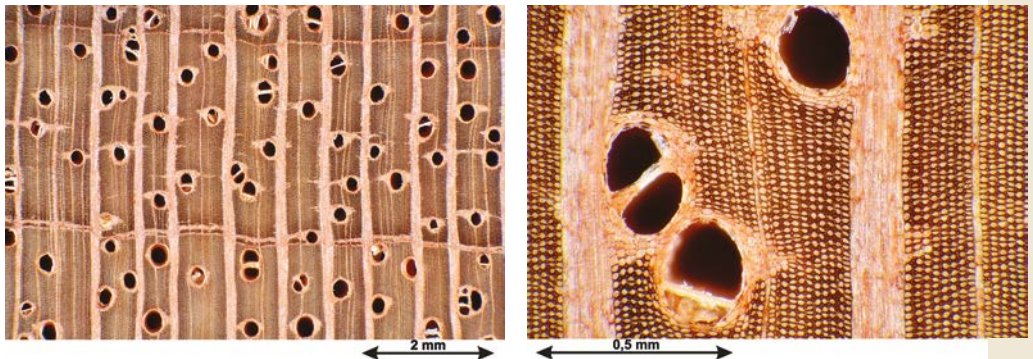
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Scaphium macropodum*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling

Common names

Country	Local name
Malaysia	Kembang semangkok, Selayar
Myanmar	Thitlaung
Thailand	Samrong

Kempas

Family. Leguminosae (Caesalpinaceae)

Botanical name

Koompassia malaccensis Maingay

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 210 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Pink when freshly sawn, weathering to orange-red or yellow-brown. Frequent concentric layers of phloem.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	6.9
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	27 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	18,530 kJ/kg
Crushing strength ⁽¹⁾	66 MPa
Static bending strength ⁽¹⁾	113 MPa
Longitudinal modulus of elasticity ⁽¹⁾	23,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Medium hardness.

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. According to this standard, Kempas treatability is considered low (class 3). However, according to certain bibliographical sources, this species is easily treatable. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Frequent concentric layers of phloem causes uneven drying and may cause wood damage.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

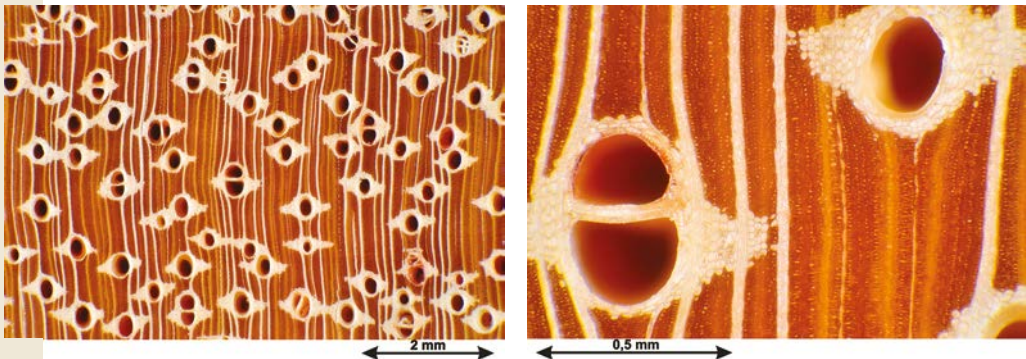
Notes. Similar to drying, concentric layers of phloem may cause sawing damage.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Koompassia malaccensis*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D60 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Vehicle or container flooring
- Exterior joinery
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Cooperage
- Sleepers

Common names

Country	Local name
Indonesia	Menggeris, Toemaling
Malaysia	Impas, Kempas, Mengris
Papua New Guinea	Kempas
Thailand	Yuan



Flat sawn

Quarter sawn



Keranji

Family. Leguminosae (Caesalpinaceae)

Botanical names

Dialium cochinchinense Pierre

Dialium indum L.

Dialium platysepalum Baker

Dialium p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight to entangled

Interlocked grain. Slight

Notes. Sapwood white to yellowish. Heartwood gold/brown turning browner, lustrous stripes. Yellow/brown deposits in the vessels. Silver figure fine, yields very fine horizontal stripes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.05
Monnin hardness ⁽¹⁾	12.3
Coefficient of volumetric shrinkage	0.63 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.8
Fibre saturation point	24 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	103 MPa
Static bending strength ⁽¹⁾	197 MPa
Longitudinal modulus of elasticity ⁽¹⁾	28,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity and extractive content: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

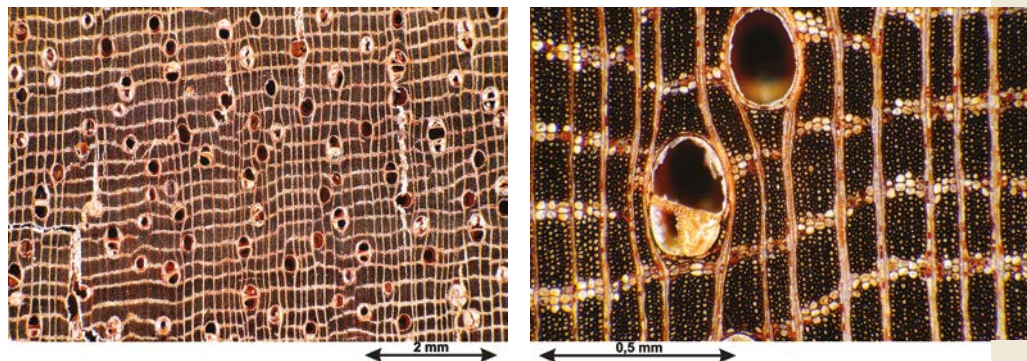
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Dialium platysepalum*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Heavy carpentry
- Boxes and crates
- Vehicle or container flooring
- Tool handles (resilient woods)
- House framing
- Flooring
- Industrial or heavy flooring

Common names

Country	Local name
Cambodia	Kralanh
Indonesia	KerANJI
Malaysia	KerANJI, Kuran, Sepau
Myanmar	Taung-kaye
Thailand	Kaki-khao, Khleung, Yi-thongbung
Viet Nam	Xoay

Keruing

Family. Dipterocarpaceae

Botanical names

Dipterocarpus acutangulus Vesque

Dipterocarpus alatus Roxb.

Dipterocarpus appendiculatus Scheff.

Dipterocarpus baudii Korth.

Dipterocarpus borneensis Slooten

Dipterocarpus caudatus Foxw.

Dipterocarpus costulatus Slooten

Dipterocarpus gracilis Blume (Syn. *Dipterocarpus pilosus*)

Dipterocarpus grandiflorus Blanco

Dipterocarpus kerrii King

Dipterocarpus verrucosus Foxw

Dipterocarpus p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible wind shakes (internal fractures in wood). Wood light red to red brown or purplish red brown. Presence of resin.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	4.6
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.4 %
T/R anisotropy ratio	1.9
Fibre saturation point	34 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,200 kJ/kg
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,610 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Several species are grouped under the name Keruing of the genus *Dipterocarpus* and the natural durability is variable from one species to another. It is thus recommended to limit use of this wood without preservation treatment for end uses under use class 2.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Moisture content very variable especially for the most resinous species. Careful stacking and end coating are recommended.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

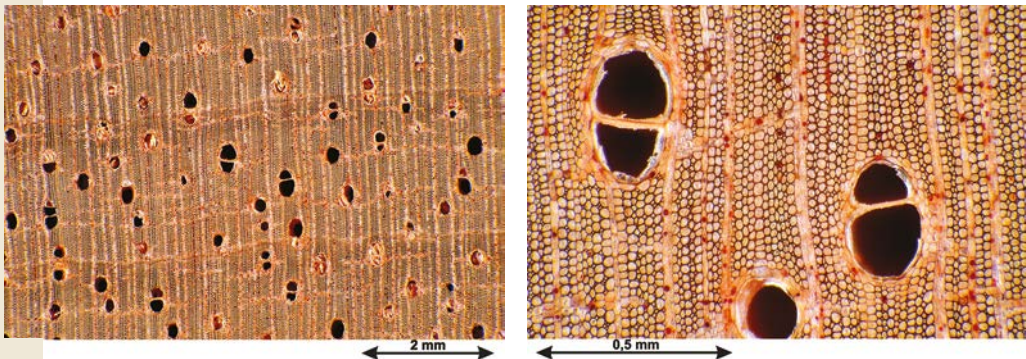
Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Silica content is variable. Some species are very resinous and tend to clog tools. Occasional tearing on quartersawn.

Cross sections of *Dipterocarpus grandiflorus*



Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Resin exudations: to be taken into account when gluing.

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading. Strength class D40 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- House framing
- Flooring
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Notes. Plywood for light woods. Resin and shakes may restrict end uses. In Asia, this species is used for sleepers and poles with a treatment.

Common names

Country	Local name
Germany	Yang
Andaman Islands	Gurjun
Cambodia	Chloeuteal, Dau, Thbeng
France	Keruing
India	Gurjun
Indonesia	Keroeing, Keruing
Laos	Mai nhang, Mai sat
Malaysia	Keruing bajak, Keruing beras, Keruing gaga
Myanmar	Kanyin, Yang
Philippines	Apitong
United Kingdom	Yang
Sri Lanka	Hora
Thailand	Yang
Viet Nam	Dau, Tro

Kondroti / East African Bombax*

* Common commercial name

Family. Malvaceae (Bombacaceae)

Botanical names

Rhodognaphalon brevicuspe Roberty (Syn. *Bombax brevicuspe*)
(Syn. *Bombax chevalieri*)

Rhodognaphalon schumannianum A. Robyns (Syn. *Bombax rhodognaphalon*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 8 to 10 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood yellowish brown to light red brown with slightly darker veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.46
Monnin hardness ⁽¹⁾	1.4
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.9
Fibre saturation point	38 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	18,240 kJ/kg
Crushing strength ⁽¹⁾	35 MPa
Static bending strength ⁽¹⁾	58 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,760 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Half-quarter sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended to reduce the risk of defects. Slight tendency to warping on backsawn.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Surface sometimes fuzzy.

Assembling

Nailing/screwing. Poor

Commercial grading

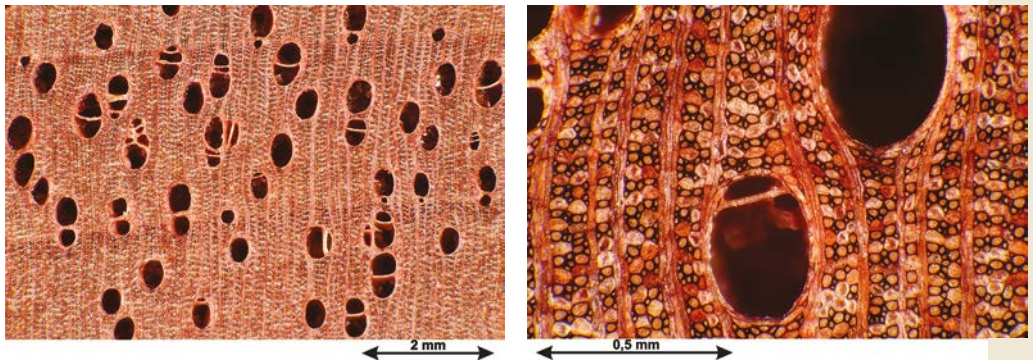
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Rhodognaphalon brevicuspe*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards

Notes. Substitute for Okoumé.

Common names

Country	Local name
Benin	Kpatin dehun
Cameroon	Ovong
Congo	N'démo
Côte d'Ivoire	Kondroti / East African Bombax
Gabon	Alone, Ogumalanga
Ghana	Bombax
Mozambique	Meguza, Mungusa
Nigeria	Awori
United Kingdom	East African bombax
Tanzania	Mfume

Kosipo

Family. Meliaceae

Botanical name

Entandrophragma candollei Harms

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 150 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Red brown with purplish glints. Darkens with light. Deposits of black resin in the pores. Ribbon-like aspect on quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.69
Monnin hardness ⁽¹⁾	3.3
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.7 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	32 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	18,640 kJ/kg
Crushing strength ⁽¹⁾	53 MPa
Static bending strength ⁽¹⁾	87 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,190 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. The French standard NF P 23-305 (December 2014) indicates that this species covers the use class 3.1 for untreated heartwood. However, in terms of wood-decaying fungi, Kosipo presents the same natural durability as Sipo, which is used without treatment and without sapwood for use class 3.2. In practice, Kosipo and Sipo have the same uses for exterior joinery. Kosipo can be considered as covering the use class 3.2 for untreated heartwood.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. The drying of backsawn is more difficult and slower with higher risks of distortion. Well-dried quartersawn is recommended for outdoor uses.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sometimes difficulties due to interlocked grain (tearing). High to very high blunting effect (silica).

Assembling

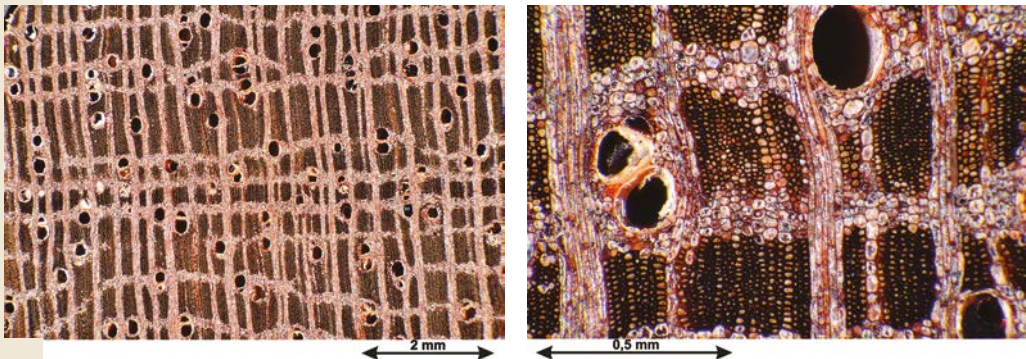
Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

Cross sections of *Entandrophragma candollei*



- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III



Triangular structure in Kosipo and posts in Tali – By J.Y. Riaux Mindourou (Cameroon).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling

Notes. The adherence of finishing product may be difficult due to the presence of resin. Filling is required to obtain a good finish.

Common names

Country	Local name
Germany	Kosipo-mahogany
Angola	Lifuco
Cameroon	Atom-assié
Congo	Diamuni
Côte d'Ivoire	Kosipo
Gabon	Étom
Ghana	Penkwa-akowaa, Kosipo
Nigeria	Heavy sapele, Omu
Central African Republic	Bakanga
Democratic Republic of Congo	Impompo
United Kingdom	Omu

Kotibé / Danta*

* Common commercial name

Family. Malvaceae (Sterculiaceae)

Botanical names

Nesogordonia fouassieri Capuron

Nesogordonia kabingaensis Capuron

Nesogordonia leplaei Capuron

Nesogordonia papaverifera Capuron (Syn. *Cistanthera papaverifera*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light brown to reddish brown. Moiré and ribbon-like aspect on quartersawn. Sometimes presence of very small knots.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.76
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.5
Fibre saturation point	30 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	18,470 kJ/kg
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	120 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,020 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Half-quarter sawn

Quarter sawn



Resistance to termites. Class D-M - durable to moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Variable natural resistance to decay depending on the species.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of casehardening if drying is too fast. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

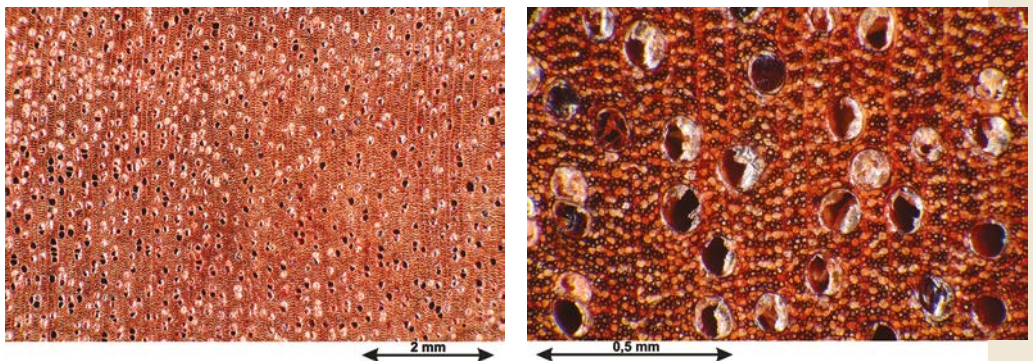
Notes. Blunting effect due to hardness. Tends to clog sawteeth when green. Sometimes difficulties due to interlocked grain.

Assembling

Nailing/screwing. Good

Notes. Pre-boring necessary. Can stain when gluing.

Cross sections of *Nesogordonia papaverifera*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market” Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length

lumpers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small

boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Sculpture

Common names

Country	Local name
Angola	Kissinhungo
Cameroon	Ovoé, Ovoui
Côte d'Ivoire	Kotibé
Gabon	Aborbora
Ghana	Danta
Nigeria	Otutu
Central African Republic	Naouya
Democratic Republic of Congo	Kondofindo
United Kingdom	Danta



Kitchen flooring – by Brenco Exotic Woods (United States).

Koto / Pterygota*

* Common commercial name

Family. Malvaceae (Sterculiaceae)

Botanical names

Pterygota bequaertii De Wild.

Pterygota macrocarpa K. Schum.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood cream white to light yellow, attractive flecked aspect on quartersawn. Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.59
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	9.6 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	2.1
Fibre saturation point	25 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	16,820 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	96 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,140 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Risk of discolouration (oxydation) and blue stain during drying.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Tendency to woolliness in machining. Good finish with filling.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

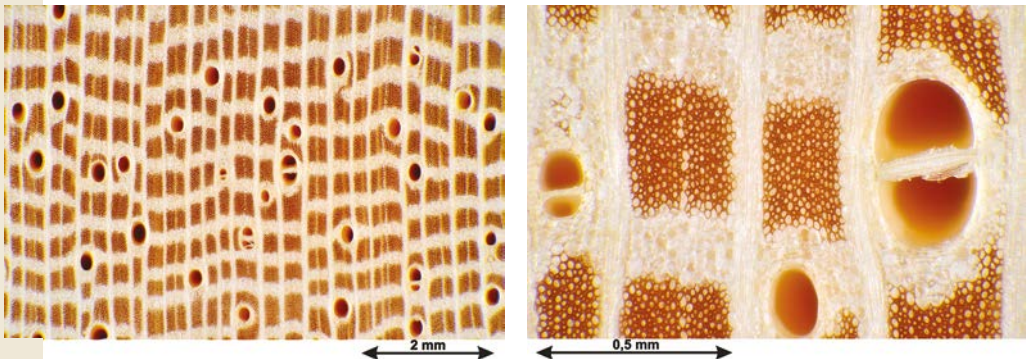
• For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Pterygota macrocarpa*



- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III
- Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Surfboard using sandwich technology (Koto veneers).

Main end uses

- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Seats
- Marquetry

Common names

Country	Local name
Germany	Anatolia
Benin	Ofete
Cameroon	Éfok ayus
Côte d'Ivoire	Koto
Gabon	Aké
Ghana	Awari, Kyere
Nigeria	Kefe, Poroposo
Central African Republic	Kakendé
Democratic Republic of Congo	Ikame
United Kingdom	African pterygota, Pterygota

Kumbi

Family. Anacardiaceae

Botanical name

Lannea welwitschii Engl.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Pink gray to pale brown, occasional light brown. Fine silver figure, barely visible.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	1.6
Coefficient of volumetric shrinkage	0.38 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	42 MPa
Static bending strength ⁽¹⁾	70 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,750 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Prone to blue stain and scolytidae.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. High

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Rotary peeling possible at room temperature

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

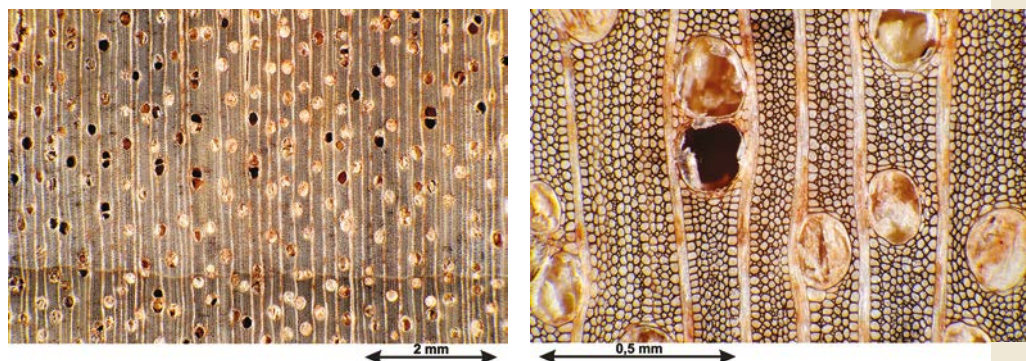
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Lanea welwitschii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard

Common names

Country	Local name
Congo	Kumbi
Côte d'Ivoire	Loloti
Ghana	Kumenini
Nigeria	Ekika
Democratic Republic of Congo	Kumbi

Kurokai / Breu*

* Common commercial name

Family. Burseraceae

Botanical name

Protium p.p. (South America)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 60 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light brown to pinkish brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	2.7
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.8
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	57 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,350 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of casehardening. yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Blunting effect quite important due to silica.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

Sawn timber appearance grading

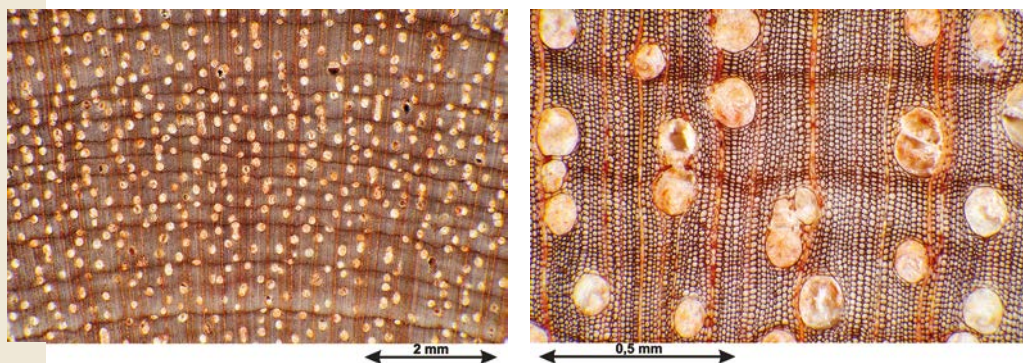
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is «Encens». Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Protium hostmannii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Built-in furniture or mobile item
- Blockboard
- Fibre or particle boards

Common names

Country	Local name
Bolivia	Carano
Brazil	Almecega, Aruru, Breu
Colombia	Carano, Anime, Currucay
Ecuador	Anime blanco
Guyana	Haiawa, Porokay, Kurokay, Kurokaï
French Guiana	Tinguimoni ; Encens blanc, gris ou rouge
Peru	Copal caspi
Suriname	Tinguimoni
Venezuela	Carano, Anime, Azucarito



Half-quarter sawn



Quarter sawn

Landa

Family. Erythroxylaceae

Botanical name

Erythroxylum mannii Oliv.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood light brown to light red brown darkening with light. Small dark pith flecks. Alternate light and dark veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	2.3
Fibre saturation point	30 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	19,420 kJ/kg
Crushing strength ⁽¹⁾	53 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,010 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to

the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

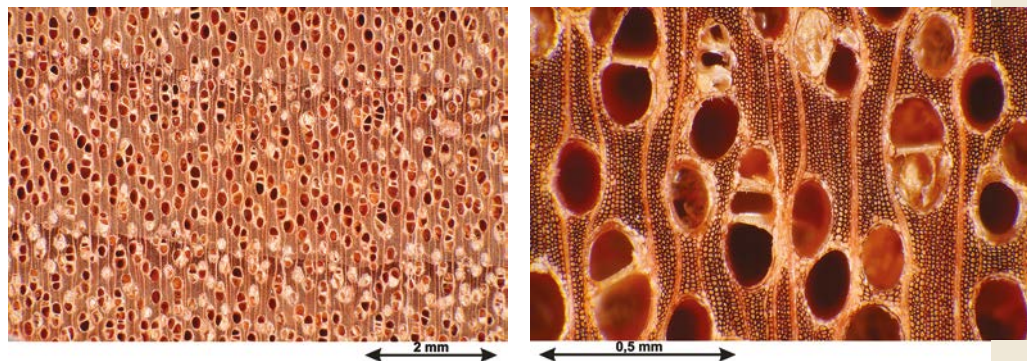
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Erythroxylum mannii*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Ship building (planking and deck)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Seats

Common names

Country	Local name
Cameroon	Landa
Congo	Lukienzo
Côte d'Ivoire	Dabé
Gabon	Landa
Democratic Republic of Congo	Nkanza
Sierra Leone	Bimini

Lati

Family. Leguminosae (Caesalpinaceae)

Botanical names

Amphimas ferrugineus Pellegr.

Amphimas pterocarpoides Harms

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Cream white to yellow brown. The presence of parenchyma bands at regular intervals give an aesthetic aspect to sawnwoods.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.82
Monnin hardness ⁽¹⁾	5.8
Coefficient of volumetric shrinkage	0.69 % per %
Total tangential shrinkage (Ts):	10.8 %
Total radial shrinkage (Rs):	6.4 %
T/R anisotropy ratio	1.7
Fibre saturation point	30 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	19,580 kJ/kg
Crushing strength ⁽¹⁾	73 MPa
Static bending strength ⁽¹⁾	128 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,830 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from fairly hard to hard.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawing may require power. Grain tearing in machining.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

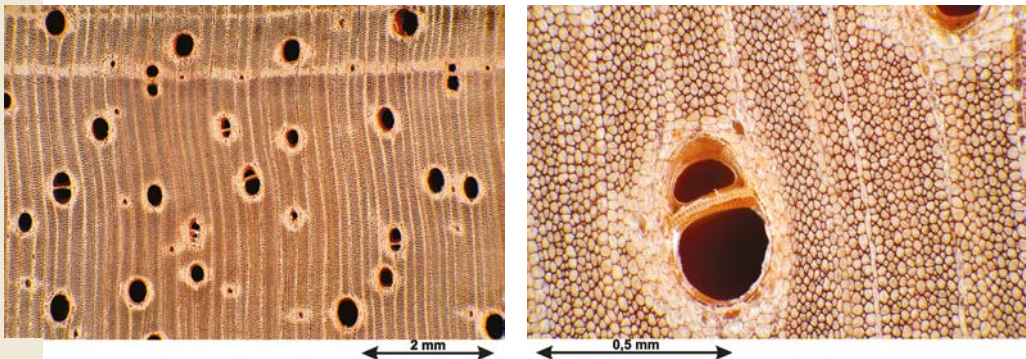
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Amphimas pterocarpoides*



Possible grading for short-length lumbers: choice I, choice II
 Possible grading for short-length rafters: choice I, choice II, choice III

• For the “Special Market”
 Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters:
 choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer

Notes. Aspect quite similar to Eyong (*Eribroma obloma*).

Common names

Country	Local name
Cameroon	Edzil, Edjin
Congo	Muizi
Côte d’Ivoire	Lati
Gabon	Edzui
Ghana	Yaya
Democratic Republic of Congo	Bokanga



Office wardrobe, CIRAD, Montpellier (France).

Lauan, Red

Family. Dipterocarpaceae

Botanical names

Shorea agsaboensis W.L. Stern

Shorea negrosensis Foxw.

Shorea polysperma Merr.

Shorea subgen. *Rubroshorea* p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Red Lauan species originate from the Philippines.

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 5 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood red brown more or less dark. Slightly lustrous. Ribbon-like aspect. Visible silver figure. Presence of white lines (resin canals).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.65
Monnin hardness ⁽¹⁾	2.7
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	7.6 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.8
Fibre saturation point	29 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,290 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Wood soft to fairly hard.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn

Quarter saw



Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Black hole quite frequent.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Tendency to tear in planing. Keep tools sharp.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

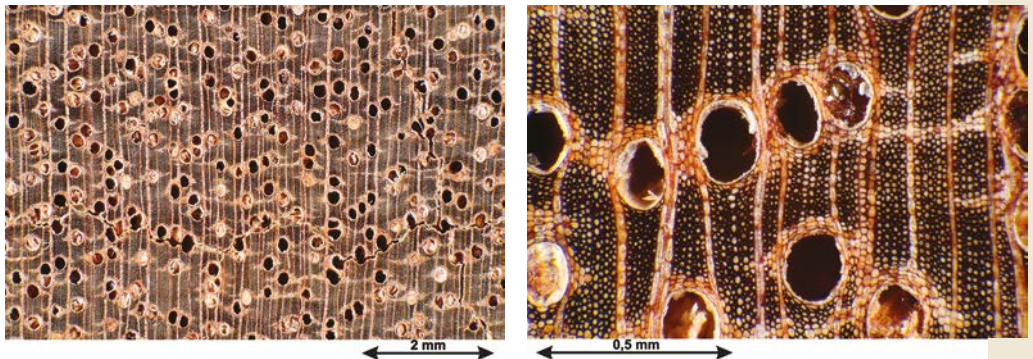
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Shorea negrosensis*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Musical instruments
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Exterior panelling
- Rolling shutters

Common names

Country	Local name
France	Lauan red
Philippines	Tangile, Red Lauan, Tiaon

Limba / Afara*

* Common commercial name

Family. Combretaceae

Botanical name

Terminalia superba Engl. & Diels

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Some logs have a black greyish heartwood, more or less veined (veined Fraké or multicoloured Fraké).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.54
Monnin hardness ⁽¹⁾	2.4
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.1 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.4
Fibre saturation point	28 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	18,410 kJ/kg
Crushing strength ⁽¹⁾	47 MPa
Static bending strength ⁽¹⁾	80 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,750 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. Treating the wood is sometimes difficult due to a variable permeability.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Variable

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Internal stresses in some logs (usually timber from plantations). Sometimes, blunting effect quite high.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

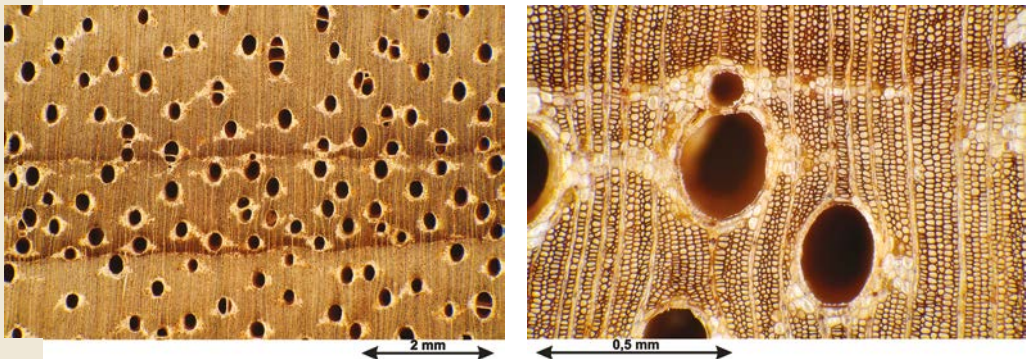
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Terminalia superba*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Coffins
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing



Semi-spiral, suspended staircase (in multi-coloured Fraké), Saint-Gély-du-Fesc (France).

- Blockboard
- Fibre or particle boards
- Sliced veneer
- Seats
- Marquetry

Notes. Sawdust may cause allergic reactions during machining.

Common names

Country	Local name
Benin	Azinii
Cameroon	Akom
Congo	Limba /Afara
Côte d'Ivoire	Fraké
United States	Korina
France	Limba, Limbo, Noyer du Mayombe, Fraké
Gabon	Akom
Ghana	Ofram
Equatorial Guinea	Akom
Nigeria	Afara, White afara
Central African Republic	N'ganga
Democratic Republic of Congo	Limba /Afara
Sierra Leone	Kojagei

Limbali

Family. Leguminosae (Caesalpinaceae)

Botanical names

Gilbertiodendron dewevrei J. Léonard (Syn. *Macrolobium dewevrei*)

Gilbertiodendron preussii J. Léonard

Gilbertiodendron splendidum J. Léonard

Gilbertiodendron p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood red brown with greenish or copper shades. Possible internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.81
Monnin hardness ⁽¹⁾	5.1
Coefficient of volumetric shrinkage	0.62 % per %
Total tangential shrinkage (Ts):	9.1 %
Total radial shrinkage (Rs):	4.7 %
T/R anisotropy ratio	1.9
Fibre saturation point	28 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	17,080 kJ/kg
Crushing strength ⁽¹⁾	72 MPa
Static bending strength ⁽¹⁾	137 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,010 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable



Half-quarter sawn



Quarter sawn

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Good resistance to white rot. Moderate resistance to brown cubical rot. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Drying must be done slowly to reduce splits.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Not recommended or without interest

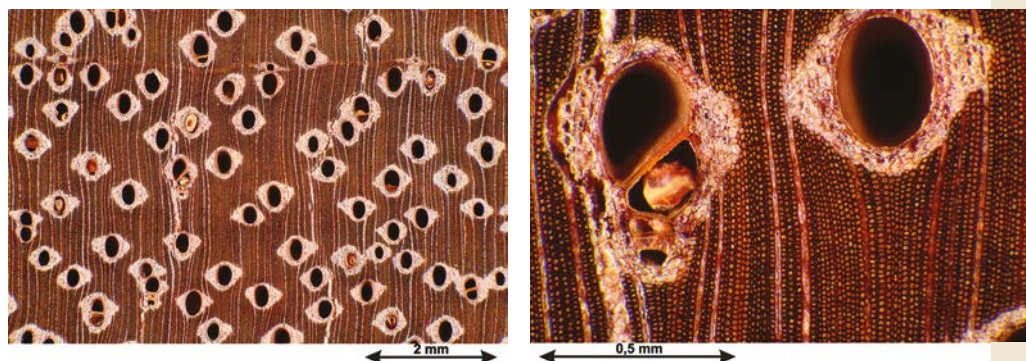
Notes. Log turning sawing recommended as soon as possible after felling (risks of splitting).

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Gilbertiodendron dewevrei*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I,

choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- House framing
- Industrial or heavy flooring
- Exterior panelling

Common names

Country	Local name
Cameroon	Ékobem
Congo	Épal
Côte d'Ivoire	Vaa
Gabon	Abeum
Ghana	Tetekon
Liberia	Sehmeh
Nigeria	Ekpagoi eze
Central African Republic	Molapa
Democratic Republic of Congo	Ditshipi, Ligudu, Limbali



Floor at the offices of Fibres Industries Bois, Saint Paul, La Réunion (France).

Longhi

Family. Sapotaceae

Botanical names

Chrysophyllum africanum A. DC. (Syn. *Gambeya africana*)

Chrysophyllum lacourtianum De Wild.
(Syn. *Gambeya lacourtiana*)

Chrysophyllum perpulchrum Mildbr.

Chrysophyllum subnudum Baker (Syn. *Gambeya subnuda*)

Chrysophyllum p.p. (Syn. *Gambeya* p.p.)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The name Longhi covers several species of the genus *Chrysophyllum* whose properties and appearance can vary widely. A distinction is made between red and white longhi. Possible confusion with Aningeria.

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 3 to 4 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pinkish brown becoming yellow brown upon exposure to air.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.75
Monnin hardness ⁽¹⁾	4.9
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	5.2 %
T/R anisotropy ratio	1.6
Fibre saturation point	31 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	122 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Half-quarter sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Several species, with different natural durability, are grouped under the name Longhi. Some species and origins can be used without preservation treatment for end-uses under use class 2. However, commercial lots are usually constituted by blended species. Consequently, it is advisable to use the less durable woods as a point of reference.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Kiln drying must be carried out slowly to prevent end checks and fungal discolourations.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

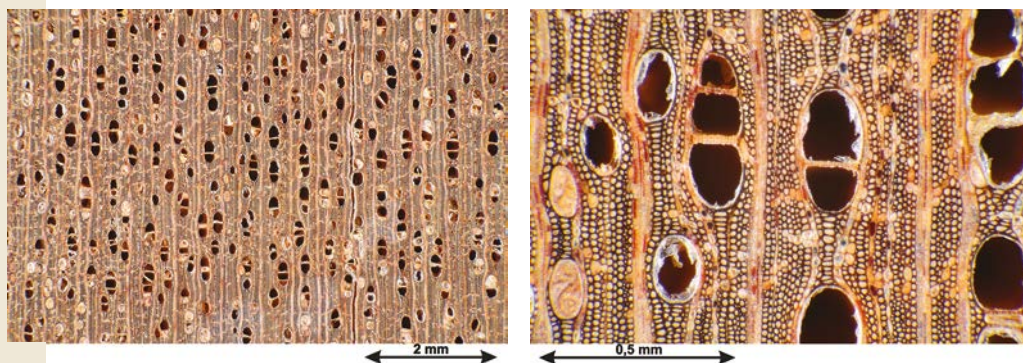
Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Cross sections of *Chrysophyllum lacourtianum*



Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Sculpture
- Seats
- Marquetry

Common names

Country	Local name
Cameroon	Abam
Congo	Longhi
Côte d'Ivoire	Akatio, Anandio, Aninguéri, Aninguéri rouge
Gabon	M'bébame
Ghana	Akasa
Nigeria	Ekpiro, Osan
Democratic Republic of Congo	Bopambu

Lotofa / Brown Sterculia*

* Common commercial name

Family. Malvaceae (Sterculiaceae)

Botanical name

Sterculia rhinopetala K. Schum.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.84
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	2.0
Fibre saturation point	26 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	72 MPa
Static bending strength ⁽¹⁾	133 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,670 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment
In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Very irritant sawdust. Some difficulties in planing in the presence of interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

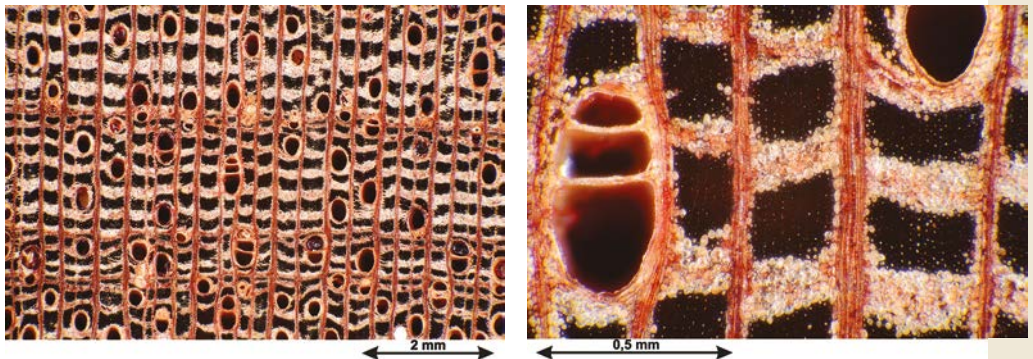
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Sterculia rhinopetala*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Seats

Notes. Filling is recommended to obtain a better finish.

Common names

Country	Local name
Cameroon	N'kanang
Côte d'Ivoire	Lotofa / Brown Sterculia
Ghana	Wawabima
Nigeria	Aye
United Kingdom	Brown sterculia

Louro branco

Family. Lauraceae

Botanical names

Ocotea cymbarum Kunth (Syn. *Nectandra elaiophora*)

Ocotea guianensis Aubl.

Ocotea oblonga Mez

Ocotea wachenheimii Benoist

Ocotea p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The pilot name "Louro" includes species of the genera *Ocotea* with light wood and light colour.

Log description

Diameter. 50 to 120 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Light brown to yellowish brown. Pleasant scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.54
Monnin hardness ⁽¹⁾	3.1
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	7.1 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	2.0
Fibre saturation point	23 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	19,730 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	75 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,290 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn

Quarter sawn



Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Resistance to decay low to high depending on the species. Treatability variable, from low to good depending on the species.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. With thick material.

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Kiln drying of wood must be done slowly.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

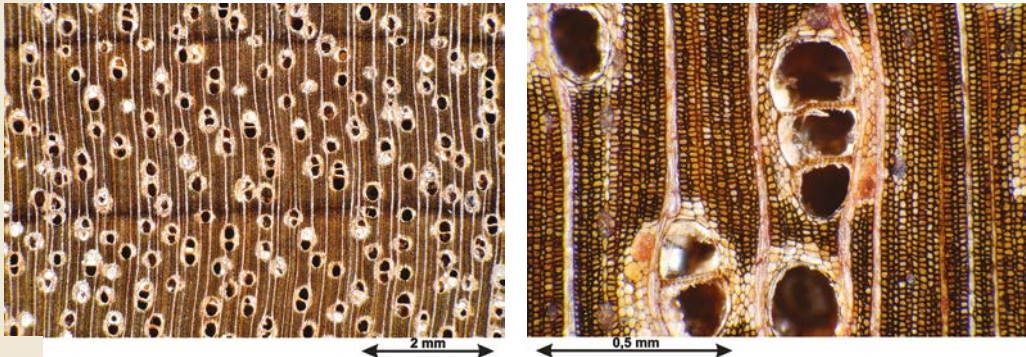
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Ocotea guianensis*



In French Guiana, the local name of this species is “Cèdre”. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Formwork
- Ship building (planking and deck)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Fibre or particle boards
- Flooring
- Sliced veneer
- Exterior panelling
- Sculpture

Common names

Country	Local name
Brazil	Canelo amarillo, Louro, Louro branco, Louro inhamui
Colombia	Amarillo, Laurel
Ecuador	Canelo amarillo, Jigua amarillo, Tinchi
Guyana	Kereti, Kereti-silberballi, Silverballi
French Guiana	Cèdre apici, Cèdre gris, Cèdre noir
Honduras	Aguacatillo
Peru	Moena amarilla, Moena blanca
Suriname	Pisi
Trinidad and Tobago	Laurier
Venezuela	Laurel

Louro vermelho / Determa*

* Common commercial name

Family. Lauraceae

Botanical names

Sextonia rubra van der Werff (Syn. *Ocotea rubra*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Light wood with pink to red brown shades. Possible presence of "wind shakes" (**internal fractures in wood**).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	2.0
Fibre saturation point	29 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	19,530 kJ/kg
Crushing strength ⁽¹⁾	51 MPa
Static bending strength ⁽¹⁾	81 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,170 Mpa

At 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in contact with the ground, outside



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water). However, it is not recommended to use it in case of strong mechanical constraints due to its softness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. Yes

Notes. High temperature steaming (80 °C) improves drying. Drying thin dimensions (less than 40 mm) is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Poor

Notes. Nail holding variable.

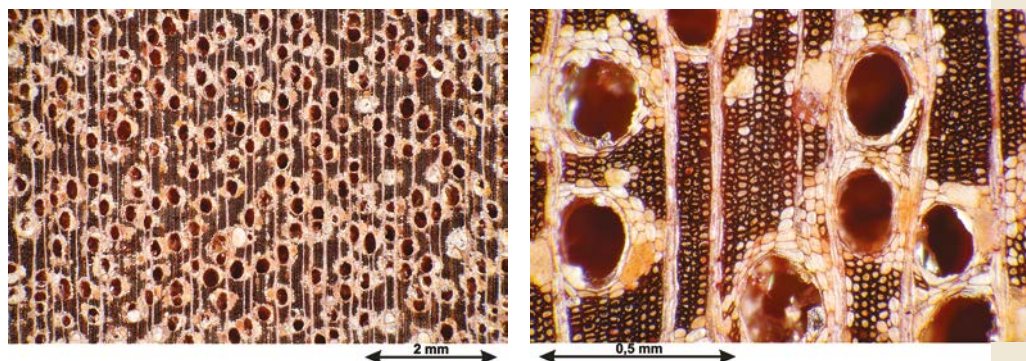
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Sextonia rubra*



In French Guiana, the local name of this species is Grignon franc. Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Grading for solid wood, according to requirements of European standard NF EN 14081-1 (April 2016): structural graded timber with a minimal thickness of 22 mm. Assigned according to procedures of the standard NF EN 13501-1. Assigned according to procedures of the European grading report No. RA05-0238^E prepared by CSTB.

Main end uses

- Turned goods
- Shingles
- Framing
- Formwork
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Boxes and crates
- Open boats
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Common names

Country	Local name
Brazil	Gamela, Louro gamela, Louro vermelho
Guyana	Baaka, Determa, Red louro, Wanu
French Guiana	Grignon franc
United Kingdom	Determa
Suriname	Teteroma, Wana



Privacy fence, Kourou (French Guiana).

Macacaúba

Family. Leguminosae (Fabaceae)

Botanical names

Platymiscium pinnatum Dugand

Platymiscium trinitatis Benth.

Platymiscium ulei Harms

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 60 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Perfect heartwood has irregular veins. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	7.3
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	4.9 %
Total radial shrinkage (Rs):	2.9 %
T/R anisotropy ratio	1.7
Fibre saturation point	18 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	58 Mpa
Static bending strength ⁽¹⁾	125 Mpa
Longitudinal modulus of elasticity ⁽¹⁾	20,490 Mpa

At 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 – poorly or not permeable



Half-quarter sawn



Quarter sawn

Use class covered by natural durability Class 3 - not in contact with the ground, outside
Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

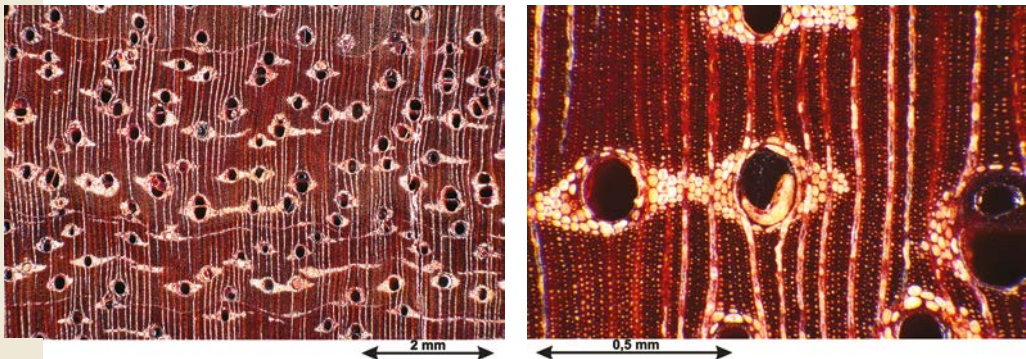
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Ebène rouge». Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Platymiscium trinitatis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Stairs (inside)
- Musical instruments
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Sculpture
- Seats

Notes. Macacauba is often reserved for deluxe end uses.

Common names

Country	Local name
Brazil	Macacaúba, Macacaúba preta, Macacaúba vermelha, Trebol
Costa Rica	Nambar
Ecuador	Caoba
United States	Macawood
French Guiana	Beati, Bois de mora
Nicaragua	Bastado
Paraguay	Trebol
Suriname	Doekaliballi, Dukalaballi, Koenatepi
Venezuela	Vencola

Maçaranduba / Bulletwood*

* Common commercial name

Family. Sapotaceae

Botanical names

Manilkara bidentata A. Chev.

Manilkara Standl. Ducke

Manilkara p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Wood dark red brown with purplish shades.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.10
Monnin hardness ⁽¹⁾	12.9
Coefficient of volumetric shrinkage	0.75 % per %
Total tangential shrinkage (Ts):	9.4 %
Total radial shrinkage (Rs):	7.1 %
T/R anisotropy ratio	1.3
Fibre saturation point	27 %
Thermal conductivity (λ)	0.35 W/(m.K)
Lower heating value	19,070 kJ/kg
Crushing strength ⁽¹⁾	89 MPa
Static bending strength ⁽¹⁾	170 MPa
Longitudinal modulus of elasticity ⁽¹⁾	24,410 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. This species covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its hardness. However use class 5 coverage can vary depending on the species. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #9 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

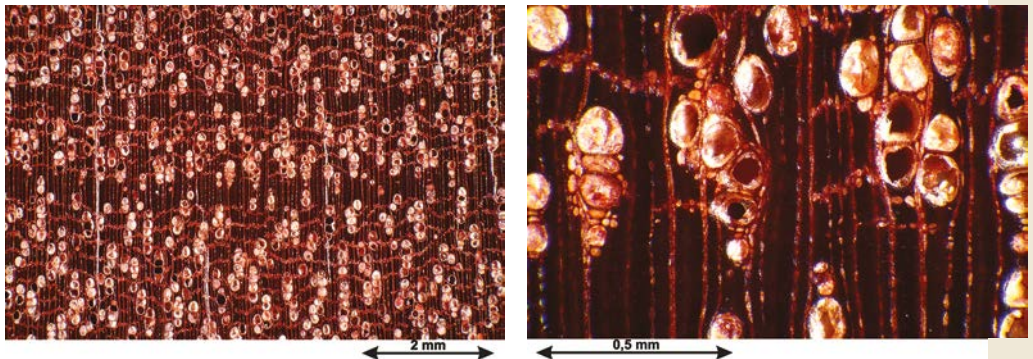
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Manilkara bidentata*



In French Guiana, the local name of this species is «Balata franc». Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading. However, strength class D60 can be provided by visual grading according to French standard NF B 52-001-1 (2011).



Floating decks, Port-Louis (France).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Shingles
- Heavy carpentry
- Ship building (planking and deck)
- Stairs (inside)
- Stringed instruments (bows)
- Tool handles (resilient woods)
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring
- Stakes
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Sculpture
- Hydraulic works (fresh water and seawater)
- Sleepers

Notes. In Brazil, *M. elata* and *M. longifolia* are used for pulpwood.

Common names

Country	Local name
Brazil	Maparajuba, Maçaranduba, Paraju
Colombia	Balata, Nispero
United States	Beefwood, Bullet wood, Bulletwood
Guyana	Balata, Beefwood, Bulletwood
French Guiana	Balata franc, Balata gomme, Balata rouge, Bois abeille
Panama	Nispero
Peru	Pamashto, Quinilla colorada
United Kingdom	Bulletwood
Suriname	Bolletrie
Venezuela	Balata, Massarandu

Macucu de paca

Family. Leguminosae (Fabaceae)

Botanical name

Aldina heterophylla Benth.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Macucu de paca is often commercialised blended with Angelim.

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked but not frequent

Notes. Wood prone to splits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	7.6
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	7.6 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.6
Fibre saturation point	24 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,920 kJ/kg
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	109 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,170 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Half-quarter sawn



Quarter sawn

Notes. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Filling is recommended to obtain a good finish.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Pre-boring imperative in case of highly interlocked grain. Risk of end checks. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

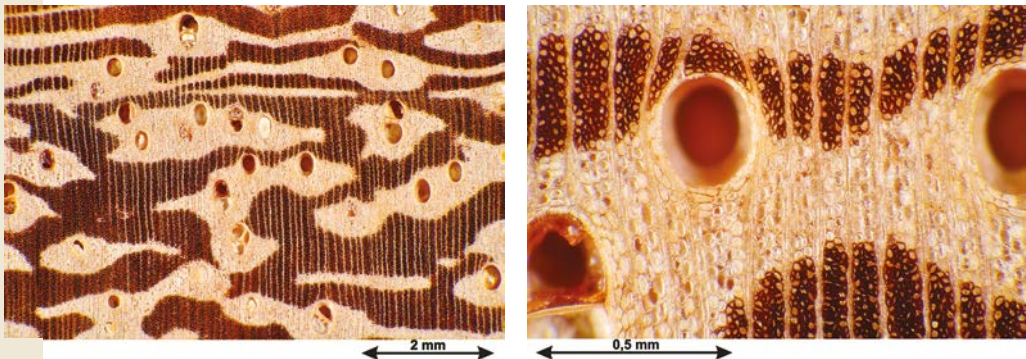
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Aldina heterophylla*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Exterior joinery
- Industrial or heavy flooring
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Stakes
- Sliced veneer
- Decking
- Poles
- Exterior panelling
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Brazil	Macucu da catinga, Macucu de paca, Macucu do baixo

Mahogany

Family. Meliaceae

Botanical names

Swietenia humilis Zucc.

Swietenia krukovii Gleason

Swietenia macrophylla King (Syn. *Swietenia candollei*)
(Syn. *Swietenia tessmannii*)

Swietenia mahagoni Jacq.

Continent. Latin America

CITES (Washington Convention of 2017)

Three species of Mahogany are listed in CITES Appendix ii : *Swietenia humilis* (all wood products), *Swietenia macrophylla* (Populations of the Neotropics; logs, sawn wood, veneer sheets and plywood), *Swietenia mahagoni* (logs, sawn wood and veneer sheets).

Log description

Diameter. 60 to 130 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sometimes internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.60
Monnin hardness ⁽¹⁾	3.4
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	3.7 %
Total radial shrinkage (Rs):	2.6 %
T/R anisotropy ratio	1.4
Fibre saturation point	23 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	19,090 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,790 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Mahogany is listed in the NF EN 350 standard. Part of the Mahogany sold in the world today comes from young plantations often constituted with woods with inferior properties than the woods from natural forests. In particular, juvenile wood presents an incomplete duraminisation which explains their lower durability compared to that of more mature woods.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

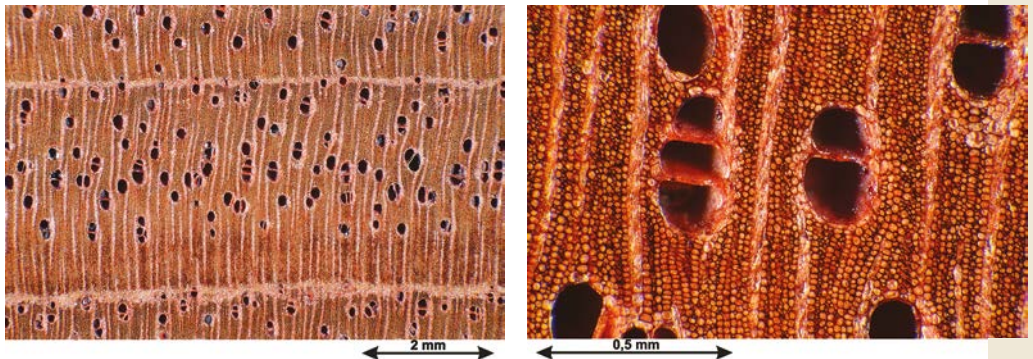
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Swietenia macrophylla*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Musical instruments
- Veneer for interior of plywood
- Panelling

Common names

Country	Local name
Germany	Mahonia
Bolivia	Caoba, Mara
Brazil	Aguano, Araputanga, Mogno
Colombia	Caoba
Cuba	Caoba
Spain	Caoba
France	Acajou d'Amérique, Mogno
Guatemala	Chacalte
Haïti	Mahogany
Italy	Mogano
Mexico	Baywood, Zopilote
Peru	Aguano, Caoba
Dominican Republic	Mahogany
United Kingdom	Mahogany
Venezuela	Orura



Art Deco style wardrobe – 1928 by René Coulomb – Éric Orsini, Pézenas (France).

- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer
- Exterior panelling
- Marquetry

Makoré

Family. Sapotaceae

Botanical name

Tieghemella heckelii Pierre

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 110 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Marked but not frequent

Notes. Sapwood whitish to pinkish. Heartwood dark pink brown to dark red brown sometimes with purple shades. Often moiré.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.67
Monnin hardness ⁽¹⁾	3.9
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.3
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	17,460 kJ/kg
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	92 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,450 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended to limit defects.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Very irritant sawdust. Occasional clogging of saw blades.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

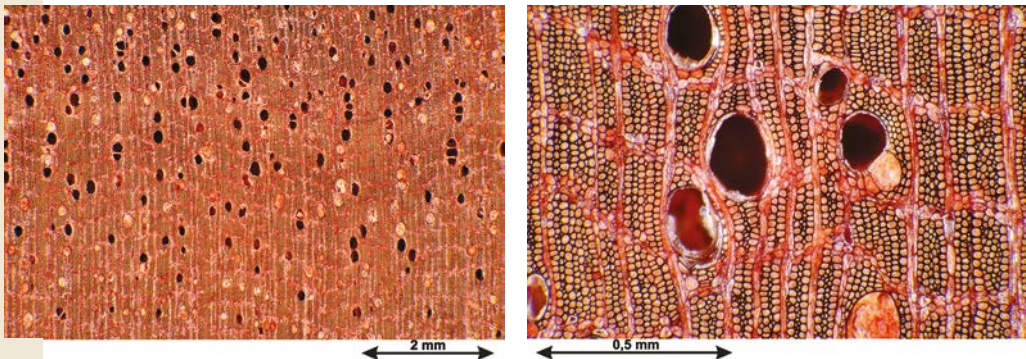
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Tieghemella heckelii*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Sculpture

Common names

Country	Local name
Côte d'Ivoire	Makoré
Ghana	Abacu, Baku



Flat sawn



Quarter sawn

Mambodé

Family. Leguminosae (Caesalpinieae)

Botanical names

Detarium macrocarpum Harms

Detarium senegalense J.F. Gmel.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 7 to 10 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium to coarse

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Coppery brown wood with dark brown veins. Resin exudation is possible.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	3.9
Coefficient of volumetric shrinkage	0.38 % per %
Total tangential shrinkage (Ts):	5.4 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	24 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	99 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This wood is given as not very sensitive to marine borers.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties with sawing and machining due to presence of resin. Tools must always be carefully sharpened.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Resin exudations: to be taken into account when gluing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

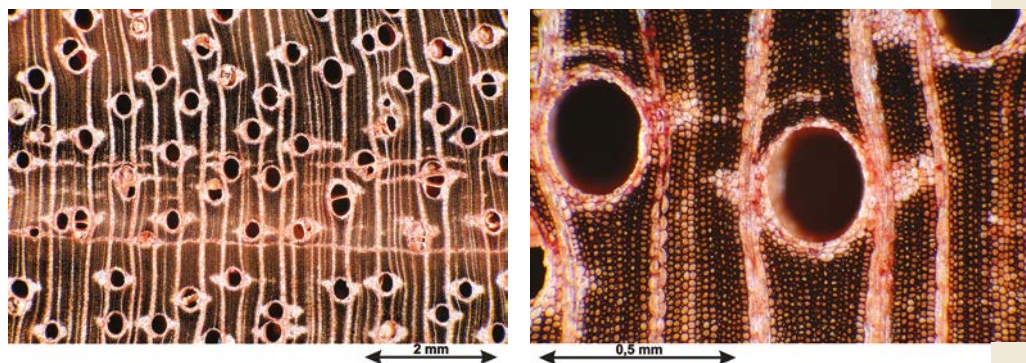
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Detarium macrocarpum*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Coffins
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Marquetry

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
Cameroon	Amouk
Côte d'Ivoire	Bodo, Boiré
France	Mambodé
Gabon	Aboranzork, Énouk
Equatorial Guinea	Eñuk
Guinea-Bissau	Mambodé
Sierra Leone	Kapuyai

Mandioqueira

Family. Vochysiaceae

Botanical names

Qualea coerulea Aubl.

Qualea dinizii Ducke

Qualea paraensis Ducke

Qualea rosea Aubl.

Qualea p.p.

Ruizterania albiflora Marc.-Berti (Syn. *Qualea albiflora*)

Ruizterania retusa Marc.-Berti

Ruizterania p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pinkish brown to red brown, sometimes olive brown. Grain sometimes wavy. Unpleasant odour when green. Wood from species of *Ruizterania* are beige grey in colour, which differentiates them from genus *Qualea* woods, which are more pinkish or reddish.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	4.7
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	9.7 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	31 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,190 kJ/kg
Crushing strength ⁽¹⁾	69 MPa
Static bending strength ⁽¹⁾	103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,400 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Half-quarter sawn

Quarter sawn



Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Variable risks of distortion depending on the species. High humidity recommended during the first stages of drying to reduce defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

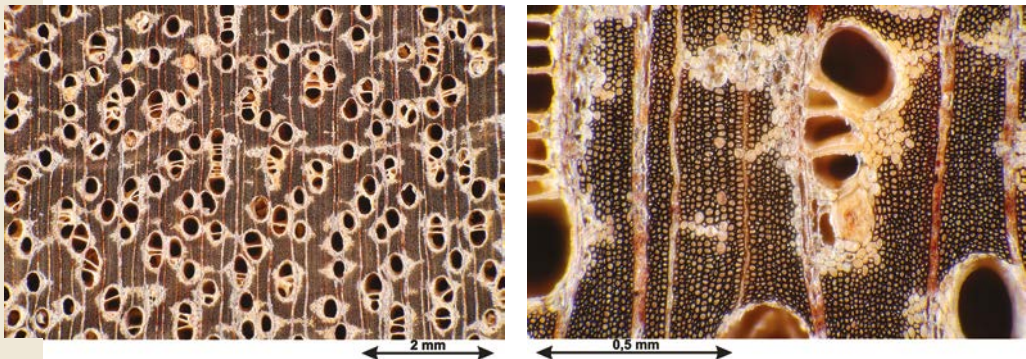
Suitability for slicing. Good

Notes. Some species can be siliceous and present an important blunting effect. In this case, it is necessary to use adequate tools.

Assembling

Nailing/screwing. Good

Cross sections of *Ruizterania albiflora*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Gonfolo". Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s1, d0

Grading for solid wood, according to requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings, with a minimal thickness of 22 mm. It was assigned according to procedures of the European standard NF EN 13501-1. Assigned according to procedures of the European grading report No. RA05-0238C prepared by the CSTB.

Main end uses

- Heavy carpentry
- Formwork
- Ship building (planking and deck)
- Boxes and crates
- Open boats
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer
- Exterior panelling
- Seats

Common names

Country	Local name
Bolivia	Arenillo
Brazil	Mandioqueira, Mandioqueira aspera, Mandioqueira escamosa, Mandioqueira lisa
French Guiana	Gonfolo, Gonfolo kouali, Gronfolo
Suriname	Berg gronfoeloe, Gronfoeloe
Venezuela	Floreccillo



Basralocus sheathing on a ceiling frame in Mandioqueira, Gontran Damas secondary school, Cayenne (French Guiana).

Mango / Machang*

* Common commercial name

Family. Anacardiaceae

Botanical names

Mangifera foetida Lour.

Mangifera indica L.

Mangifera laurina Blume

Mangifera p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 120 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Undulating

Interlocked grain. Absent

Notes. Wide sapwood. Light brown slightly pink. Heartwood with grey or dark brown veins in some logs.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.76
Monnin hardness ⁽¹⁾	3.7
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	6.1 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.5
Fibre saturation point	25 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	17,670 kJ/kg
Crushing strength ⁽¹⁾	71 MPa
Static bending strength ⁽¹⁾	82 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,250 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties of Mango vary widely depending on the species.

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of colouration of wood during drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Occasional presence of tension wood and tendency to woolliness. Careful sanding and filling are necessary. Veneers quite brittle.

Assembling

Nailing/screwing. Good

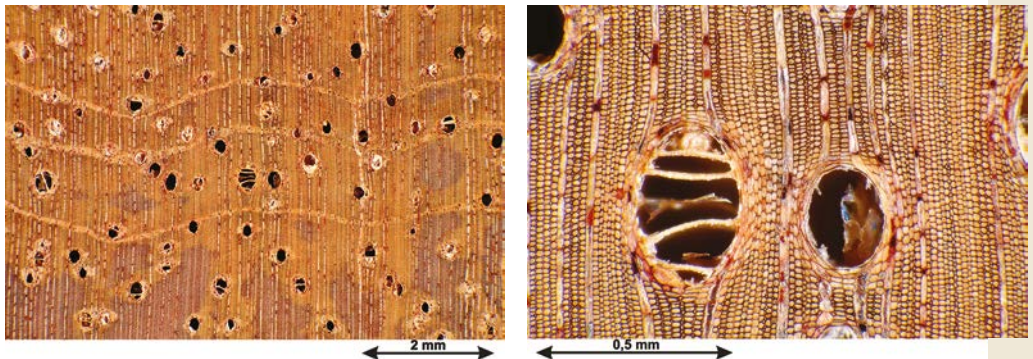
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Mangifera foetida*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer

Notes. Wood with grey or dark brown veins can be used for decorative sliced veneer.



"Picadilly" seven-drawer chest – Maisons du monde, Lattes (France).

Common names

Country	Local name
France	Manguier
Îles Salomon	Ma-muang-pa
India	Mampalagai, Mango, Mangga, Mave, Mavu
Indonesia	Membacang
Malaysia	Asam, Machang, Sepam
Myanmar	Mangowood, Thayet
Pakistan	Mango
Papua New Guinea	Mango
Philippines	Ailai, Asai, Pahutan
United Kingdom	Mangowood
Thailand	Ma-muang-pa, Pamutan
Viet Nam	Xoai

Manil / Manni*

* Common commercial name

Family. Clusiaceae

Botanical name

Symphonia globulifera L. f.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. This species is also found in Asia (Ossol in Gabon).

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Light brown to yellow brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	3.3
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	10.1 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	2.1
Fibre saturation point	29 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,400 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	104 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,630 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Notes. Treatability of Manil seems rather easy with oil-type preservation products. It is difficult with saline-type preservation products.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Initial air drying under cover is recommended prior to kiln drying. The application of an end-coating is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Risk of splitting when nailing.

Commercial grading

Sawn timber appearance grading

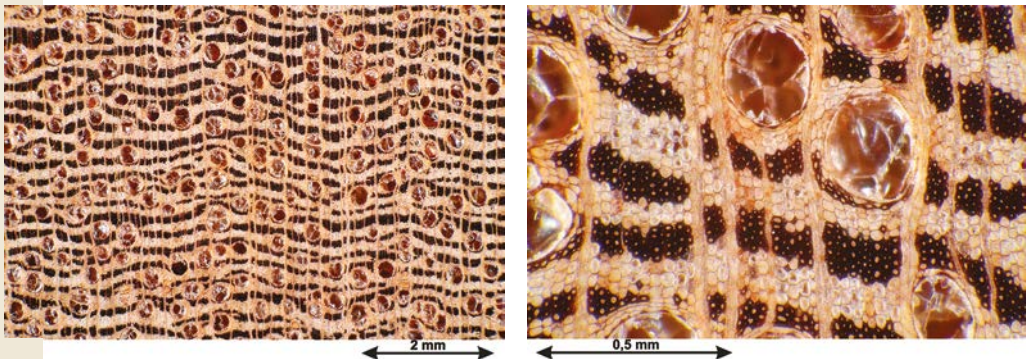
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Cross sections of *Symphonia globulifera*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Boxes and crates
- Veneer for back or face of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer
- Pulp
- Marquetry
- Cooperage

Common names

Country	Local name
Bolivia	Azufre, Brea amarilla
Brazil	Anani, Canadi, Mani
Colombia	Azufre, Machare
Ecuador	Machare, Puenga, Zaputi
United States	Boarwood
Guyana	Manni
French Guiana	Manil, Manil marécage
Peru	Azufre, Brea-caspi
Suriname	Mani, Matakí
Trinidad and Tobago	Mangue
Venezuela	Mani, Paraman, Peramancillo

Coffee table in Manil marécage, by Copeaux and Co, Sinnamary (French Guiana).





Half-quarter sawn

Quarter sawn



Manniballi

Family. Clusiaceae

Botanical name

Moronobeia coccinea Aubl.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Manniballi should not be confused with Manil or Manil marécage (*Symphonia globulifera*).

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood light yellow slightly veined. Grain sometimes wavy at the periphery of logs.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.90
Monnin hardness ⁽¹⁾	10.3
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	2.1
Fibre saturation point	25 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	68 MPa
Static bending strength ⁽¹⁾	143 MPa
Longitudinal modulus of elasticity ⁽¹⁾	26,540 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Initial air drying under cover is recommended prior to kiln drying. Drying in moderate conditions and the application of an end-coating are recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

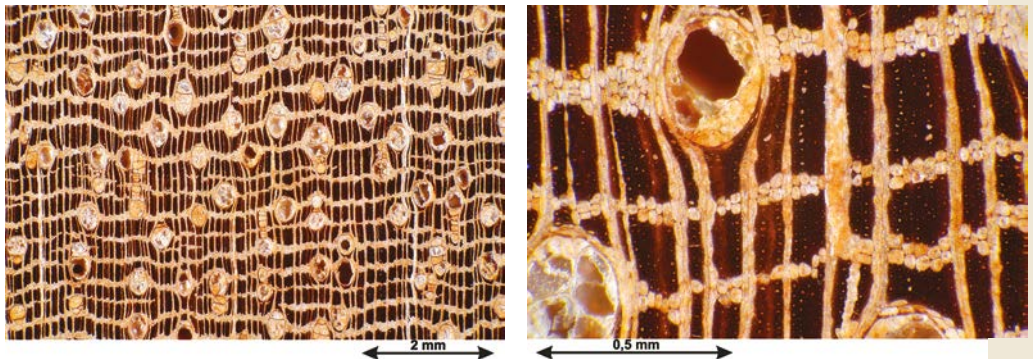
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Moronobea coccinea*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Exterior joinery
- Built-in furniture or mobile item
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Sleepers

Common names

Country	Local name
Brazil	Anani da terra firme, Bacuri de anta
Guyana	Coronobo, Morombo-rai, Moronobo
French Guiana	Manil montagne, Manil peou, Parcouri-manil
Suriname	Manniballi, Matakkie



Console table in Manniballi – by Dissi, Rémire-Montjoly (French Guiana).

Maritime Pine

Family. Pinaceae

Botanical names

Pinus pinaster Aiton (Syn. *Pinus maritima*)

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Grows naturally in the west part of the Mediterranean basin. Largely used in plantations (Landes, France).

Log description

Diameter. 20 to 60 cm

Thickness of sapwood. 6 to 12 cm

Buoyancy. Not applicable

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood is pale yellow. Heartwood is yellow with reddish brown veins. Strong resin (and turpentine) odour on green wood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	9.0 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	2.0
Fibre saturation point	32 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	19,110 kJ/kg
Crushing strength ⁽¹⁾	39 MPa
Static bending strength ⁽¹⁾	80 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Specific gravity of tapped woods is higher (up to 0.75).

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Use class 3 only covers wood components without sapwood. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Notes. Difficult gluing for woods with high resin content. Drying over 70° practically eliminates this problem.

Commercial grading

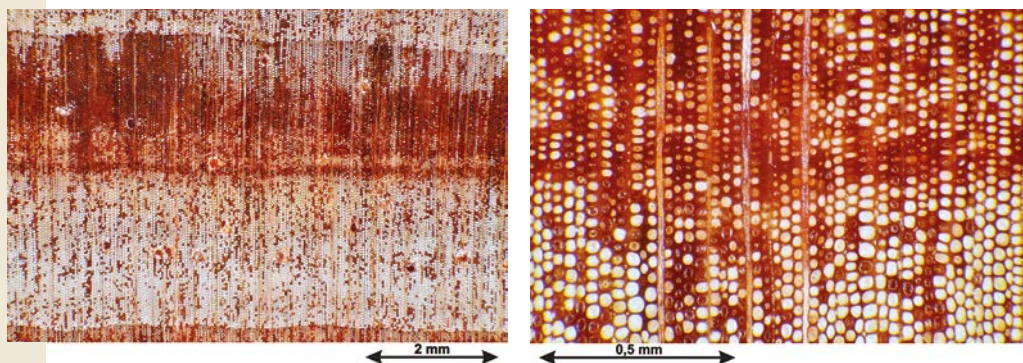
Sawn timber appearance grading

According to French standard NF EN 1611-1 (October 1999)

Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Cross sections of *Pinus pinaster*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C18 and C24 can be provided by visual grading. However, strength classes C14, C28, C24 and C30, can be provided by visual grading according to French standard NF B 52-001-1 (2011).



Structured floorboards – designed by Verniland, FP Bois (France).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Heavy carpentry
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Poles
- Exterior panelling

Common names

Country	Local name
Germany	Seekiefer
Spain	Pino marítimo
France	Maritime Pine
Italy	Pino marittimo
Portugal	Pinheiro bravo
United Kingdom	Maritime pine

Marupa

Family. Simaroubaceae

Botanical names

Simarouba amara Aubl.

Simarouba glauca DC.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Wood cream white to light yellow. Sometimes oily veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.41
Monnin hardness ⁽¹⁾	1.1
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	6.3 %
Total radial shrinkage (Rs):	2.8 %
T/R anisotropy ratio	2.3
Fibre saturation point	32 %
Thermal conductivity (λ)	0.15 W/(m.K)
Lower heating value	19,030 kJ/kg
Crushing strength ⁽¹⁾	34 MPa
Static bending strength ⁽¹⁾	59 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,070 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. Marupa is prone to blue stain before and during drying.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

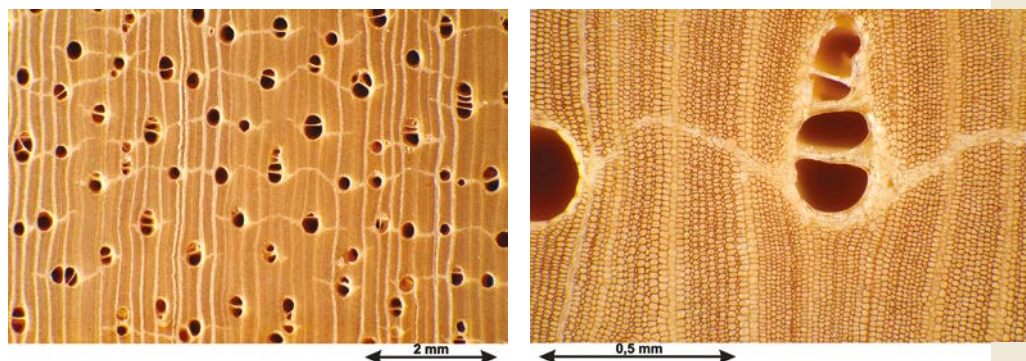
In French Guiana, the local name of this species is "Simarouba". Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Cross sections of *Simarouba amara*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Kitchen cupboard, Kourou (French Guiana).

Main end uses

- Matches
- Turned goods
- Boxes and crates
- Veneer for back or face of plywood
- Stringed instruments (sounding board)
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Marquetry

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
Bolivia	Chiruana
Brazil	Marupa, Marupauba, Parahyba, Paraiba, Tamanqueira
Colombia	Simaruba
Ecuador	Cedro amargo, Cuna, Guitarro
Guyana	Simarupa
French Guiana	Simarouba
Peru	Marupa
United Kingdom	Bitterwood
Suriname	Soemaroeba
Venezuela	Cedro blanco, Simarouba

Mecrussé

Family. Picrodendraceae (Euphorbiaceae)

Botanical name

Androstachys johnsonii Prain

Continent. Africa (including Madagascar)

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Yellowish white sapwood. Heartwood light brown to reddish brown, often with darker veining.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.93
Monnin hardness ⁽¹⁾	8.7
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	6.2 %
Total radial shrinkage (Rs):	5.7 %
T/R anisotropy ratio	1.1
Fibre saturation point	23 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	16,640 kJ/kg
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	163 MPa
Longitudinal modulus of elasticity ⁽¹⁾	-

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or



Flat sawn



Half-quarter sawn

brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

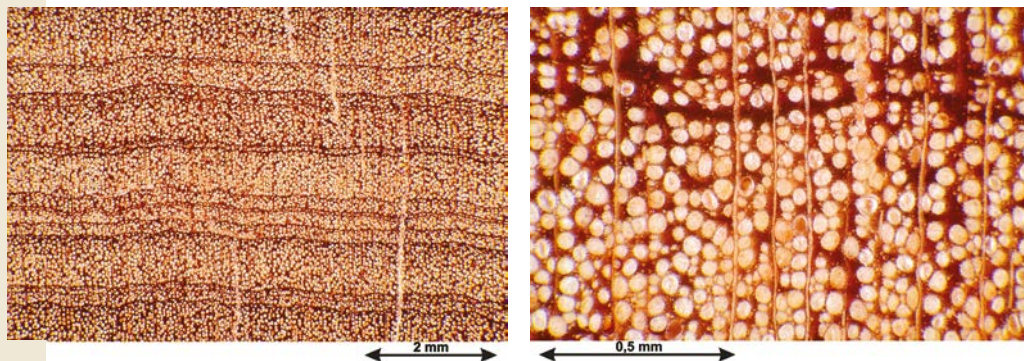
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Androstachys johnsonii*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Hydraulic works (seawater)

Notes. Substitute for Muhuhu.

Common names

Country	Local name
Magagascar	Merana, Ombafo
Mozambique	Mecrussé, Mezimbite
Portugal	Cimbirre
Zimbabwe	Lebombo ironwood



Half-quarter sawn



Quarter sawn

Melancieira

Family. Leguminosae (Fabaceae)

Botanical names

Alexa grandiflora Ducke

Alexa imperatricis Baill.

Alexa leiopetala Sandwith

Alexa wachenheimii Benoist

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light yellow to reddish brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.76
Monnin hardness ⁽¹⁾	4.9
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	10.7 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	2.1
Fibre saturation point	30 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	60 MPa
Static bending strength ⁽¹⁾	96 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,810 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. Yes

Notes. Drying is very difficult. Kiln drying gives better results than air drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Notes. Pre-boring sometimes necessary, in particular for heavier woods.

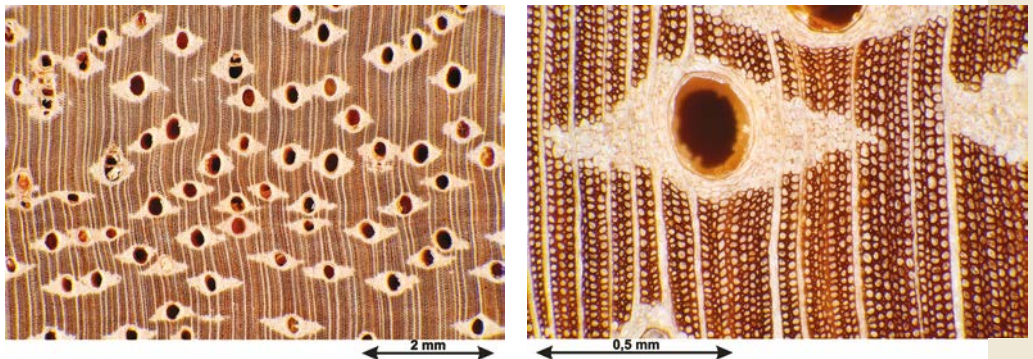
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Alexa imperatricis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Boxes and crates
- Stairs (inside)
- Vehicle or container flooring
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling

Notes. Drying problems restrict the use of this timber.

Common names

Country	Local name
Brazil	Fava bolocha, Melancieira, Sucupira-pepino
Guyana	Haariballi
Suriname	Nekoe-oedoe

Melunak

Family. Malvaceae (Tiliaceae)

Botanical names

Pentace burmanica Kurz

Pentace triptera Mast.

Pentace p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Sapwood more or less distinct depending on the species and origin, varies from straw-coloured to pale reddish brown. Heartwood gold red brown turning darker in the light. Fine silver figure, transverse stripes. Zig-zag runs of parenchyma, moiré on radial side.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	3.1
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.5
Fibre saturation point	25 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	63 MPa
Static bending strength ⁽¹⁾	111 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,700 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible



Flat sawn

Quarter sawn



Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

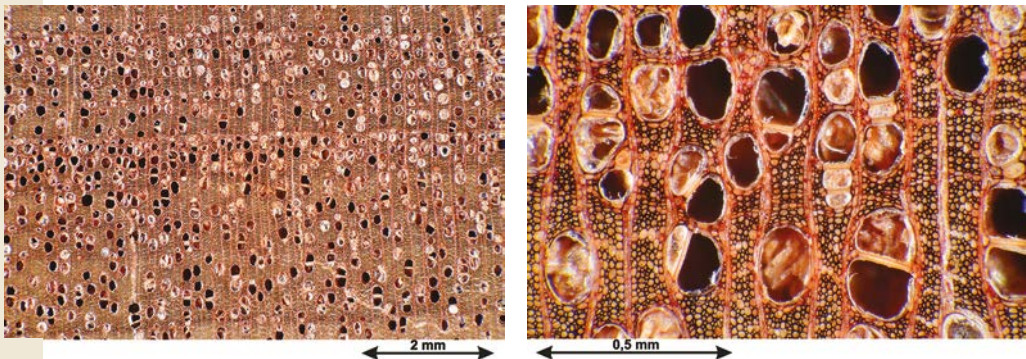
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Pentace burmanica*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Coffins
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring
- Sliced veneer

Notes. Needs filling before polishing. Possible substitute for Mahogany.

Common names

Country	Local name
Cambodia	Tassit
Indonesia	Pinang
Laos	Sisiet
Malaysia	Baru-baran, Melunak, Takalis
Myanmar	Kashit, Thitka
Thailand	Daeng-samaet, Sisiat, Tongsuk
Viet Nam	Nghien

Mengkulang

Family. Malvaceae (Sterculiaceae)

Botanical names

Heritiera javanica Kosterm. (Syn. *Tarrietia javanica*)

Heritiera simplicifolia Kosterm. (Syn. *Tarrietia simplicifolia*)

Heritiera sumatrana Kosterm. (Syn. *Tarrietia sumatrana*)

Heritiera p.p. (Syn. *Tarrietia* p.p.)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood colour varies from light pink to red, darkening to red brown in the light. Clearly visible silver figure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	4.0
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	8.7 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.9
Fibre saturation point	35 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	101 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,450 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable



Flat sawn

Half-quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Resistance to decay low to moderate depending on the species.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Blunting effect normal to high due to silica content. Tendency to tear on quartersawn.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

Sawn timber appearance grading

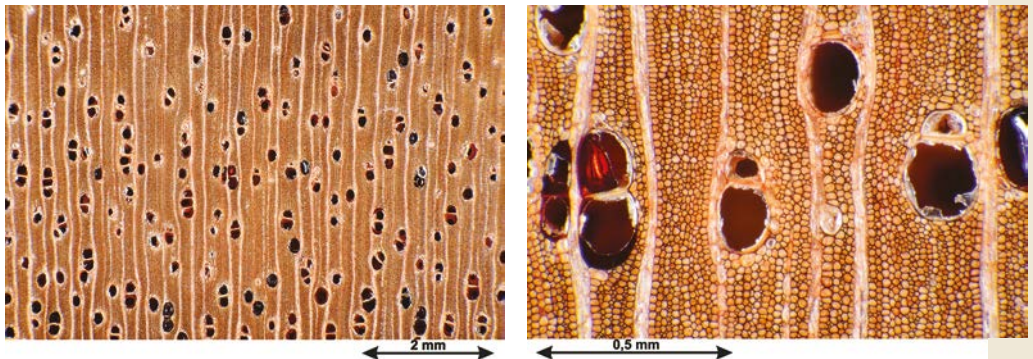
According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Cross sections of *Heritiera simplicifolia*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Cabinetry (high-end furniture)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Flooring
- Sliced veneer
- Exterior panelling

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
Cambodia	Don chêm
Indonesia	Palapi, Teraling
Laos	Mai hao, Mai po hao
Malaysia	Kembang, Mengkulang
Myanmar	Kanzo
Philippines	Lumbayau
Thailand	Chumprak
Viet Nam	Huynh

Meranti, Dark Red

Family. Dipterocarpaceae

Botanical names

Shorea acuminata Dyer

Shorea argentifolia Symington

Shorea curtisii Dyer

Shorea hemsleyana King

Shorea macrantha Brandis

Shorea ovata Dyer

Shorea pachyphylla Ridl.

Shorea pauciflora King

Shorea platycarpa F. Heim

Shorea platyclados Slooten

Shorea singkawang Burck

Shorea subgen. *Rubroshorea* p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Shorea* subgen. *Rubroshorea* species with a specific gravity between 0.56 and 0.78.

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark red

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood pink brown to dark red or purplish brown, with white resin streaks.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.49 % per %
Total tangential shrinkage (Ts):	7.6 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	1.9
Fibre saturation point	26 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	20,210 kJ/kg
Crushing strength ⁽¹⁾	52 MPa
Static bending strength ⁽¹⁾	92 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,020 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Half-quarter sawn



Quarter sawn

Notes. Specific gravity varies from 0.58 to 0.78. Wood soft to fairly hard.

Natural durability and treatability

Resistance to decay. Class 2 to Class 4 - durable to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Durability variable (linked to a variable mass per unit), depending on the species. Variable treatability.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Thin sawnwoods must be stacked carefully with the appropriate number of spacer sticks in order to avoid any risk of distortion.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

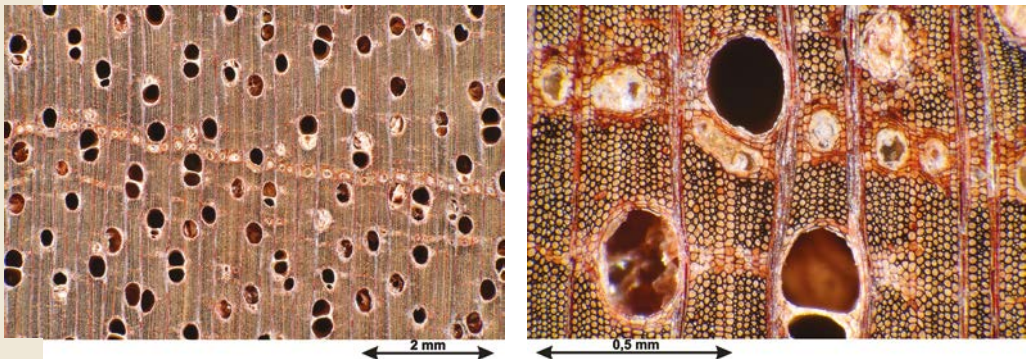
Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Cross sections of *Shorea curtisii*



Notes. Some risks of grain tearing in the presence of interlocked grain. Ribbon-like aspect. Certain woods can have a high silica content.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Open boats
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Sculpture
- Marquetry

Notes. Frequent black holes and brittleheart. White resin canals may detract from the wood's visual appearance for certain end uses.

Common names

Country	Local name
France	Meranti dark red
Indonesia	Merah-tua, Meranti bunga, Meranti Ketung, Red Meranti
Malaysia	Binatoh, Dark red Meranti, Dark red Seraya, Engbang chenak, Merant bukit, Meranti bunga sengawan, Meranti daun basar, Nemesu, Oba suluk, Seraya bukit, Seraya daun
Philippines	Bataan, Red Lauan, Tanguile



Entrance gate, Tournon (France).

Meranti, Light Red

Family. Dipterocarpaceae

Botanical names

<i>Shorea dasyphylla</i> Foxw.	<i>Shorea parvifolia</i> Dyer
<i>Shorea gysbertsiana</i> Burck	<i>Shorea quadrinervis</i> Slooten
<i>Shorea johorensis</i> Foxw.	<i>Shorea revoluta</i> P.S. Ashton
<i>Shorea lepidota</i> Blume	<i>Shorea sandakanensis</i>
<i>Shorea leprosula</i> Miq.	Symington
<i>Shorea leptocladus</i> Symington	<i>Shorea smithiana</i> Symington
<i>Shorea macrophylla</i> P.S. Ashton	<i>Shorea squamata</i> Benth. &
<i>Shorea macroptera</i> Dyer	Hook. f.
<i>Shorea ovalis</i> Blume	<i>Shorea teysmanniana</i> Dyer
<i>Shorea palembanica</i> Miq.	<i>Shorea</i> subgen. <i>Rubroshorea</i>
<i>Shorea palosapis</i> Merr.	p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Shorea* subgen. *Rubroshorea* species with specific gravity between 0.38 and 0.58.

Log description

Diameter. 70 to 150 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light red

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Frequent brittleheart and black holes. Wood pink to light red or pink brown. Presence of white resin streaks. Ribbon-like aspect. Lustrous surface.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	2.4
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	7.1 %
Total radial shrinkage (Rs):	3.6 %
T/R anisotropy ratio	2.0
Fibre saturation point	29 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	19,360 kJ/kg
Crushing strength ⁽¹⁾	42 MPa
Static bending strength ⁽¹⁾	86 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,620 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Notes. Specific gravity varies from 0.38 to 0.58 (over 0.58 for Dark Red Meranti).

Natural durability and treatability

Resistance to decay. Class 2-4 - durable to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Frequent black holes. Variable treatability.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Thin sawnwoods must be stacked carefully with the appropriate number of spacer sticks in order to avoid any risk of distortion.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

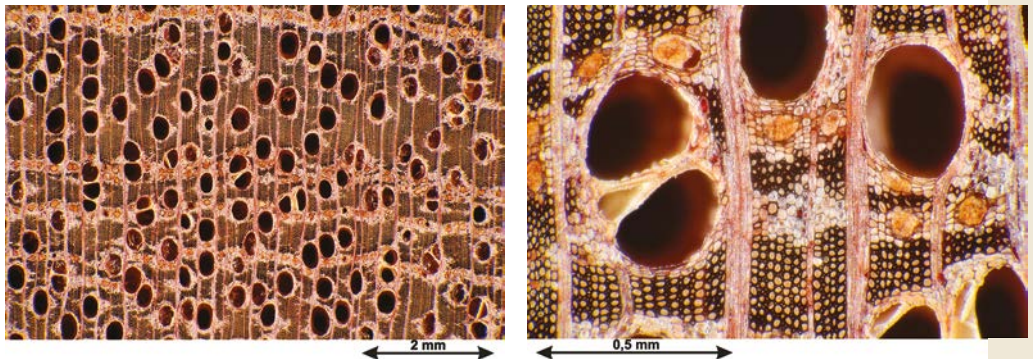
Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Tendency to woolliness. Keep sharp tools.

Cross sections of *Shorea squamata*



Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Sliced veneer
- Exterior panelling

Notes. Filling is recommended. Presence of white streaks can be inconvenient for certain end uses. Specific gravity > 0.45 for joinery.

Common names

Country	Local name
France	Meranti light red
Indonesia	Meranti bunga, Meranti merah muda, Red meranti
Malaysia	Damar siput, Engkabang, Kawang, Light red meranti, Light red seraya, Meranti hantu, Meranti kepong, Meranti langgang, Meranti melanthi, Meranti paya, Meranti rambai, Meranti sangkawang, Meranti tembaya, Meranti tengkawang, Seraya batu, Seraya bunga, Seraya punai
Thailand	Chan hoi, Saya khao, Saya lueang
Philippines	Mayapis

Meranti, White

Family. Dipterocarpaceae

Botanical names

Shorea agami P.S. Ashton

Shorea assamica Dyer

Shorea bracteolata Dyer

Shorea dealbata Foxw.

Shorea farinosa C.E.C. Fisch.

Shorea gratissima Dyer

Shorea hentonyensis Foxw.

Shorea hypochra Hance

Shorea javanica Koord. & Valetton

Shorea lamellata Foxw.

Shorea ochracea Symington

Shorea plagata Foxw.

Shorea polita S. Vidal

Shorea resinosa Foxw.

Shorea roxburghii G. Don

(Syn. *Shorea floribunda*)

Shorea sericeiflora

C.E.C.Fisch. & Hutch.

Shorea talura Roxb.

Shorea subgen. *Anthoshorea*

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 150 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Presence of brittleheart in some logs. Wood cream white becoming yellow brown with age. Ribbon-like aspect on quartersawn. Grain sometimes highly interlocked.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.72
Monnin hardness ⁽¹⁾	3.3
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	8.5 %
Total radial shrinkage (Rs):	4.0 %
T/R anisotropy ratio	2.1
Fibre saturation point	33 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,890 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Quarter sawn



Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Presence of black holes. Variable treatability.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

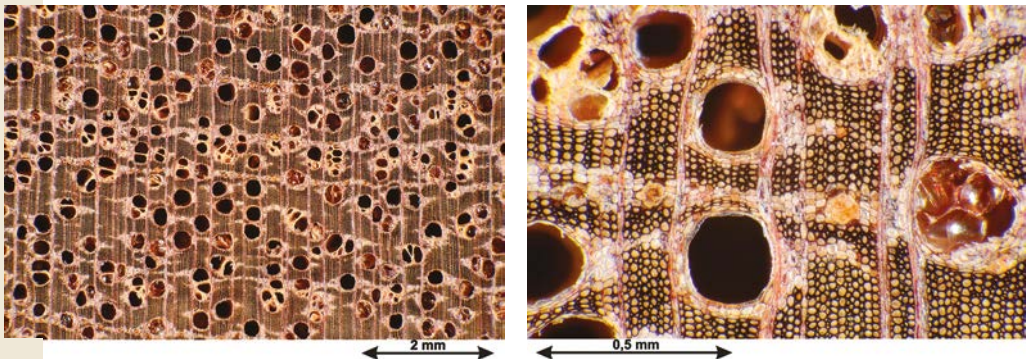
Notes. High silica content. Tendency to woolliness. Filling is recommended to obtain a good finish.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Risk of splitting when nailing.

Cross sections of *Shorea agami*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Common names

Country	Local name
Cambodia	Koki phnom
France	Meranti white
Indonesia	Damar puthi, Damar putih, Meranti putih
Malaysia	Kebon tang, Melapi, Meranti jerit, Meranti lapis, Meranti temak, White meranti
Myanmar	Makai
Philippines	Lauan white, White lauan
Thailand	Kabak khao, Kanawang, Pa nong, Pendan, Pha-yom, Sual
Viet Nam	Chai

Meranti, Yellow

Family. Dipterocarpaceae

Botanical names

Shorea acuminatissima
Symington

Shorea blumutensis Foxw.

Shorea dolichocarpa Slooten

Shorea faguëtiana F. Heim

Shorea faguëtioides P.S.
Ashton

Shorea gibbosa Brandis

Shorea hopeifolia Symington

Shorea kaluntî Merr.

Shorea longisperma Roxb.

Shorea maxima Symington

Shorea multiflora Symington

Shorea peltata Symington

Shorea resina-nigra Foxw.

Shorea subgen. *Richetia*

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 110 cm

Thickness of sapwood. 6 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Brittleheart (in large diameter trees). Wood light yellow or yellow brown with sometimes greenish glints. Darkens in the air. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.54
Monnin hardness ⁽¹⁾	2.4
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	7.3 %
Total radial shrinkage (Rs):	3.1 %
T/R anisotropy ratio	2.4
Fibre saturation point	25 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	19,940 kJ/kg
Crushing strength ⁽¹⁾	48 MPa
Static bending strength ⁽¹⁾	98 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Resistance to decay low to moderate depending on the species. Low to moderate treatability. Presence of black holes.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Wood must be carefully stacked to reduce the risk of distortions.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

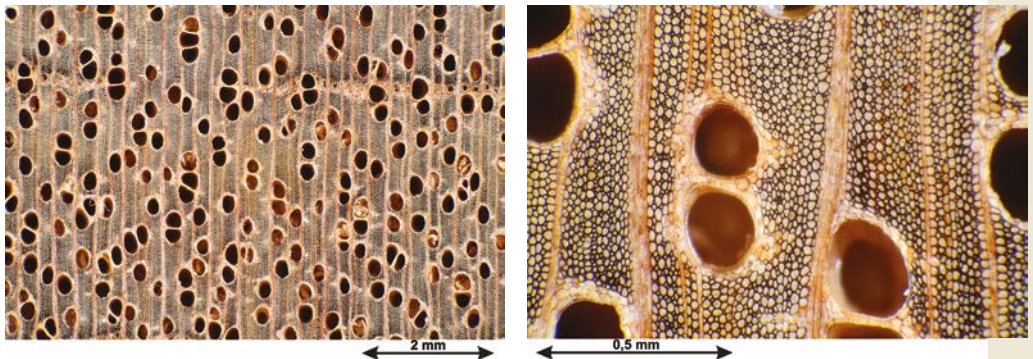
Suitability for slicing. Good

Notes. Some difficulties in machining in the presence of interlocked grain.

Assembling

Nailing/screwing. Good

Cross sections of *Shorea faguiana*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
France	Meranti yellow
Indonesia	Meranti kuning, Kunyit
Malaysia	Lun gajah, Lun kuning, Lun merat, Lun siput, Meranti damar hitam, Meranti kelim, Meranti telepok, Meranti Yellow, Selangan kacha, Selangan kuning, Seraya kuning, Seraya Yellow, Yellow meranti, Yellow seraya
Thailand	Kalo

Notes. Yellow Meranti generally refers to timber from the peninsular area of Malaysia, while Yellow Seraya refers to wood from the Sabah-Sarawak region of the country.

Merawan

Family. Dipterocarpaceae

Botanical names

<i>Hopea apiculata</i> Symington	<i>Hopea odorata</i> Roxb.
<i>Hopea dryobalanoides</i> Miq.	<i>Hopea papuana</i> Diels
<i>Hopea griffithii</i> Kurz	<i>Hopea pierrei</i> Hance
<i>Hopea lowii</i> Dyer	<i>Hopea sangal</i> Korth.
<i>Hopea mengarawan</i> Miq.	<i>Hopea sulcata</i> Symington
<i>Hopea nervosa</i> King	<i>Hopea</i> p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. *Hopea* density lower than 0.85. The most dense species are marketed under the name of Giam.

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Some logs are not floatable. Yellow brown to chocolate reddish brown with an occasional dark striping. Texture is fine to medium.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.0
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	6.6 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	2.1
Fibre saturation point	20 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	102 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. *Hopea* p.p. with a density > 0.85 (Giam) have a better resistance to decay. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

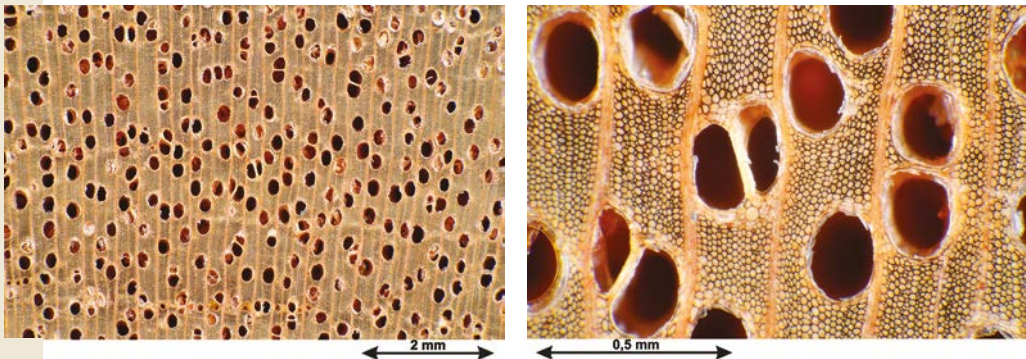
Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Poor

Notes. Tends to split when nailing or screwing; nails hold poorly.

Cross sections of *Hopea sangal*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Fibre or particle boards
- Flooring
- Cooperage
- Sleepers

Notes. Wood is resistant to acids.

Common names

Country	Local name
Germany	Merawan
Cambodia	Koki
France	Merawan
Indonesia	Cengal, Merawan, Sengal
Italy	Merawan
Malaysia	Gagil, Merawan, Selangan, Selangan-Kasha, Sengal
Myanmar	Thingan
Papua New Guinea	Light hopea
Philippines	Manggachapoi, Manggachapui
United Kingdom	Merawan
Thailand	Takhina, Takien
Viet Nam	Sao



Flat sawn

Quarter sawn



Merbau

Family. Leguminosae (Caesalpinieaceae)

Botanical names

Intsia bijuga Kuntze (Syn. *Afzelia bijuga*) (Syn. *Intsia amboinensis*) (Syn. *Intsia retusa*)

Intsia palembanica Miq. (Syn. *Intsia backeri*)

Intsia p.p.

Continent. Asia, Oceania, Madagascar

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood sometimes orangey brown becoming dark red brown or dark brown in the light. Present of yellow sulphur deposits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.83
Monnin hardness ⁽¹⁾	8.8
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	4.4 %
Total radial shrinkage (Rs):	2.7 %
T/R anisotropy ratio	1.6
Fibre saturation point	24 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	74 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,440 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. It covers the use class 4, but presents a variable durability towards marine borers. Its use under sea water is not recommended. Resistance to termites ranges from moderately good to good. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawblades tend to clog. Tendency to tear on quartersawn. Silica content is variable.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

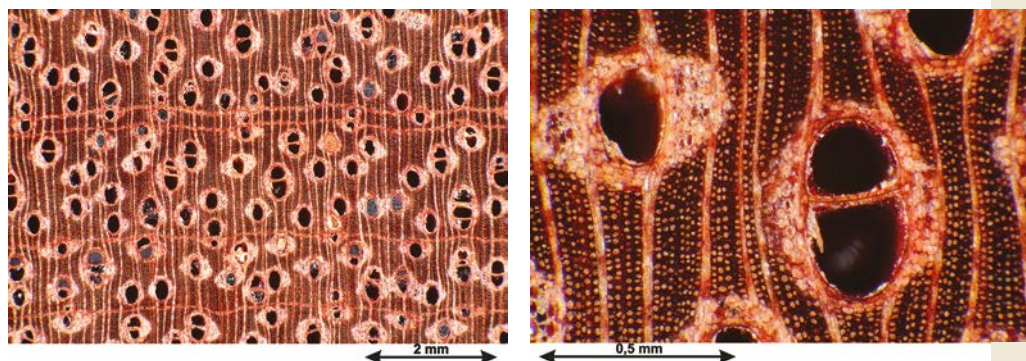
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Intsia bijuga*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D50 can be provided by visual grading. Strength class D40 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Boxes and crates
- Stairs (inside)
- Vehicle or container flooring
- Musical instruments
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring

Common names

Country	Local name
Australia	Kwilau
China	Kalabau
Fiji	Vesi
Indonesia	Merbau
Magadascar	Hintsy
Malaysia	Merbau, Mirabow
New Caledonia	Kohu
Papua New Guinea	Kwila
Philippines	Ipil, Ipil laut
Thailand	Lum-paw
Viet Nam	Gonuoc



Semi-spiral staircase made in Kohu, Nouméa (New Caledonia).

- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Sculpture
- Marquetry
- Cooperage
- Hydraulic works (fresh water)
- Sleepers

Merpauh

Family. Anacardiaceae

Botanical names

Swintonia floribunda Griff.

Swintonia penangiana King

Swintonia pierrei Hance

Swintonia schwenckii Teijsm. & Binn.

Swintonia spicifera Hook. f.

Swintonia p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Wood light brown with or without pink to reddish brown glints. Lustrous surface. Sometimes wavy grain. Presence of tension wood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.75
Monnin hardness ⁽¹⁾	5.5
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	7.2 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.5
Fibre saturation point	24 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	66 MPa
Static bending strength ⁽¹⁾	114 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn

Quarter sawn



Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Moderate to good amenability to preservation treatment.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of colouration of wood during drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Wood difficult to saw in presence of tension wood. Sap and green timber may cause irritations. Sometimes, presence of silica.

Assembling

Nailing/screwing. Good

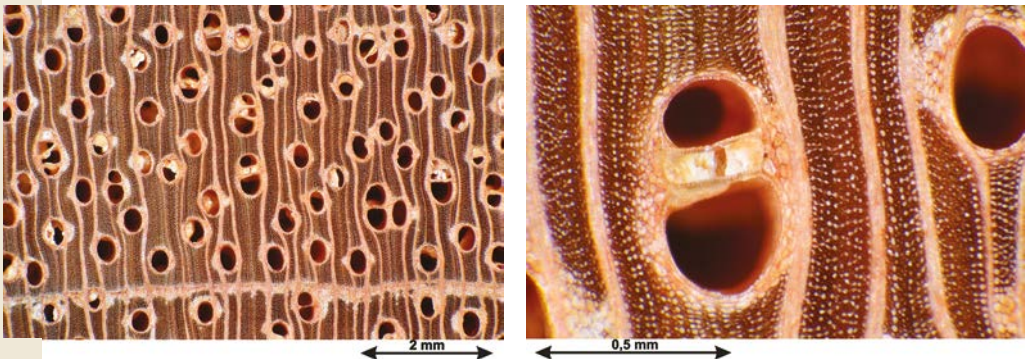
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Swintonia floribunda*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Blockboard

Common names

Country	Local name
Cambodia	Muom
France	Merpauh
India	Thayet-kin
Malaysia	Merpau
Myanmar	Civit taung thayet, Taung-thayet
Pakistan	Civit
Viet Nam	Muom

Mersawa

Family. Dipterocarpaceae

Botanical names

Anisoptera costata Korth. (Syn. *Anisoptera cochinchinensis*)

Anisoptera curtisii Dyer

Anisoptera glabra Kurz

Anisoptera laevis Ridl.

Anisoptera marginata Korth.

Anisoptera scaphula Pierre

Anisoptera thurifera Blume

Anisoptera p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 150 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Orange yellow

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sometimes orangey yellow darkening to golden brown. Presence of whitish resin streaks.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.63
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	2.4
Fibre saturation point	32 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	83 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,930 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Wood soft to fairly hard.



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Sometimes presence of water pockets.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

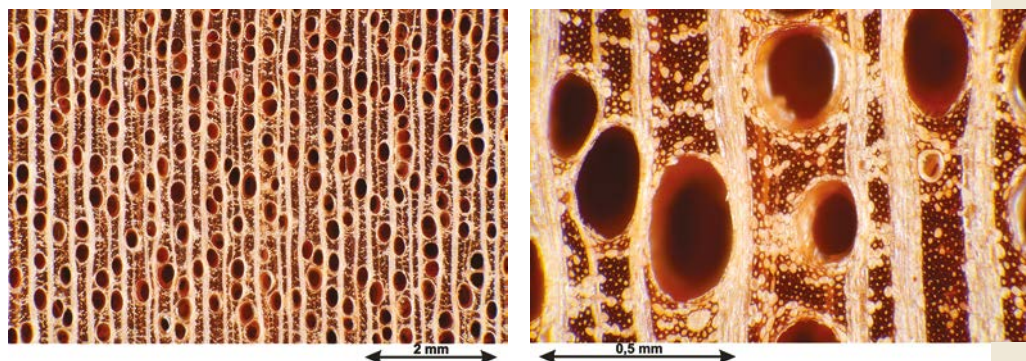
Suitability for slicing. Good

Notes. Resin exudation in steaming. Tendency to tearing on quartersawn.

Assembling

Nailing/screwing. Good

Cross sections of *Anisoptera cochinchinensis*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
Cambodia	Phdiek
United States	Bella rosa
France	Ven-ven
Indonesia	Mersawa
Laos	Mai bak
Malaysia	Mersawa, Pengiran
Myanmar	Kaunghmu
Papua New Guinea	Mersawa
Philippines	Palosapis
United Kingdom	Krabak
Thailand	Krabak, Pik
Viet Nam	Ven-ven

Moabi

Family. Sapotaceae

Botanical names

Baillonella toxisperma Pierre (Syn. *Mimusops djave*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pink brown to red brown more or less dark and finely veined. Satin-like aspect on quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	6.8
Coefficient of volumetric shrinkage	0.64 % per %
Total tangential shrinkage (Ts):	8.7 %
Total radial shrinkage (Rs):	6.5 %
T/R anisotropy ratio	1.3
Fibre saturation point	23 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	19,610 kJ/kg
Crushing strength ⁽¹⁾	74 MPa
Static bending strength ⁽¹⁾	143 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,040 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or



Half-quarter sawn



Quarter sawn

regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Initial air drying under cover is recommended prior to kiln drying.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Dulling effect due to silica content. Machining dust may cause allergies.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

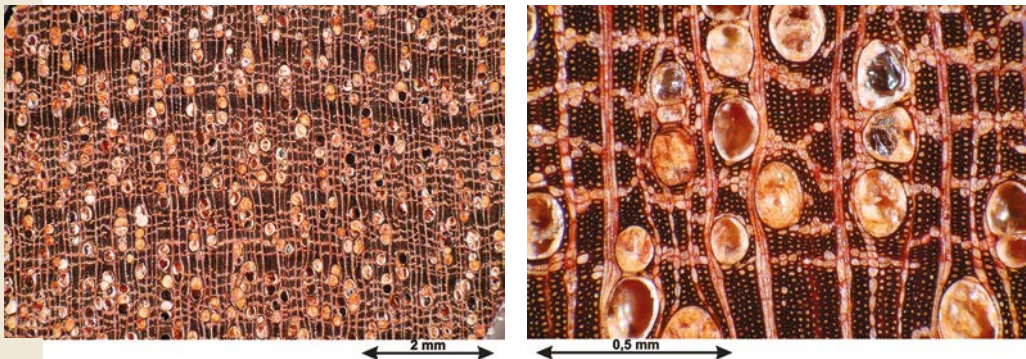
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Baillonella toxisperma*



Possible grading for short-length lumbers: choice I, choice II
Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring

Common names

Country	Local name
Angola	Moabi
Cameroon	Adjap, Ayap
Congo	Dimpampi, Moabi
Gabon	Adza, M'foi, Oabé
Equatorial Guinea	Adjap, Ayap
Nigeria	Oko uku
Democratic Republic of Congo	Muamba jaune
United Kingdom	African Pearwood



Door in Moabi, posts in Tali, framework in Kosipo, vertical thin timber cladding in Mukulungu – J.Y. Riaux, Mindourou (Cameroon).

- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts not in contact with water or ground)
- Sculpture
- Sleepers
- Rolling shutters

Monghinza

Family. Sapotaceae

Botanical names

Manilkara mabokeensis Aubrév.

Manilkara obovata J.H. Hemsl.

Manilkara p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood pinkish. Heartwood rich red brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.98
Monnin hardness ⁽¹⁾	10.0
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	10.1 %
Total radial shrinkage (Rs):	6.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	26 %
Thermal conductivity (λ)	0.32 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	82 MPa
Static bending strength ⁽¹⁾	162 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Half-quarter sawn



Quarter sawn

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #9 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

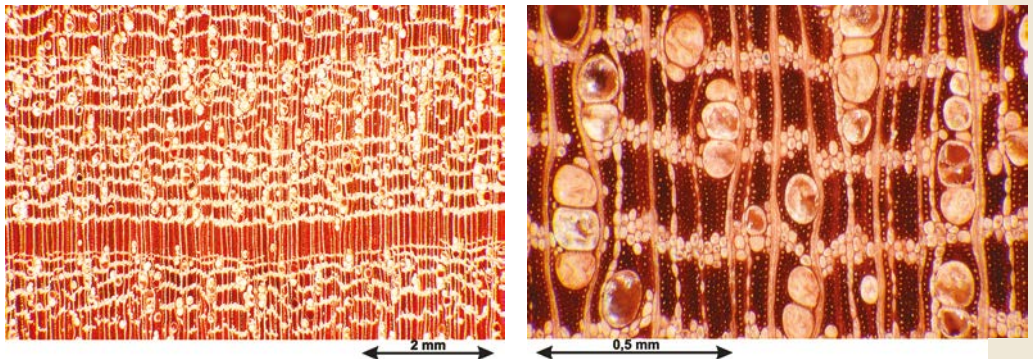
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Manilkara maboekensis*



Possible grading for short-length lumbers: choice I, choice II
 Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Square-edged timber for export – Entreprise Rougier, Mokabi (Congo).

Main end uses

- Arched goods
- Turned goods
- Ship building (planking and deck)
- Stairs (inside)
- Stringed instruments (bows)
- Exterior joinery
- Interior joinery
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. Same end uses to those of Bulletwood.

Common names

Country	Local name
Côte d’Ivoire	Sisina
Gabon	Adzacon-aboga
Central African Republic	Monghinza, Monginja
United Kingdom	African Pearwood

Mora

Family. Leguminosae (Caesalpinaceae)

Botanical names

Mora excelsa Benth.

Mora paraensis Ducke

Mora p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 150 cm

Thickness of sapwood. 5 to 15 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Heartwood pinkish brown to red brown with sometimes thin darker veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.03
Monnin hardness ⁽¹⁾	8.6
Coefficient of volumetric shrinkage	0.68 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	6.5 %
T/R anisotropy ratio	1.5
Fibre saturation point	26 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	80 MPa
Static bending strength ⁽¹⁾	141 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,940 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Must be dried slowly to reduce the risk of defects.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Difficult to saw due to hardness and interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

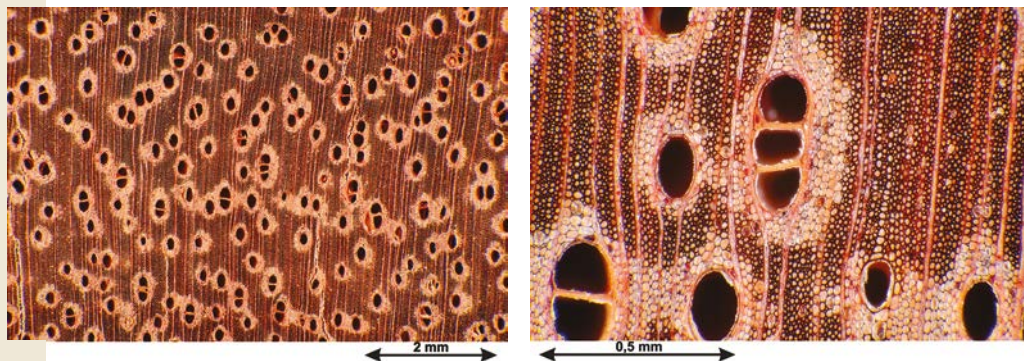
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Mora excelsa*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Stocked wooden ties – Woods Direct International LLC, New York (United States).

Main end uses

- Turned goods
- Heavy carpentry
- Tool handles (resilient woods)
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Brazil	Pracuúba, Pracuúba branca, Pracuúba vermelha
Colombia	Nato, Nato rojo
Ecuador	Nato
Guyana	Mora, Morabukea
French Guiana	Mora
Panama	Alcornoque
Suriname	Mora, Moraboekea
Trinidad and Tobago	Mora
Venezuela	Mora

Moral

Family. Moraceae

Botanical names

Maclura tinctoria D. Don (Syn. *Chlorophora tinctoria*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Sapwood greyish white to pale beige. Heartwood yellow turning golden brown to dark wood. Silver figure fine and clearly distinct. Interlocked grain produces a fine ribbon figure on radial surfaces.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	12.0
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	6.1 %
Total radial shrinkage (Rs):	3.3 %
T/R anisotropy ratio	1.8
Fibre saturation point	18 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	91 MPa
Static bending strength ⁽¹⁾	151 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 – poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Machining dust may cause irritation.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

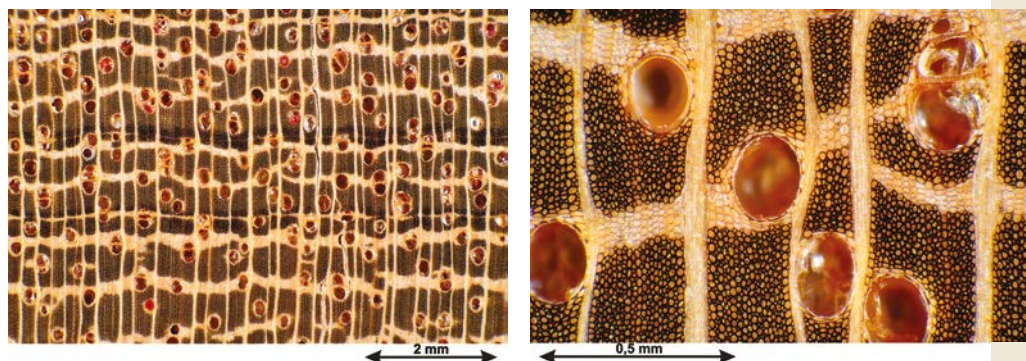
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Maclura tinctoria*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Stairs (inside)
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Sleepers

Notes. Risk of oxydation in contact with iron.

Common names

Country	Local name
Argentina	Tatayiva-saiyu
Bolivia	Amarillo
Brazil	Amarello, Taiuva
Colombia	Dinde, Palo amarillo
Costa Rica	Palo de mora
Mexico	Barossa, Moral
Trinidad and Tobago	Bois d'orange

Morototo

Family. Araliaceae

Botanical names

Schefflera angustissima Frodin

Schefflera decaphylla Harms (Syn. *Schefflera paraensis*)

Schefflera morototoni Maguire, Steyerl. & Frodin (Syn.

Didymopanax morototoni)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Morototo is sometimes commercialised blended with Marupa.

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood sometimes greyish white to very light brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	2.0
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	9.8 %
Total radial shrinkage (Rs):	6.4 %
T/R anisotropy ratio	1.5
Fibre saturation point	35 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	17,920 kJ/kg
Crushing strength ⁽¹⁾	41 MPa
Static bending strength ⁽¹⁾	68 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible



Flat sawn



Quarter sawn

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Surface sometimes fuzzy.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

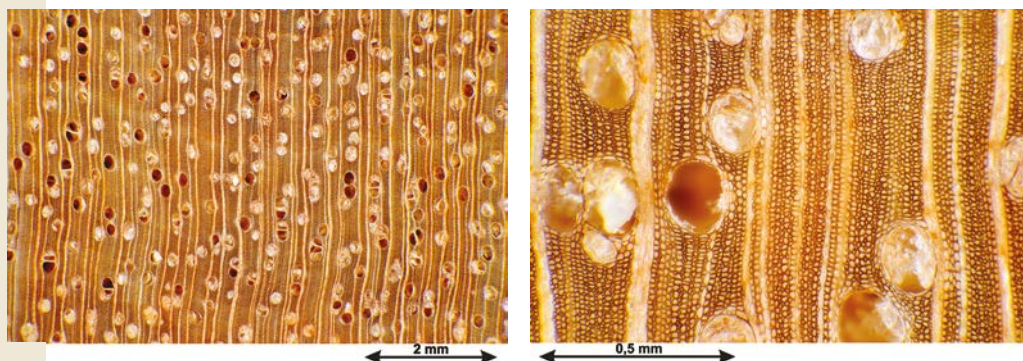
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Schefflera morototoni*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Pencils
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer

Common names

Country	Local name
Argentina	Ambay-guazu
Bolivia	Borracho, Guitarrero
Brazil	Mandiocai, Marupauba falso, Matatauba, Morototo, Mucututu, Pixixica, Sambacuim
Colombia	Pata de galina, Yarumero
Cuba	Yagrumo macho
Ecuador	Platanillo, Suntuch
Guyana	Karohoro
French Guiana	Tobitoutou
Honduras	Guarumo macho
Panama	Pavo
Peru	Anonilla, Sacha-uva
Puerto Rico	Yagrumo macho
République dominicaine	Yagrumo macho
Suriname	Kasavehout, Morototo
Venezuela	Cafetero, Sun-sun, Tinajero



Flat sawn



Half-quarter sawn

Movingui / Ayan*

* Common commercial name

Family. Leguminosae (Caesalpinieae)

Botanical name

Distemonanthus benthamianus Baill.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Lemon-yellow to yellow brown. Some logs present a highly figured wood. Possible presence of internal stresses and wind shakes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.73
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	5.8 %
Total radial shrinkage (Rs):	3.6 %
T/R anisotropy ratio	1.6
Fibre saturation point	23 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	19,940 kJ/kg
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,740 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Movingui cannot be used without appropriate preservation treatment for end uses under use class 3, except for some parts of a work such as windows, which are less exposed than others (entrance doors, shutters, etc.) This wood is used for exterior joinery in tropical regions. In temperate regions, its use is limited by its vulnerability to *Coriolus versicolor* rot.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties due to irregular grain. Filling is recommended to obtain a better finish.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Pre-boring recommended for large diameter nails due to risk of splitting.

Commercial grading

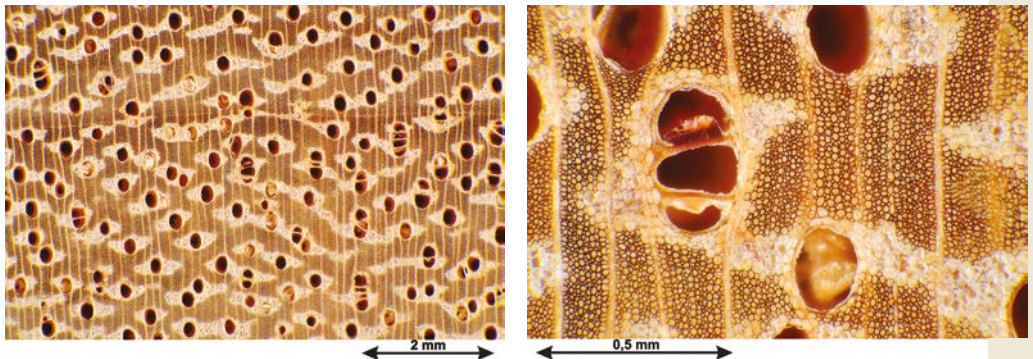
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Distemonanthus benthamianus*



Possible grading for short-length lumbers: choice I, choice II
Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Shingles
- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Panelling

- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Exterior panelling
- Cooperage

Notes. Movingui contains water-soluble yellow extracts that can stain the elements in contact with wood in moist conditions. Resistant to one or several acids.

Common names

Country	Local name
Benin	Ayan
Cameroon	Éyen
Côte d'Ivoire	Barré
Gabon	Movingui, Éyen
Ghana	Bonsamdua, Ayan
Equatorial Guinea	Eyen
Nigeria	Ayan, Ayanran
United Kingdom	Ayan, Distemonanthus



Folding blinds in outdoor, sheltered location – supplies from Fibres Industries Bois, La Réunion, France.

Mubala

Family. Leguminosae (Mimosaceae)

Botanical name

Pentaclethra macrophylla Benth.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood pale yellow with occasional brown spots. Heartwood dark brown with dark coloured veins on the radial face. Tangential face slightly striped.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.95
Monnin hardness ⁽¹⁾	8.8
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	9.9 %
Total radial shrinkage (Rs):	5.4 %
T/R anisotropy ratio	1.8
Fibre saturation point	25 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	78 MPa
Static bending strength ⁽¹⁾	122 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,160 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires preservation treatment for termites.

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Logs must be extracted and sawn as soon as possible after felling to limit the risks of splits and distortions.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

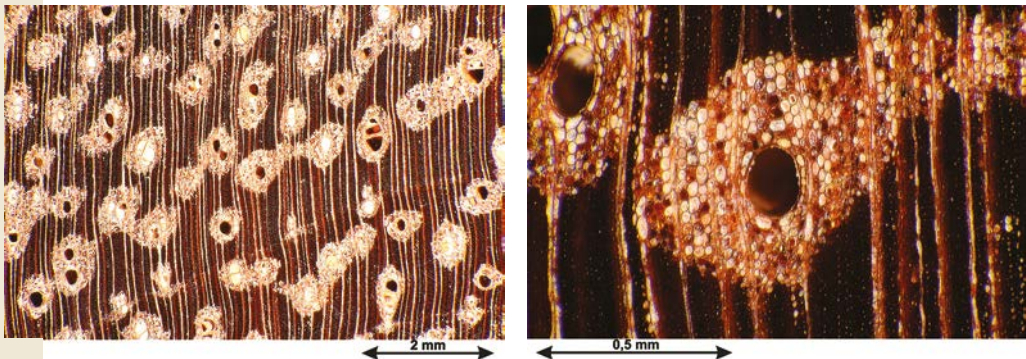
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Pentaclethra macrophylla*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Pit props
- Heavy carpentry
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- Industrial or heavy flooring
- Stakes
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Cooperage
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Congo	Essiri
Côte d'Ivoire	Ovala
Democratic Republic of Congo	Mubala



Flat sawn



Quarter sawn

Muhuhu

Family. Asteraceae

Botanical names

Brachylaena huillensis O. Hoffm. (Syn. *Brachylaena hutchinsii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 50 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Small diameter logs. Sapwood greyish white. Heartwood yellow brown to greenish brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.93
Monnin hardness ⁽¹⁾	7.9
Coefficient of volumetric shrinkage	-
Total tangential shrinkage (Ts):	5.3 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	1.5
Fibre saturation point	-
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	134 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,630 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently

or regularly submerged in salt water, sea water or brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

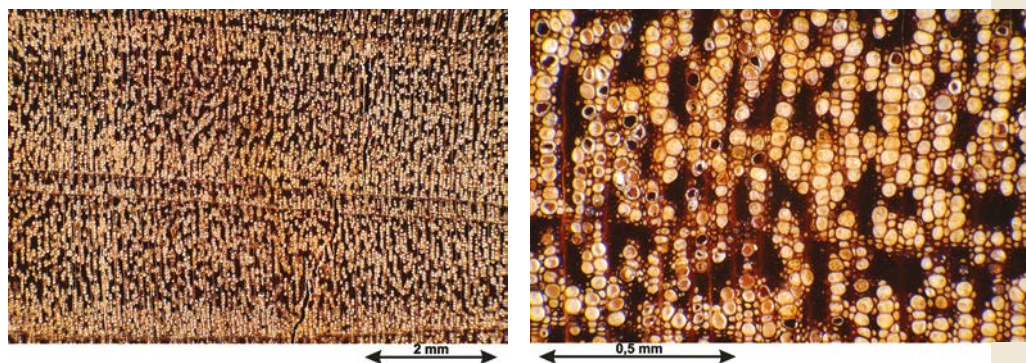
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Brachylaena huillensis*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Sculpture
- Hydraulic works (fresh water)
- Hydraulic works (seawater)

Notes. Formerly used for its distillate (substitute for Santal). Substitute for Mecrussé.

Common names

Country	Local name
Kenya	Mkalambaki, Mkarambati
Uganda	Muhuhu, Mühühü, Mvumo
Tanzania	Muhugwe

Muiracatiara

Family. Anacardiaceae

Botanical names

Astronium fraxinifolium Schott

Astronium graveolens Jacq. (Syn. *Astronium gracile*)

Astronium lecointei Ducke

Astronium p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 4 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Pinkish brown to yellow brown, becoming red brown to dark brown, with very irregularly spaced black brown veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	6.1
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	1.8
Fibre saturation point	22 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	76 MPa
Static bending strength ⁽¹⁾	96 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable



Half-quarter sawn

Quarter sawn



Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

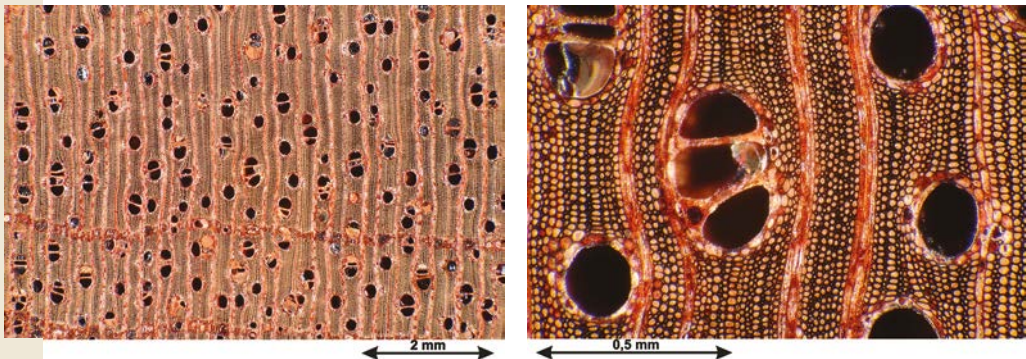
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Astronium lecoitei*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Musical instruments
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Flooring
- Sliced veneer
- Decking
- Sculpture
- Marquetry

Common names

Country	Local name
Brazil	Aderno-preto, Baracatiara, Gonçaleiro, Gonçalo-alvez, Guarita, Guaribu-preto, Mirueira, Muiracatiara, Sanguessugueira
Colombia	Gusanero
Ecuador	Guasango
Mexico	Palo de culebra
Paraguay	Urunday-para
Venezuela	Gateado

Muirapiranga

Family. Moraceae

Botanical names

Brosimum rubescens Taub. (Syn. *Brosimum lanciferum*)
(Syn. *Brosimum paraense*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. 4 to 20 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark red

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Very important and perishable sapwood. Heartwood often has darker veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.10
Monnin hardness ⁽¹⁾	17.6
Coefficient of volumetric shrinkage	0.59 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	4.1 %
T/R anisotropy ratio	1.4
Fibre saturation point	21 %
Thermal conductivity (λ)	0.35 W/(m.K)
Lower heating value	20,420 kJ/kg
Crushing strength ⁽¹⁾	106 MPa
Static bending strength ⁽¹⁾	162 MPa
Longitudinal modulus of elasticity ⁽¹⁾	28,130 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside



Flat sawn



Quarter sawn

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Good

Notes. Sawing and machining difficulties. Some difficulties due to hardness. Good finish and beautiful polish.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

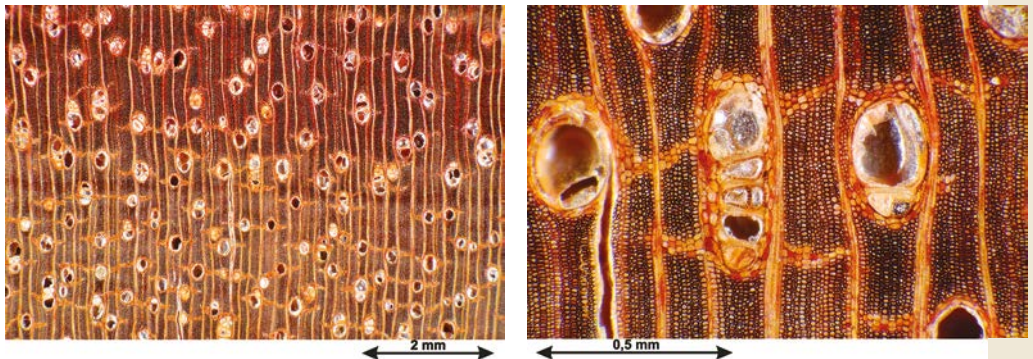
Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Satiné". Grading is done according to local rules «Bois guyanais classés" (1990).

Cross sections of *Brosimum rubescens*



Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Stringed instruments (bows)
- Panelling
- Tool handles (resilient woods)
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. This species is usually reserved for deluxe end uses.

Common names

Country	Local name
Brazil	Amapa rana, Conduru, Falso pao Brasil, Ipê, Muirapiranga, Pau rainha
Colombia	Riu sinu
Spain	Palo de oro
Guyana	Satinwood
French Guiana	Satiné, Satiné rouge, Satiné rubané, Siton paya
Italy	Ferolia, Legno satino
United Kingdom	Bloodwood, Satinwood
Suriname	Doekaliballi, Satijnhout



Counter of a mini-bar (French Guiana).

Muiratinga

Family. Moraceae

Botanical names

Maquira sclerophylla C.C. Berg (Syn. *Olmedioperebea sclerophylla*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood cream white to light yellow. Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.47
Monnin hardness ⁽¹⁾	1.3
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.8
Fibre saturation point	26 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	39 MPa
Static bending strength ⁽¹⁾	58 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,070 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
 In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Prone to blue stain.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Fuzzy surface. Very high silica content.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

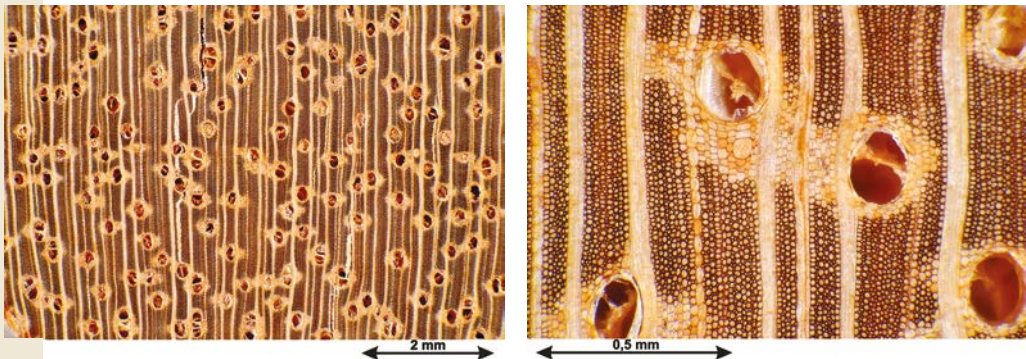
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Maquira sclerophylla*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer
- Marquetry

Common names

Country	Local name
Brazil	Capinuri, Muiratinga
France	Muiratinga
United Kingdom	Capomo

Mukulungu

Family. Sapotaceae

Botanical names

Austranella congolensis A. Chev. (Syn. *Mimusops congolensis*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heart of logs tends to split. Wood red brown with darker brown veins. Sometimes oblique grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.94
Monnin hardness ⁽¹⁾	7.7
Coefficient of volumetric shrinkage	0.66 % per %
Total tangential shrinkage (Ts):	8.4 %
Total radial shrinkage (Rs):	7.4 %
T/R anisotropy ratio	1.1
Fibre saturation point	26 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	74 MPa
Static bending strength ⁽¹⁾	119 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,060 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or



Half-quarter sawn



Quarter sawn

regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawing and machining difficulties. Dust highly irritating for the throat and nose.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

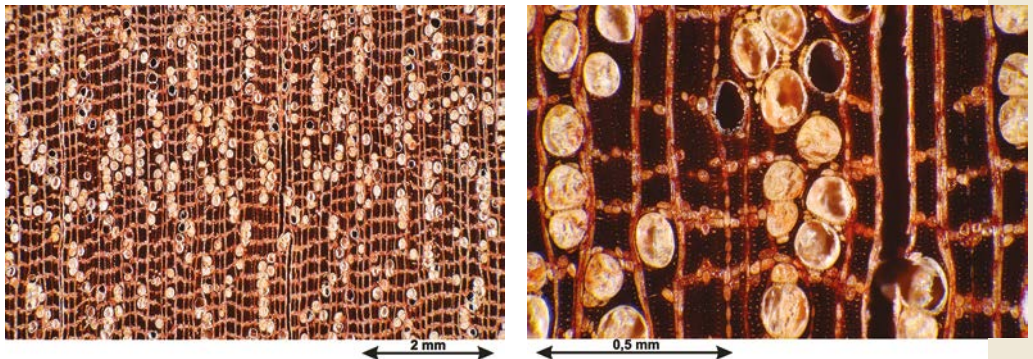
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Autranella congolensis*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)



Belfry and sawtooth cladding in Mukulungu and posts in Tali – By J.Y. Riaux, Mindourou (Cameroon).

- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Cooperage
- Hydraulic works (seawater)
- Sleepers

Notes. Resistant to one or several acids.

Common names

Country	Local name
Angola	Kungulu
Cameroon	Élang, Élanzok
Congo	Mfua
Gabon	Akola
Nigeria	Uku
Central African Republic	Bouanga
Democratic Republic of Congo	Mukulungu

Musizi

Family. Rhamnaceae

Botanical name

Maesopsis eminii Engl.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Sapwood white to yellowish. Heartwood bright yellow-green or green-brown, turns a pale golden brown on exposure. Stripe or ribbon figure when quartersaw due to interlocked grain. Large knots near the core.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.35 % per %
Total tangential shrinkage (Ts):	4.9 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	1.6
Fibre saturation point	25 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	40 MPa
Static bending strength ⁽¹⁾	75 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,030 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

• For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

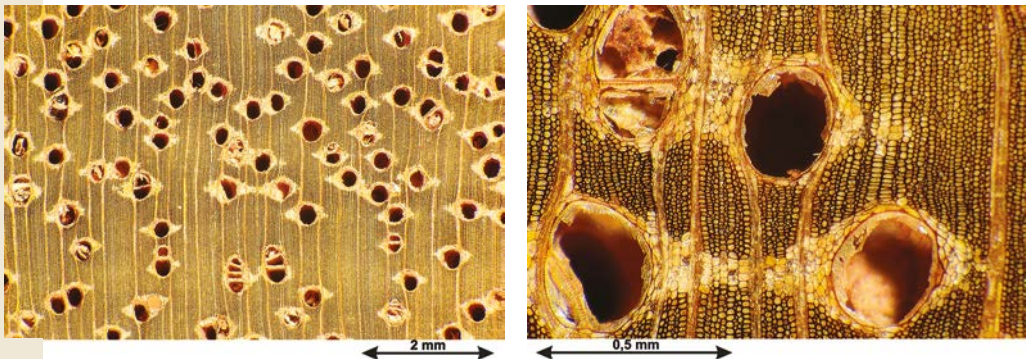
Possible grading for short-length rafters: choice I, choice II, choice III

• For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Maesopsis eminii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Flooring

Notes. Needs filling before polishing.

Common names

Country	Local name
Cameroon	N'kanguelé
Gabon	N'kanguelé
Kenya	Musizi
Uganda	Musizi
Democratic Republic of Congo	Ndunga
Tanzania	Musira



Flat sawn



Quarter sawn

Mutényé

Family. Leguminosae (Caesalpinieae)

Botanical name

Guibourtia arnoldiana J. Léonard

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 80 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood yellowish brown to brown presenting a dark striping or reddish glints.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	5.9
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	1.8
Fibre saturation point	27 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,940 kJ/kg
Crushing strength ⁽¹⁾	79 MPa
Static bending strength ⁽¹⁾	138 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,250 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D-M - durable to moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Some difficulties in planing due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

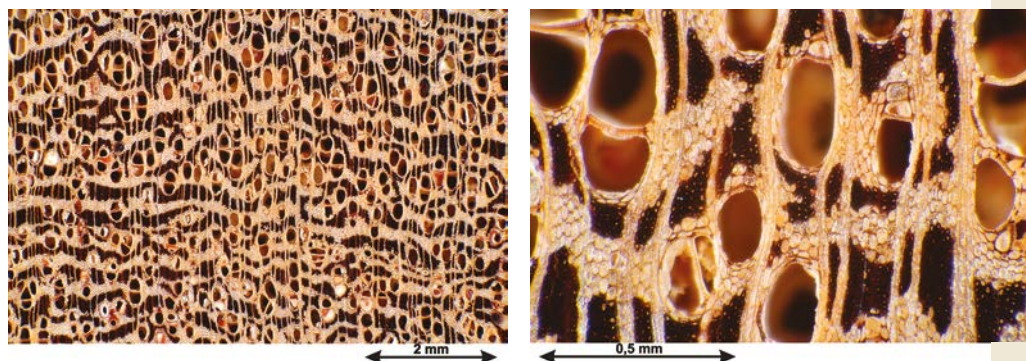
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Guibourtia arnoldiana*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Seats
- Marquetry

Notes. Can be used as a substitute for Walnut (*Juglans regia*) for sliced veneer.

Common names

Country	Local name
Angola	M'penze
Congo	Benzi
Democratic Republic of Congo	Mbengé, Mutényé
United Kingdom	Olive walnut

Dresser – from Atelier 7 ébénisterie, Eke (Belgium).



Naga / Okwen*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Brachystegia cynometroides Harms

Brachystegia eurycoma Harms

Brachystegia leonensis Burt Davy & Hutch.

Brachystegia nigerica Hoyle & A.P.D. Jones

Brachystegia p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 6 to 15 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Heartwood light brown to red brown with purplish glints. Grain sometimes irregular.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	6.8 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	30 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	93 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,880 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn

Quarter sawn



Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Drying must be carried out slowly to prevent defects.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Difficult to obtain good finish due to irregular grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Commercial grading

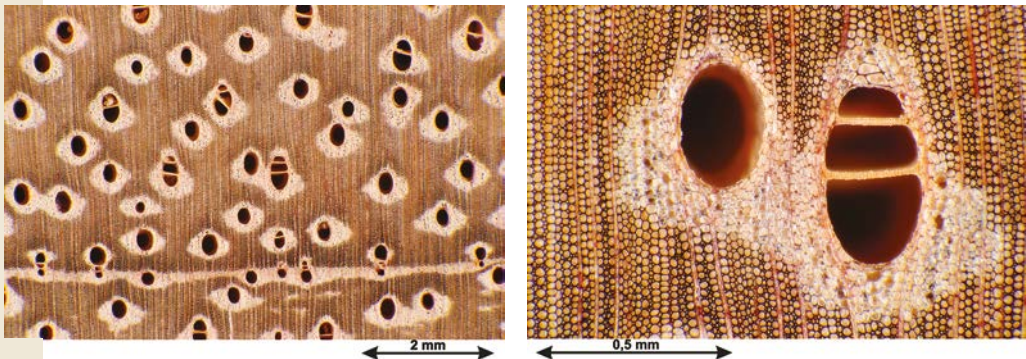
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Brachystegia leonensis*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Marquetry

Notes. Careful sanding and filling are required to obtain a good finish.

Common names

Country	Local name
Cameroon	Ékop-naga
Côte d'Ivoire	Méblo
France	Naga
Gabon	Mendou
Liberia	Tebako
Nigeria	Okwen
United Kingdom	Okwen
Sierra Leone	Bogdei



Flat sawn

Half-quarter sawn



Nganga

Family. Leguminosae (Caesalpinieae)

Botanical names

Cynometra ananta Hutch. & Dalziel

Cynometra hankei Harms

Cynometra p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 2 to 7 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Pink brown or yellow. Heartwood dark red-brown with fine markings. Interlocked grain irregular, more or less marked.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.96
Monnin hardness ⁽¹⁾	11.2
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	9.2 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.8
Fibre saturation point	26 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	82 MPa
Static bending strength ⁽¹⁾	144 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,730 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its hardness and high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

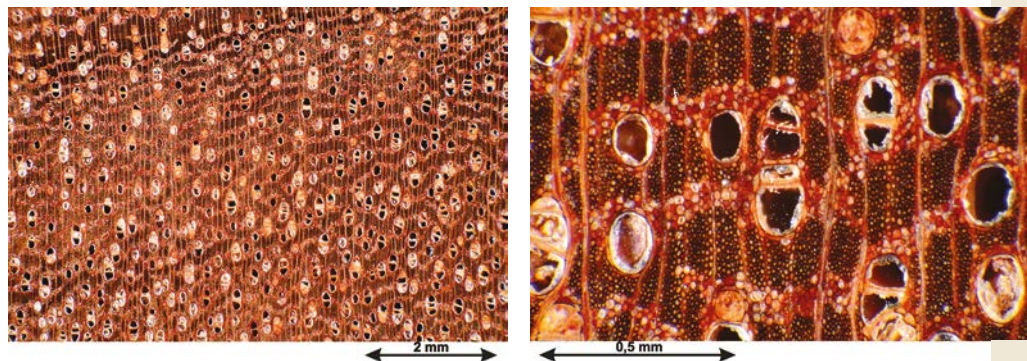
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Cynometra hankei*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard

NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. *C. hankei* gives very attractive sliced veneers. In very damp environments, assembling of *C. hankei* with iron components is not advisable due to risks of reciprocal attack between the wood and the iron.

Common names

Country	Local name
Cameroon	Nganga, Ekop-nganga
Equatorial Guinea	Nkokom
Democratic Republic of Congo	Baraka, Wehu

Niangon

Family. Malvaceae (Sterculiaceae)

Botanical names

Heritiera densiflora Kosterm. (Syn. *Tarrietia densiflora*)

Heritiera utilis Sprague (Syn. *Tarrietia utilis*)

Heritiera p.p. (Syn. *Tarretia* p.p.)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Genera *Tarrietia* and *Heritiera* are synonymous.

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. 3 to 4 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood pink brown to purplish red brown becoming bronze with age. Large and visible silver figure. Wood oily to the touch.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	3.8
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	8.8 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	2.1
Fibre saturation point	32 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	20,080 kJ/kg
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	103 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,430 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. *T. utilis* has slightly lower properties than *T. densiflora*. The latter sometimes has a slightly wavy grain.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Half-quarter sawn

Quarter sawn



Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Niangon cannot be used without appropriate preservation treatment for end uses under use class 3, except for some parts of works such as windows, which are less exposed than others (entrance doors, shutters, etc.)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. High risk of distortion for thin sections with highly interlocked grain; initial air drying prior to kiln drying is then recommended.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

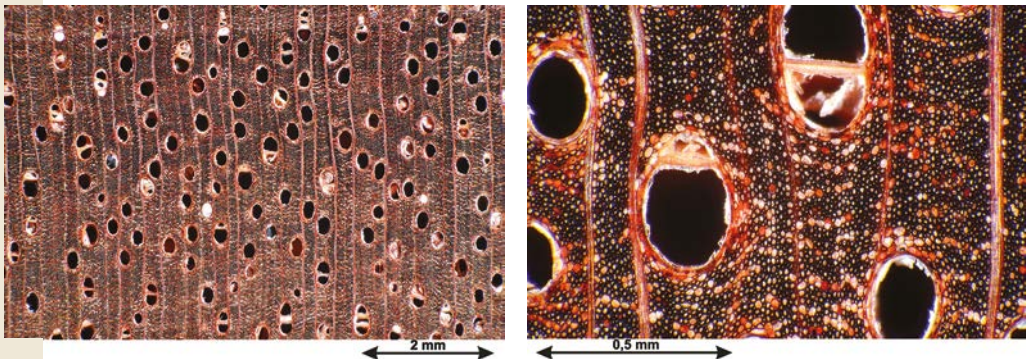
Machining tools. Tungsten carbide

Suitability for peeling. Mediocre

Suitability for slicing. Good

Notes. Risk of clogging and overheating of blades and tools. Risk of tearing in machining. Peeling is not recommended: often irregular logs.

Cross sections of *Heritiera densiflora*



Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Exterior panelling

Notes. Species very appreciated for sliced, decorative veneers. Filling is recommended to obtain a good finish. Resistant to one or several acids.

Common names

Country	Local name
Côte d'Ivoire	Niangon
Gabon	Ogoué
Ghana	Niangon, Nyankom
Liberia	Whismore
Sierra Leone	Yami



Flat sawn



Quarter sawn

Nieuuk

Family. Leguminosae (Mimosaceae)

Botanical name

Fillaeopsis discophora Harms

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 130 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Pinkish brown to grey brown with orang brown veins. Presence of transition wood between the yellowish white sapwood and coloured heartwood. Logs are often sinuous.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.58
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.4 %
Total radial shrinkage (Rs):	3.3 %
T/R anisotropy ratio	1.9
Fibre saturation point	25 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	45 MPa
Static bending strength ⁽¹⁾	79 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,700 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Highly variable durability against fungi rot.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good for well-shaped logs.

Suitability for slicing. Not recommended or without interest

Notes. Nieuuk has an unpleasant odour when green.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

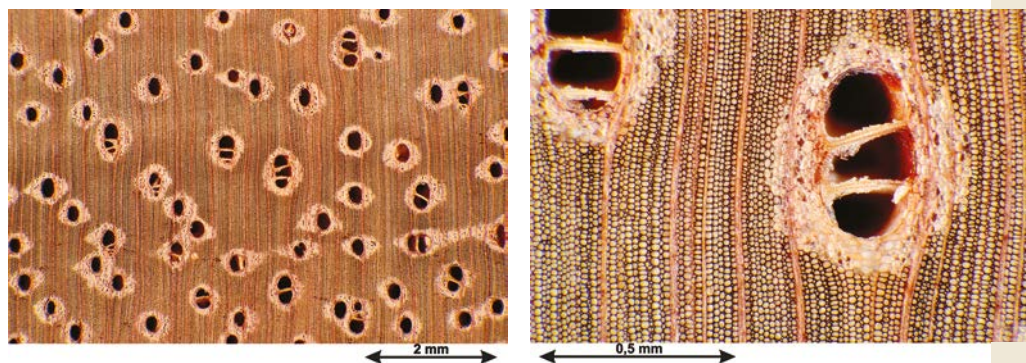
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Fillaeopsis discophora*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Veneer for interior of plywood

Notes. The use of Nieuk presents several difficulties due to interlocked grain or weak stability. These defects strongly limit the possible end uses of this species, which must be processed with great respect for codes of practice.

Common names

Country	Local name
Cameroon	Éyek
Congo	Mouali, Moulala
France	Nieuk
Gabon	Énoum noumé, Éyegh, Nieuk, Tfouma
Equatorial Guinea	Angocon

Niové

Family. Myristicaceae

Botanical names

Staudtia kamerunensis Warb. (Syn. *Staudtia gabonensis*) (Syn. *Staudtia stipitata*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 8 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Heartwood orangey yellow brown to red brown with darker veins. Sometimes oily surface. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	7.5
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	6.0 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.3
Fibre saturation point	24 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,710 kJ/kg
Crushing strength ⁽¹⁾	88 MPa
Static bending strength ⁽¹⁾	151 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,510 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Half-quarter sawn

Notes. This species is listed in the NF EN 350 standard. Presence of transition wood with a lower durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Risk of water pockets. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawing and machining difficulties.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

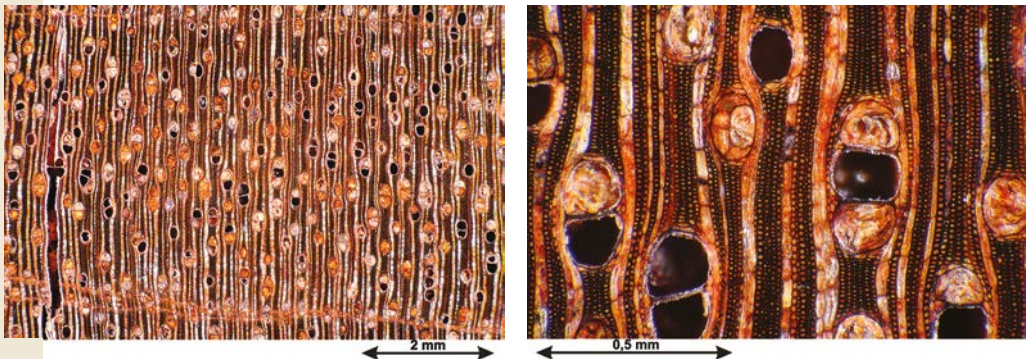
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Staudtia kamerunensis*



Possible grading for short-length lumbers: choice I, choice II
Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D50 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Seats
- Hydraulic works (fresh water)
- Sleepers

Notes. Wood colour is often uneven. Resistant to one or several acids.

Common names

Country	Local name
Angola	Menga-menga
Cameroon	M'bonda
Congo	Menga-menga
Gabon	M'boun, Niové
Equatorial Guinea	Bokapi
Nigeria	Oropa
Central African Republic	Molanga
Democratic Republic of Congo	Kamashi, Susumenga



Posts for outdoor use in the Netherlands – Compagnie des bois du Gabon (CBG), Port-Gentil (Gabon).



Flat sawn



Flat sawn

Nogal

Family. Juglandaceae

Botanical names

Juglans australis Griseb.

Juglans boliviana Dode

Juglans neotropica Diels

Juglans p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Species present in the subtropical and temperate regions of Central and South America.

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood grey white. Heartwood dark grey brown with pink tinge, sometimes dark brown or reddish brown veins (less pronounced than European and Asian *Juglans*).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.61
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	5.2 %
Total radial shrinkage (Rs):	2.7 %
T/R anisotropy ratio	1.9
Fibre saturation point	-
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	36 MPa
Static bending strength ⁽¹⁾	57 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,720 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 2-3 - poorly to moderately permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires preservation treatment for termites.

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Veneers dry very slowly.

Assembling

Nailing/screwing. Good

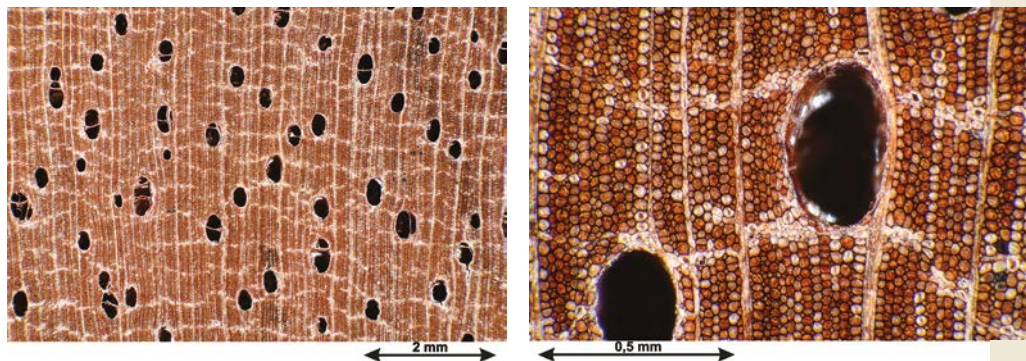
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Juglans neotropica*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Interior joinery
- Sliced veneer
- Sculpture
- Marquetry

Notes. Similar to temperate Walnut in terms of uses.

Common names

Country	Local name
Argentina	Nogal
Colombia	Nogal
Ecuador	Nogal, Togte
Mexico	Nogal
Peru	Nogal
Venezuela	Nogal

Nyatoh

Family. Sapotaceae

Botanical names

<i>Madhuca burckiana</i> H.J. Lam	<i>Palaquium obovatum</i> Engl.
<i>Madhuca malaccensis</i> H.J. Lam	<i>Palaquium rostratum</i> Burck
<i>Madhuca motleyana</i> J.F. Macbr.	<i>Palaquium xanthochymum</i> Pierre
<i>Madhuca</i> p.p.	<i>Palaquium</i> p.p.
<i>Palaquium burkii</i> H.J. Lam	<i>Payena acuminata</i> Pierre
<i>Palaquium gutta</i> Burck (Syn. <i>Palaquium acuminatum</i>)	<i>Payena lanceolata</i> Ridl.
<i>Palaquium hexandrum</i> Baill.	<i>Payena maingayi</i> C.B. Clarke
<i>Palaquium maingayi</i> Engl.	<i>Payena</i> p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 4 to 9 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Dark pink to red brown wood. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.57
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	4.1 %
T/R anisotropy ratio	1.9
Fibre saturation point	29 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	18,410 kJ/kg
Crushing strength ⁽¹⁾	53 MPa
Static bending strength ⁽¹⁾	83 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,770 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Properties vary depending on the different species.



Flat sawn



Half-quarter sawn

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Nyatoh is the generic name for species of the *Palaquium* genus. Natural durability is variable from one species to another. It is thus recommended to limit use of this wood without preservation treatment for end uses under use class 2.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

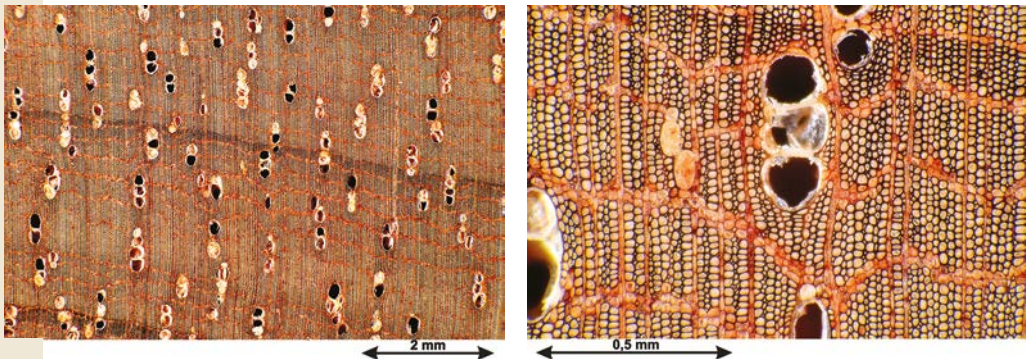
Suitability for slicing. Good

Notes. Highly variable silica content according to the species. Sawdust may cause irritations.

Assembling

Nailing/screwing. Good but pre-boring necessary

Cross sections of *Palaquium hexandrum*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer

Common names

Country	Local name
India	Illupai, Katillupai, Paali, Pala, Pale, Pali, Panchonta,
Indonesia	Nyatoh
Italy	Nyatoh
Malaysia	Mayang, Nyatoh, Riam, Taban
Papua New Guinea	Pencil cedar
Netherlands	Balam
Philippines	Nato
United Kingdom	Nyatoh, Padang
Thailand	Kha-nunnok
Viet Nam	Chay

Oak

Family. Fagaceae

Botanical names

Quercus petraea (Matt.) Liebl.

Quercus robur L.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Oak trees are the dominant broad-leaved species of temperate Europe.

Log description

Diameter. 40 to 80 cm

Thickness of sapwood. 1 to 4 cm

Buoyancy. Not applicable

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Light brown wood to straw colour turning darker with light. The texture is “medium” but can be “fine” or “coarse” depending on origin. The pearly white silver figure is large and clearly visible.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.74
Monnin hardness ⁽¹⁾	4.2
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	9.7 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	2.2
Fibre saturation point	31 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,390 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Slow-growing oak is less dense than fast-growing varieties.

Natural durability and treatability

Resistance to decay. Class 2-4 - durable to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn

Quarter sawn



Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Durability is linked to the presence of water soluble tannins. It decreases with the washing of tannins in cases of exposure to harsh conditions. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Must be dried slowly.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

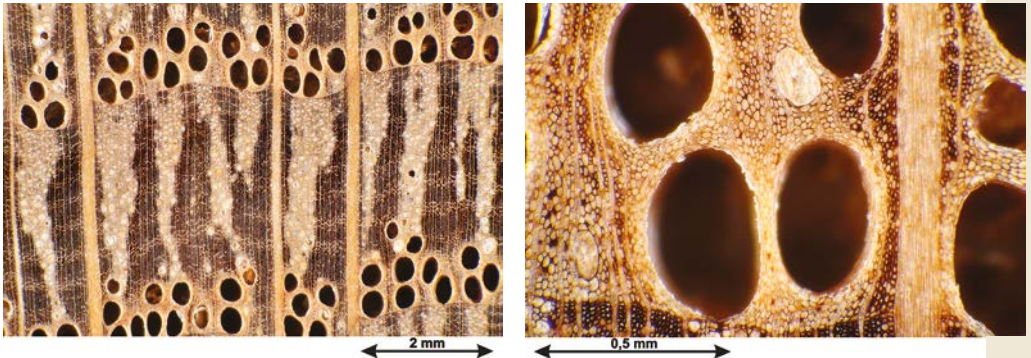
Notes. Slicing after steaming.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Gluing must be done with care: wood is dense, slightly acidic, rich in tannins, and prone to stain. Nail or screw corrosion if in contact with humidity.

Cross sections of *Quercus robur*



Commercial grading

Sawn timber appearance grading

According to French standard NF EN 975-1 (April 2009)

Possible grading for boules: Q-BA, Q-B1, Q-B2, Q-B3

Possible grading for selected boards: Q-SA, Q-S1, Q-S2, Q-S3

Possible grading for strips and square edged timber (sapwood excluded): Q-FA, Q-F1a, Q-F1b, Q-F2, Q-F3 (for strips and square-edged timber, x or xx suffixes indicate the presence and size of sound sapwood)

Possible grading for baulks: Q-PA, Q-P1, Q-P2

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D30

can be provided by visual grading. Strength classes D18, D24 and D30, however, can be provided by visual grading according to French standard NF B 52-001-1/A3 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Coffins
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Exterior joinery
- Interior joinery
- Moulding
- Flooring
- Sliced veneer
- Seats
- Marquetry
- Cooperage
- Hydraulic works (fresh water)
- Sleepers

Notes. Risk of tannin smudges on woods if not well dried or if processed in a non-protected area without any protection or finish.

Common names

Country	Local name
Germany	Eiche
Spain	Roble
France	Chêne, Chêne blanc européen
Italy	Quercia
United Kingdom	Oak



The flour store, Cluny Abbey (France).

Oboto

Family. Calophyllaceae (Clusiaceae)

Botanical name

Mammea africana Sabine

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Dark red to purplish red brown wood. Sometimes frequent small brown resinous spots.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.75
Monnin hardness ⁽¹⁾	5.2
Coefficient of volumetric shrinkage	0.44 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	6.0 %
T/R anisotropy ratio	1.6
Fibre saturation point	37 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,040 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Half-quarter sawn

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Must be dried slowly to prevent defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

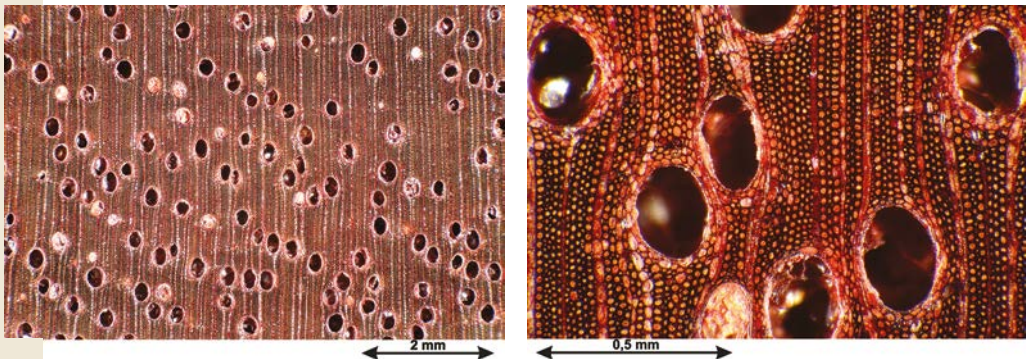
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Mammea africana*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Decking
- Bridges (parts not in contact with water or ground)

Notes. Sometimes difficult to paint or varnish due to resin exudations.

Common names

Country	Local name
Benin	Ologbomodu
Cameroon	Abotzok
Congo	Libu, M'bossi
Côte d'Ivoire	Djimbo
Gabon	Ébornzork, Oboto
Ghana	Bom pegya
Nigeria	Ologbomidu
Central African Republic	Bolélé, Bolele
Democratic Republic of Congo	Bokoli, Boliki, M'boza

Ohia

Family. Cannabaceae (Ulmaceae)

Botanical names

Celtis gomphophylla Baker

Celtis mildbraedii Engl.

Celtis zenkeri Engl. (Syn. *Celtis soyauxii*)

Celtis p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Diania and Ohia are two different groups of *Celtis* species. Sometimes they are grouped together under the name of African *Celtis*.

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Uniformly whitish or with uneven greenish-brown veins in the innermost part of the logs.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.75
Monnin hardness ⁽¹⁾	7.0
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	8.4 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.8
Fibre saturation point	28 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	18,790 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	113 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Half-quarter sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Very prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Defects can be reduced by top weighting the piles and applying end-coating products. Drying must be done slowly.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

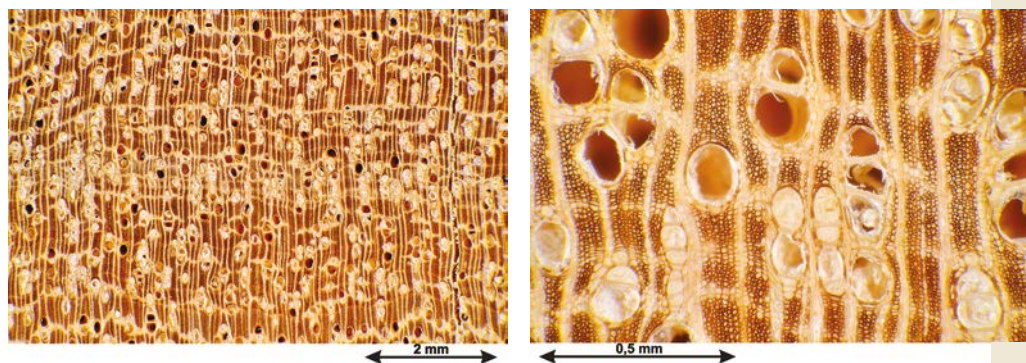
Notes. Possible sawing and machining difficulties if there is interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

Cross sections of *Celtis mildbraedii*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Heavy carpentry
- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Panelling
- Tool handles
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer

Notes. Machining dust is allergenic.

Common names

Country	Local name
Benin	Bawe
Cameroon	Odou
Congo	Édou
Côte d'Ivoire	Asan, Ba
Ghana	Celtis, Esa
Kenya	Shiunza
Nigeria	Ohia
Uganda	Mukokukoma, Namanuka
Democratic Republic of Congo	Bolundé, Kayombo, Liniumbu



Flooring in a public building – by Brenco Exotic Woods (United States).

Okan

Family. Leguminosae (Mimosaceae)

Botanical name

Cylicodiscus gabunensis Harms

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 150 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Unpleasant odour when green. Heartwood yellow brown becomes red brown on exposure.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	10.3
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	25 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,410 kJ/kg
Crushing strength ⁽¹⁾	82 MPa
Static bending strength ⁽¹⁾	134 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,260 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or



Flat sawn



Quarter sawn

regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Difficult to obtain good finish due to sometimes highly interlocked grain. Tendency to tear on quartersawn.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

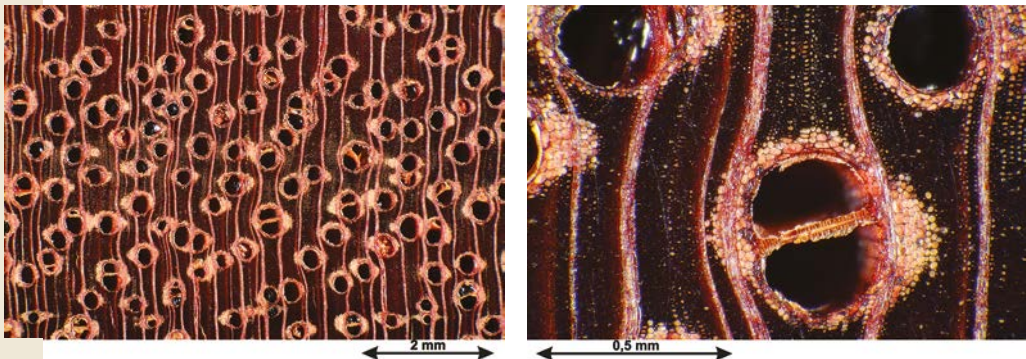
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Cylicodiscus gabunensis*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

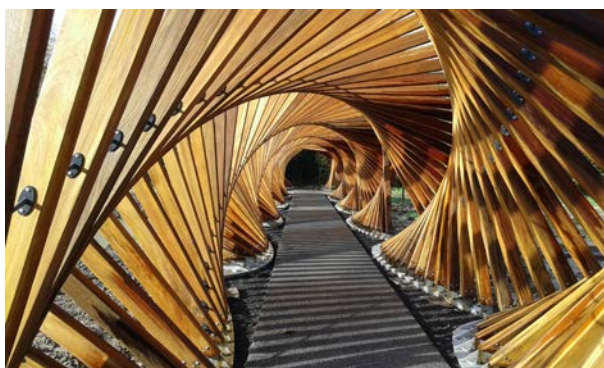
Main end uses

- Turned goods
- Heavy carpentry
- Vehicle or container flooring
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Sculpture
- Hydraulic works (seawater)
- Sleepers

Notes. Substitute for Azobe (Eki) and Greenheart.

Common names

Country	Local name
Cameroon	Adoum, African greenheart, Bokoka
Congo	N'duma
Côte d'Ivoire	Bouémon
Gabon	Édoum, Oduma
Ghana	Adadua, Benya, Denya
Nigeria	Okan



“Drôle de Carré”, Mallet-Stevens gardens – creation by Bois et Loisirs, Croix (France).

Okoumé / Gaboon*

* Common commercial name

Family. Burseraceae

Botanical name

Aucoumea klaineana Pierre

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light red

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. More or less dark pinkish white to red brown, darkens with age. Sometimes lustrous or pearly. The grain can be slightly wavy.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.44
Monnin hardness ⁽¹⁾	1.6
Coefficient of volumetric shrinkage	0.33 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	40 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	18,710 kJ/kg
Crushing strength ⁽¹⁾	36 MPa
Static bending strength ⁽¹⁾	62 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,690 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties in planing due to interlocked grain. Tendency to woolliness. Filling is required to obtain a good finish.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

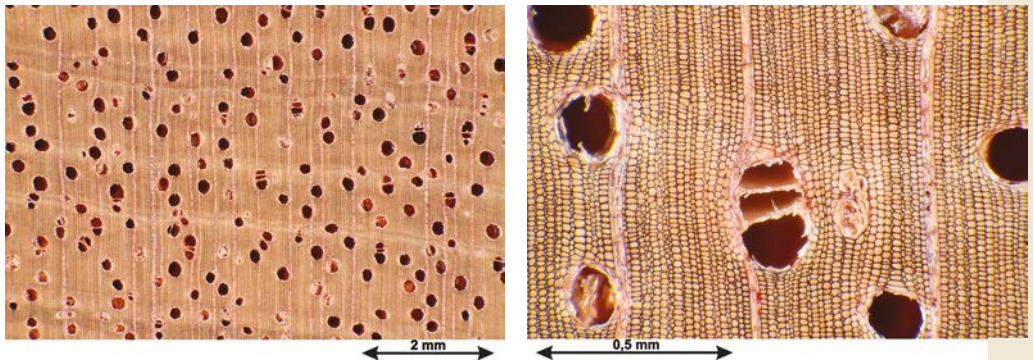
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Aucoumea klaineana*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

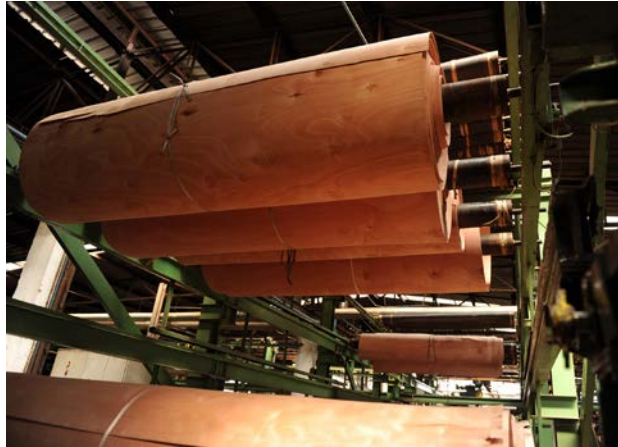
Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1

(April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Peeled veneers – Rougier factory in Owendo (Gabon).

Main end uses

- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Sliced veneer

Common names

Country	Local name
Cameroon	Mfumu
Congo	N'kumi
Gabon	Angouma, Okoumé
Equatorial Guinea	N'goumi, Okume
United Kingdom	Gaboon

Olène

Family. Irvingiaceae

Botanical name

Irvingia grandifolia Engl.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 10 to 20 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood yellow brown. Heartwood with various shades of brown with a grey lustre.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.92
Monnin hardness ⁽¹⁾	7.1
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	10.1 %
Total radial shrinkage (Rs):	6.2 %
T/R anisotropy ratio	1.6
Fibre saturation point	29 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	73 MPa
Static bending strength ⁽¹⁾	136 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,550 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn

Half-quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Dulling effect on cutting edges due to resin cells.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

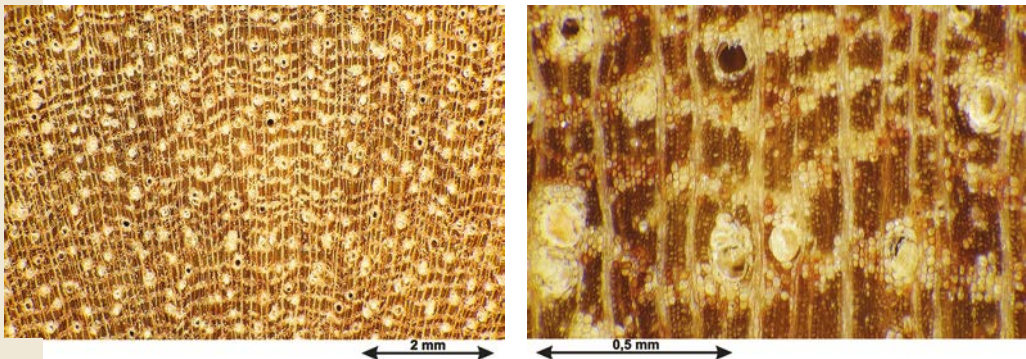
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Irvingia grandifolia*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shipbuilding
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- House framing
- Flooring
- Industrial or heavy flooring

Notes. Not in the international market, barely used at a local scale.

Common names

Country	Local name
Cameroon	Andongwé, Andok ngoe, Bwibanjoe, Géndo, Ikomkpa, Solia
Congo	Liar
Gabon	Olène
Nigeria	Akhuekhue, Apepere
Central African Republic	Sombo
Democratic Republic of Congo	Mukessu, Ntesi

Olon

Family. Rutaceae

Botanical names

Zanthoxylum heitzii P.G. Waterman (Syn. *Fagara heitzii*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Olon is often confused with Olonvogo (*Zanthoxylum gillettii*), which is heavier and harder.

Log description

Diameter. 55 to 80 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood light yellow to greenish yellow. Lustrous aspect. Slight ribbon-like aspect on quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	2.0
Coefficient of volumetric shrinkage	0.40 % per %
Total tangential shrinkage (Ts):	5.7 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.5
Fibre saturation point	30 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	44 MPa
Static bending strength ⁽¹⁾	72 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,410 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2-3 - poorly to moderately permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties in planing due to interlocked grain. The silica content can be quite high. Sawdust is an irritant.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

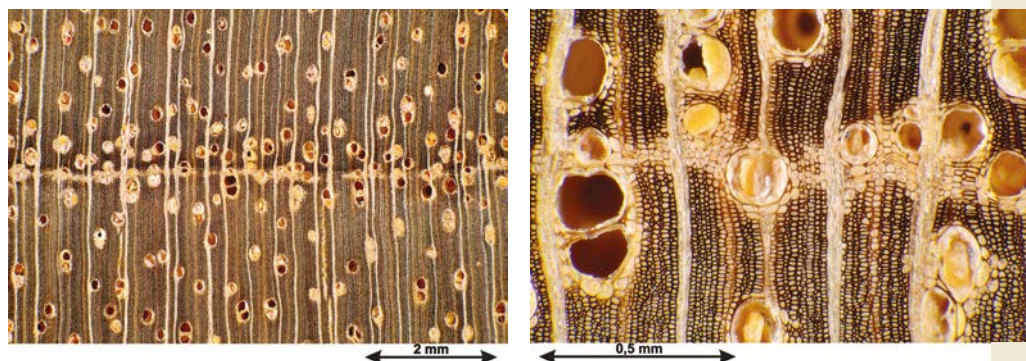
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Zanthoxylum heitzii*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Fibre or particle boards
- Sliced veneer

Notes. Olon bark has numerous medical applications.

Common names

Country	Local name
Cameroon	Bongo
Congo	M'banza
Gabon	Olon
Equatorial Guinea	Olong
Democratic Republic of Congo	Kamasumu

Onzabili

Family. Anacardiaceae

Botanical names

Antrocaryon klaineum Pierre

Antrocaryon micraster A. Chev. & Guillaumin

Antrocaryon nannanii De Wild.

Antrocaryon p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 65 to 120 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood pinkish white to light brown. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	1.9
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	31 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	40 MPa
Static bending strength ⁽¹⁾	76 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,450 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.



Flat sawn

Quarter sawn



Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Risk of tearing. Filling is required to obtain a good finish.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

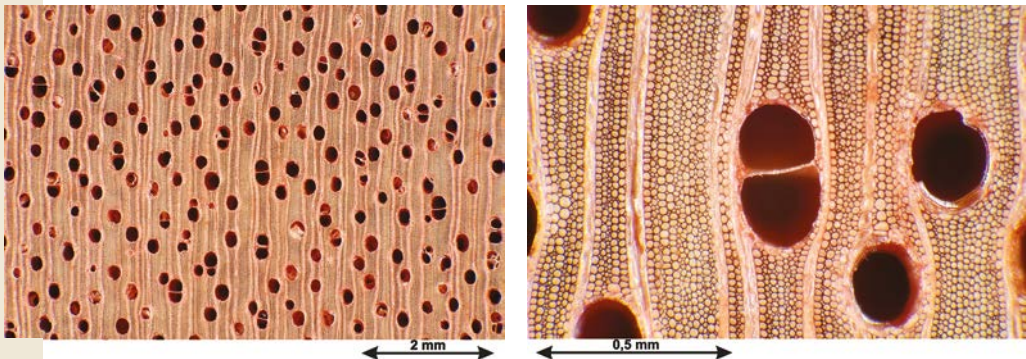
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Antrocaryon klaineanum*



- For the “Special Market”
- Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Sliced veneer
- Seats

Notes. Substitute for Okoumé (*Aucoumea klaineana*) and Ilomba (*Pycnanthus angolensis*).

Common names

Country	Local name
Angola	N'gongo
Cameroon	Angonga
Congo	N'gongo
Côte d'Ivoire	Akoua
Gabon	Onzabili
Ghana	Aprokuma
Equatorial Guinea	Anguekong
Portugal	Mongongo
Central African Republic	Gongu
Democratic Republic of Congo	Mugongo

Osanga

Family. Combretaceae

Botanical names

Pteleopsis hylodendron Mildbr.

Pteleopsis myrtifolia Engl. & Diels

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 7 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Yellow brown to greenish grey. Irregular grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	6.3
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	5.8 %
Total radial shrinkage (Rs):	3.6 %
T/R anisotropy ratio	1.6
Fibre saturation point	34 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 2-3 - poorly to moderately permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used. This wood is given as not very sensitive to marine borers.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

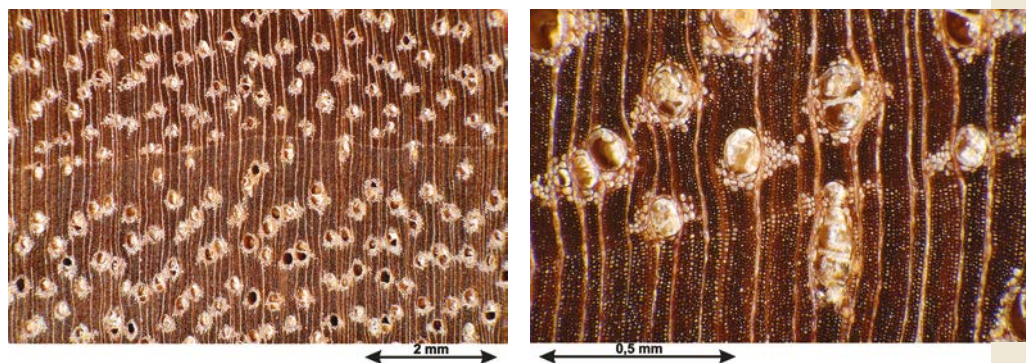
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Pteleopsis hylodendron*



- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III
- Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Stairs (inside)
- Vehicle or container flooring
- Exterior joinery
- Interior joinery
- House framing
- Flooring
- Decking
- Bridges (parts in contact with water or ground)
- Poles
- Exterior panelling
- Sleepers

Common names

Country	Local name
Cameroon	Sikon
Côte d'Ivoire	Koframiré
Democratic Republic of Congo	Osanga



Decking around an infinity pool – By Agencement Tiby, supplies from Fibres Industries Bois, La Réunion, France.

Ossabel

Family. Burseraceae

Botanical name

Dacryodes normandii Aubrév. & Pellegr.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.59
Monnin hardness ⁽¹⁾	2.9
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	7.7 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	48 MPa
Static bending strength ⁽¹⁾	87 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,040 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Some difficulties in sawing and machining in the presence of interlocked grain.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

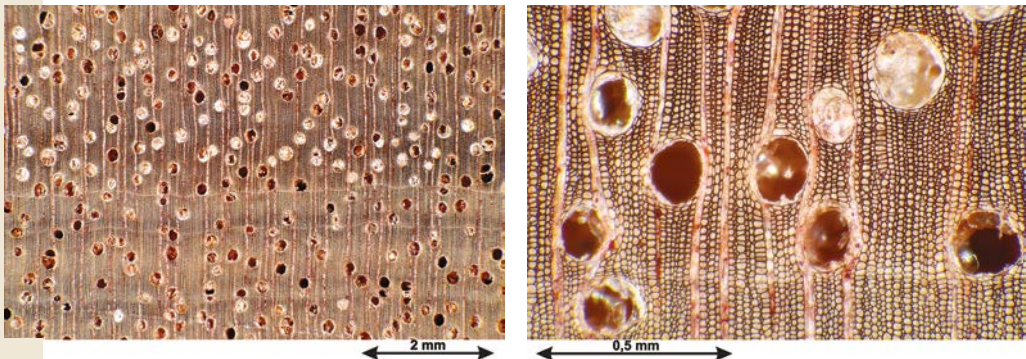
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Dacryodes normandii*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- House framing
- Blockboard
- Fibre or particle boards
- Seats

Common names

Country	Local name
Congo	Koma
Gabon	Ossabel

Ossimiale

Family. Leguminosae (Mimosaceae)

Botanical names

Newtonia leucocarpa G.C.C. Gilbert & Boutique
(Syn. *Piptadenia leucocarpa*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellowish to light brown. Heartwood silvery pink to reddish brown, often with wider, dark veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	4.3
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	7.2 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	1.8
Fibre saturation point	36 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	19,830 kJ/kg
Crushing strength ⁽¹⁾	63 MPa
Static bending strength ⁽¹⁾	111 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,740 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Very fine surface obtained after sanding.

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

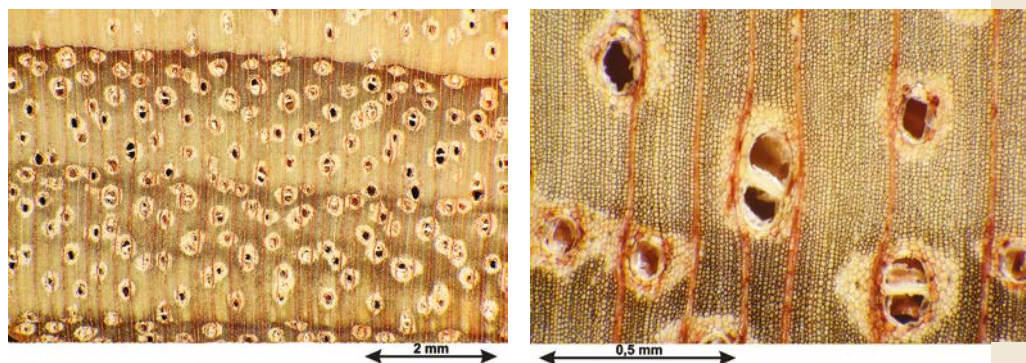
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Newtonia leucocarpa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Formwork
- Boxes and crates
- Open boats
- Stairs (inside)
- Veneer for back or face of plywood
- Vehicle or container flooring
- Veneer for interior of plywood
- Tool handles (resilient woods)
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring
- Pulp
- Sculpture
- Cooperage

Notes. Ossimiale is similar to Ozigo but has a lower silica content.

Common names

Country	Local name
Cameroon	Nom atui
Gabon	Ossimiale
Equatorial Guinea	Atui, Eseng

Ossoko

Family. Myristicaceae

Botanical names

Scyphocephalum ochocoa Warb.
(Syn. *Scyphocephalum manni*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. 5 to 15 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Brown to orange brown, with slight grey veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.59
Monnin hardness ⁽¹⁾	2.8
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	1.9
Fibre saturation point	25 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	18,300kJ/kg
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	78 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment
In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Peeling is easy but not often done because logs are often crooked and with several knots.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

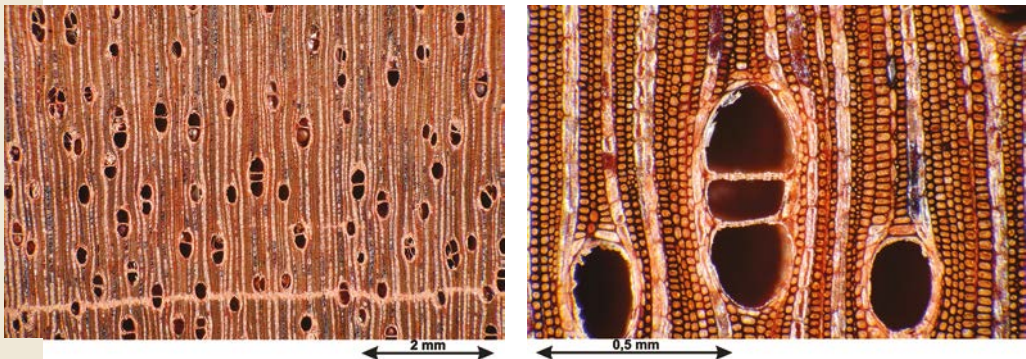
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Scyphocephalum ochocoa*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D24 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Boxes and crates
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Flooring
- Sculpture

Common names

Country	Local name
Cameroon	Akurna, Éboukzok
Gabon	N'suku, Ossoko, Sogho, Sorro

Ovèngkol

Family. Leguminosae (Caesalpinaceae)

Botanical name

Guibourtia ehie J. Léonard

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 75 cm

Thickness of sapwood. 4 to 7 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood yellow brown to dark brown, with grey to blackish veins and copper glints. Moiré aspect on quartersawn. White deposits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.82
Monnin hardness ⁽¹⁾	7.5
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	2.1
Fibre saturation point	24 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	69 MPa
Static bending strength ⁽¹⁾	127 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,470 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Quarter sawn

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Some difficulties due to interlocked grain. Sometimes white efflorescence on sawnwoods; a wash with warm water can remove it.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

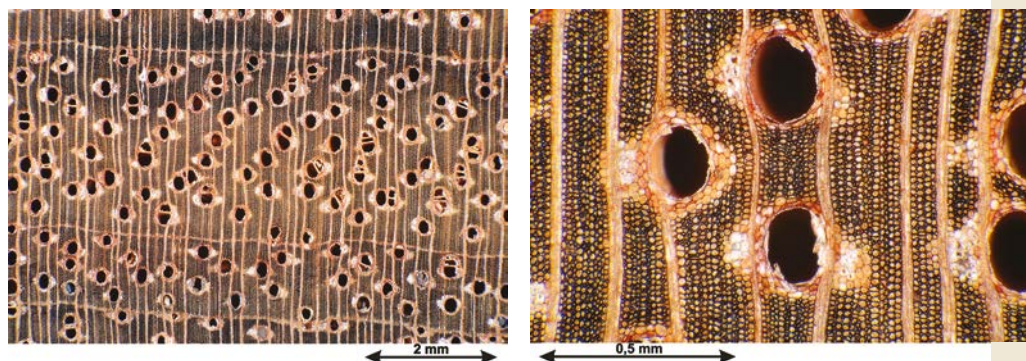
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Guibourtia ehie*



- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III
- Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Stairs (inside)
- Musical instruments
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Exterior panelling

Notes. Resistant to one or several acids.

Common names

Country	Local name
Cameroon	M'bagna, Mbagna
Côte d'Ivoire	Amazakoué
United States	Mozambique
France	Ovèngkol
Gabon	Ovangkol, Ovèngkol
Ghana	Anokye, Anokyé, Hyedua, Hyeduanini
Equatorial Guinea	Palissandro
Nigeria	Guibourtia, Kaluk afuon



Hanging cupboard – by Atelier 7 ébénisterie, Eke (Belgium).

Ovoga

Family. Anisophylleaceae

Botanical name

Poga oleosa Pierre

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish white

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Silver figure on quartersawn due to broad rays. Lustrous aspect. Grain sometimes slightly wavy.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.47
Monnin hardness ⁽¹⁾	1.6
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	7.3 %
Total radial shrinkage (Rs):	2.7 %
T/R anisotropy ratio	2.7
Fibre saturation point	33 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	63 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,320 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. Slight tendency to warping on backsawn. Drying rate between each board is highly variable.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Rays can make polishing difficult.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

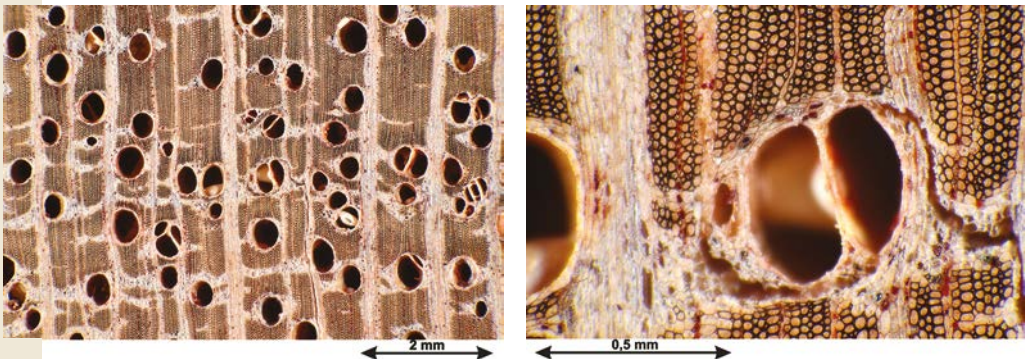
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Poga oleosa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer

Notes. Filling is required to obtain a good finish.

Common names

Country	Local name
Cameroon	Angalé
Congo	Ohélé
Gabon	Ovoga
Equatorial Guinea	Afo
Nigeria	Enoi
United Kingdom	Poga

Owui

Family. Annonaceae

Botanical name

Hexalobus crispiflorus A. Rich.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood yellowish. Heartwood light yellow to pinkish or light brown. Lustrous, with some stripy figure on the quartersawn and backsawn faces.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	2.1
Coefficient of volumetric shrinkage	0.35 % per %
Total tangential shrinkage (Ts):	8.1 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	2.1
Fibre saturation point	26 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	77 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires preservation treatment for termites.

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Wood difficult to saw due to the uneven shape of the logs.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

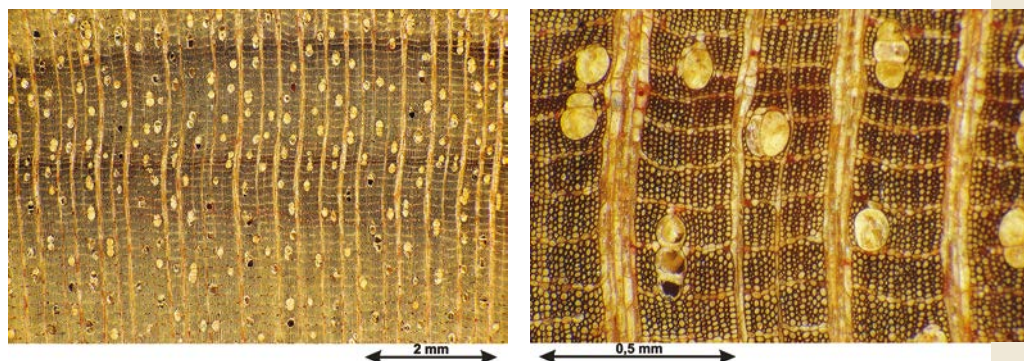
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Hexalobus crispiflorus*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shipbuilding
- Boxes and crates
- Open boats
- Vehicle or container flooring
- Musical instruments
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Fibre or particle boards
- Flooring
- Pulp
- Cooperage

Notes. Not present on the international market but widely used for a large range of everyday objects.

Common names

Country	Local name
Cameroon	Chungé, Evota, Leoué, Owé, Pota
Côte d'Ivoire	Siéléké
Gabon	Owui
Nigeria	Lapawe
Central African Republic	Mossome

Ozigo

Family. Burseraceae

Botanical names

Dacryodes buettneri H.J. Lam (Syn. *Pachylobus buettneri*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 5 to 9 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood light brown to pinkish white. Lustrous surface. Ribbon-like and sometimes moiré aspect on quartersawn.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.59
Monnin hardness ⁽¹⁾	2.8
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	7.3 %
Total radial shrinkage (Rs):	5.2 %
T/R anisotropy ratio	1.4
Fibre saturation point	33 %
Thermal conductivity (λ)	0.20 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	52 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,820 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Must be dried slowly. Preliminary air drying recommended.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Reducing the cutting angle to 15° is recommended. High silica content. Some difficulties in planing due to interlocked grain. Tendency to woolliness.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

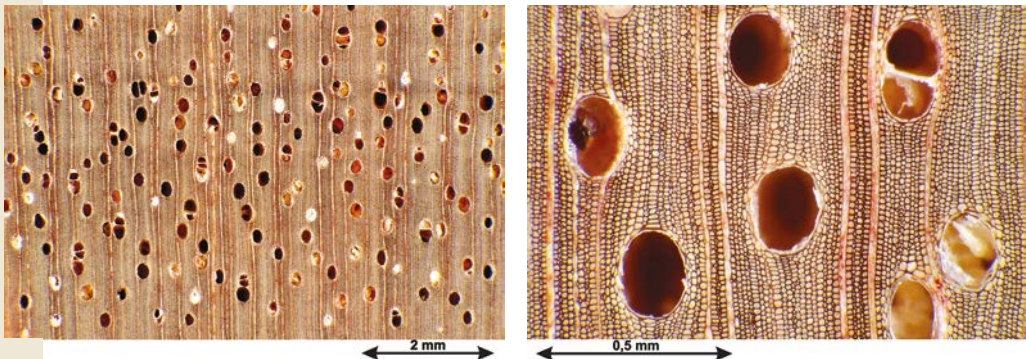
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Dacryodes buettneri*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring

Common names

Country	Local name
Germany	Assia
Cameroon	Assas
Gabon	Assia, Ozigo
Equatorial Guinea	Assia

Ozouga

Family. Humiriaceae

Botanical name

Sacoglottis gabonensis Urb.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Trunk often crooked. Purplish red to dark wood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.89
Monnin hardness ⁽¹⁾	8.1
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	9.1 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	31 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	20,010kJ/kg
Crushing strength ⁽¹⁾	84 MPa
Static bending strength ⁽¹⁾	138 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,770 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. The possible presence of few demarcated sapwood may have an influence on the expected durability. According to



Half-quarter sawn



Quarter sawn

the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

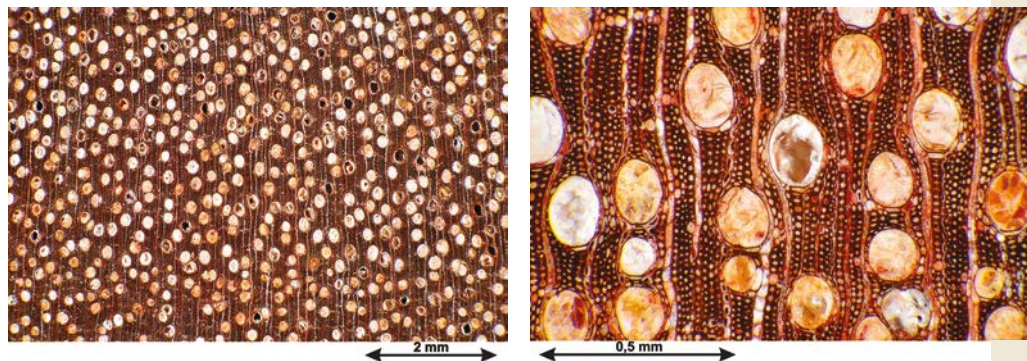
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Sacoglottis gabonensis*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- House framing
- Flooring
- Industrial or heavy flooring
- Poles
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Hydraulic works (fresh water)
- Sleepers

Notes. Difficult to obtain good finish due to interlocked grain.

Common names

Country	Local name
Cameroon	Bedwa, Bidou, Bodoua, Édoué, Éloué
Congo	Niuka
Côte d'Ivoire	Akouapo, Tougbi
Gabon	Essoua, Ozouga
Ghana	Ozouga
Nigeria	Atala, Tala, Ugu
Sierra Leone	Kpowuli

Padauk Amboina

Family. Leguminosae (Fabaceae)

Botanical names

Pterocarpus dalbergioides DC.

Pterocarpus indicus Willd. (Syn. *Pterocarpus vidalianus*)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Light red

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Sapwood straw yellow. Heartwood deep blood-red with almost black markings, alternatively honey coloured with reddish black markings, darkening to dark brown, lustrous. Rose scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	4.1
Coefficient of volumetric shrinkage	0.32 % per %
Total tangential shrinkage (Ts):	4.0 %
Total radial shrinkage (Rs):	2.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	20 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	51 MPa
Static bending strength ⁽¹⁾	82 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable



Flat sawn

Half-quarter sawn



Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (end uses submerged in salt water, sea water or brackish water) due to its pronounced hardness. However this characteristic is of little interest for this precious species. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Blunting effect quite important due to latex and resin deposits.

Assembling

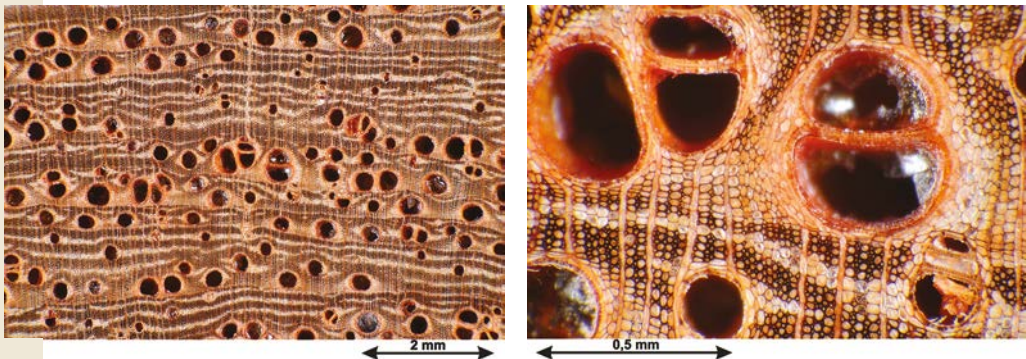
Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Cross sections of *Pterocarpus indicus*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Coffins
- Shipbuilding
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Musical instruments
- Veneer for interior of plywood
- Panelling
- Flooring
- Sliced veneer
- Decking
- Exterior panelling
- Seats
- Marquetry

Notes. Burrs with dark marking and wavy parenchyma structure are particularly decorative and appreciated for cabinet works.

Common names

Country	Local name
Andaman Islands	Andaman Padauk
India	Honne, Venga, Vengai
Indonesia	Amboina, Angsana, Linggua, Sonokembang
Malaysia	Sena
Myanmar	Pashu-Padauk
Papua New Guinea	Rosewood
Philippines	Manila-Padouk, Narra, Vitali
United Kingdom	Padauk amboina



Burr Amboina, CIRAD, Montpellier (France).



Flat sawn

Quarter sawn



Pao rosa / Dina*

* Common commercial name

Family. Leguminosae (Caesalpinieaceae)

Botanical names

Bobgunnia fistuloides J.H. Kirkbr. & Wiersema (Syn. *Swartzia fistuloides*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Light red

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood pinkish white to light red, with red brown veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.02
Monnin hardness ⁽¹⁾	9.1
Coefficient of volumetric shrinkage	0.66 % per %
Total tangential shrinkage (Ts):	6.2 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.5
Fibre saturation point	19 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	90 MPa
Static bending strength ⁽¹⁾	149 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,290 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Risk of end checks.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawing and machining requires powerful equipment. Sawblades can vibrate and overheat. Tendency to burn the wood in boring. Sometimes slight woolliness. Sawdust is an irritant.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

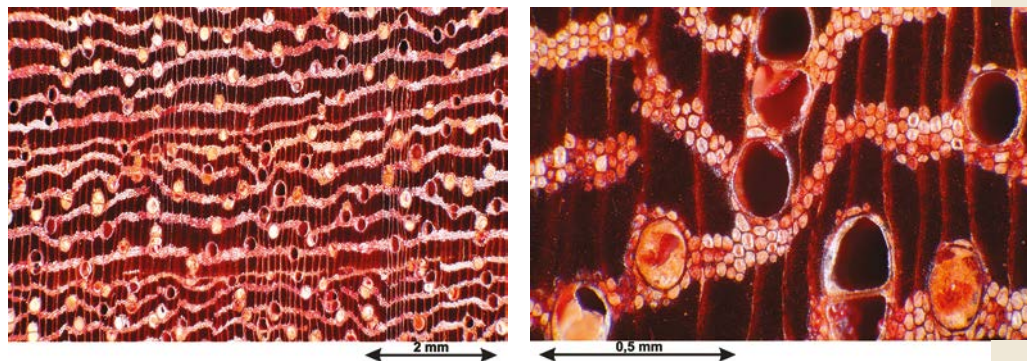
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Bobgunnia fistuloide*



Possible grading for short-length lumbers: choice I, choice II
Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Percussion instruments
- Tool handles (resilient woods)
- Sliced veneer
- Resistant to one or several acids
- Sculpture
- Cooperage

Notes. Resistant to several acids.

Common names

Country	Local name
Cameroon	Nom nsas
Congo	Kisasamba
Côte d'Ivoire	Boto
France	Pao rosa
Gabon	Oken
Mozambique	Pau ferro
Nigeria	Udoghogho
Central African Republic	N'guessa
Democratic Republic of Congo	Nsakala
United Kingdom	Dina
Zimbabwe	Munyii, Mutsonga, Umncaga



Chest of drawers in Pao Rosa (1950-1970) – Éric Orsini, Pézenas (France).

Parapará

Family. Bignoniaceae

Botanical name

Jacaranda copaia D. Don

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Evacuation by floatage not recommended: low durability, logs tend to sink after a long period in water. Wood cream white to pinkish white.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.43
Monnin hardness ⁽¹⁾	1.1
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	8.5 %
Total radial shrinkage (Rs):	5.7 %
T/R anisotropy ratio	1.5
Fibre saturation point	32 %
Thermal conductivity (λ)	0.15 W/(m.K)
Lower heating value	18,340 kJ/kg
Crushing strength ⁽¹⁾	31 MPa
Static bending strength ⁽¹⁾	54 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Prone to blue stain.



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. For thick material, a treatment is recommended to reduce the risks of blue stain.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Log turning sawing recommended to avoid shakes caused by internal stresses. Tendency to woolliness. Keep sharp tools.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

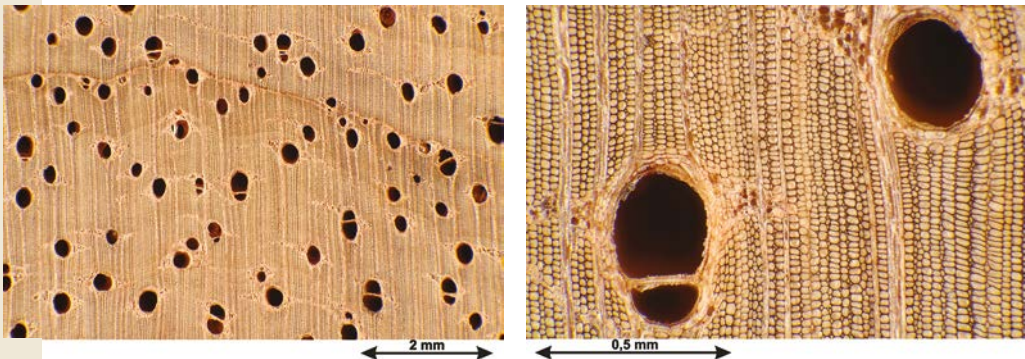
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Cross sections of *Jacaranda copaia*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Boxes and crates
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Pulp
- Marquetry

Common names

Country	Local name
Argentina	Caroba, Jacarana, Tarco
Bolivia	Tinto blanco
Brazil	Caroba, Caroba do mato, Caroba manaca, Jacaranda, Marupa falso, Parapará, Para-para
Colombia	Pavito, Chingale, Gualanday
Ecuador	Arabisco, Kuiship
Guyana	Fotui, Futui, Futi
French Guiana	Bois pian, Copaia, Copaya, Yachimambo
Peru	Chicharra caspi, Ishtapi
United Kingdom	Copaia
Suriname	Foeti, Gobaja, Goebaja
Venezuela	Gualanday



Flat sawn

Quarter sawn



Pashaco / Paricá*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Schizolobium amazonicum Ducke

Schizolobium parahyba S.F. Blake (Syn. *Schizolobium excelsum*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood cream white to light yellow, often with greyish veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.35
Monnin hardness ⁽¹⁾	0.8
Coefficient of volumetric shrinkage	0.32 % per %
Total tangential shrinkage (Ts):	5.5 %
Total radial shrinkage (Rs):	1.8 %
T/R anisotropy ratio	3.1
Fibre saturation point	26 %
Thermal conductivity (λ)	0.13 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	34 MPa
Static bending strength ⁽¹⁾	51 MPa
Longitudinal modulus of elasticity ⁽¹⁾	7,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #2 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Risk of woolliness during drying.

Assembling

Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Fire safety

Conventional French grading

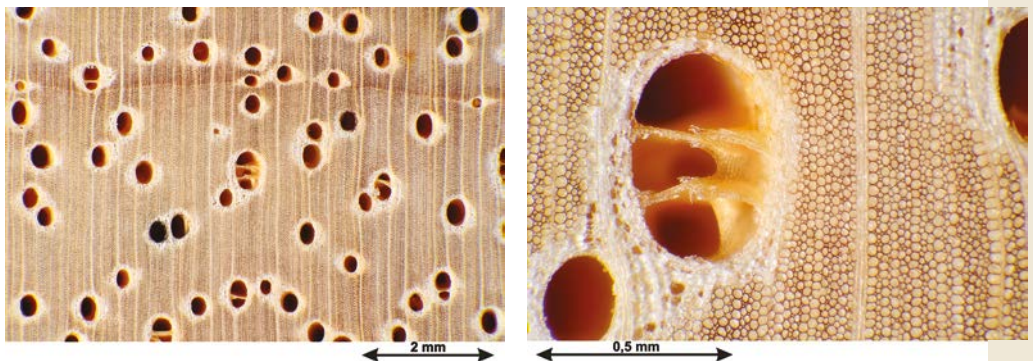
Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. Ungraded

Average density under 0.35.

Cross sections of *Schizolobium amazonicum*



Main end uses

- Matches
- Boxes and crates
- Open boats
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Fibre or particle boards
- Pulp

Notes. Used for industrial plantations, in particular for plywood and composite panels manufacturing.



Plywood – Floraplac, Paragominas (Pará, Brazil).

Common names

Country	Local name
Brazil	Acurubu, Guapuruvù, Paricá
Ecuador	Pashaco
Mexico	Quon
Nicaragua	Gavilan
Peru	Pino chuncho

Pau amarelo

Family. Rutaceae

Botanical name

Euxylophora paraensis Huber

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 80 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood bright yellow becoming yellowish light brown with air.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.81
Monnin hardness ⁽¹⁾	5.5
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	5.7 %
T/R anisotropy ratio	1.1
Fibre saturation point	21 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	80 MPa
Static bending strength ⁽¹⁾	119 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,460 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. The possible presence of few demarcated sapwood may have an



Flat sawn



Quarter sawn

influence on the expected durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment because sapwood is not very demarcated.

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Risks of checks and casehardening, particularly with thick material.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Planing and sanding must accommodate the presence of interlocked grain.

Assembling

Nailing/screwing. Good

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

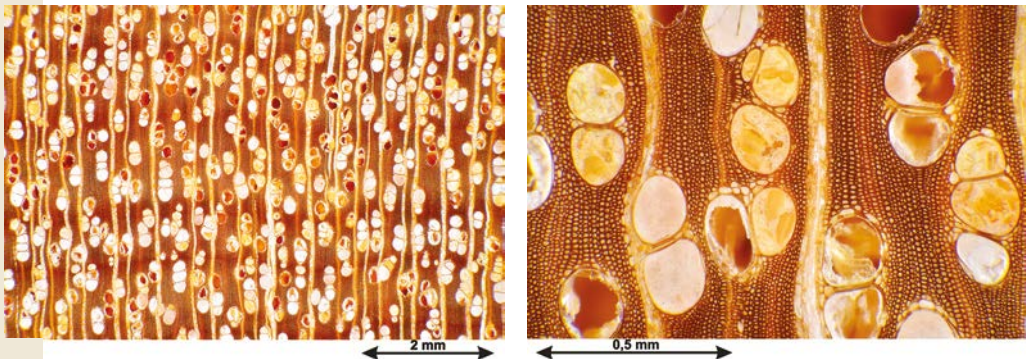
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Euxylophora paraensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Sculpture
- Marquetry
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Brazil	Amarelo, Amarelo cetim, Amaretao, Muirataua, Pau amarelo, Pau cetim, Pequia cetim
United Kingdom	Pao amarello

Pau mulato

Family. Rubiaceae

Botanical name

Calycophyllum spruceanum Benth.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 30 to 40 cm

Thickness of sapwood. Not applicable

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Beige grey to uniform yellowish beige. Silver figure very fine but perceptible.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.83
Monnin hardness ⁽¹⁾	6.5
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	2.1
Fibre saturation point	22 %
Thermal conductivity (λ)	0.27 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	77 MPa
Static bending strength ⁽¹⁾	116 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,560 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

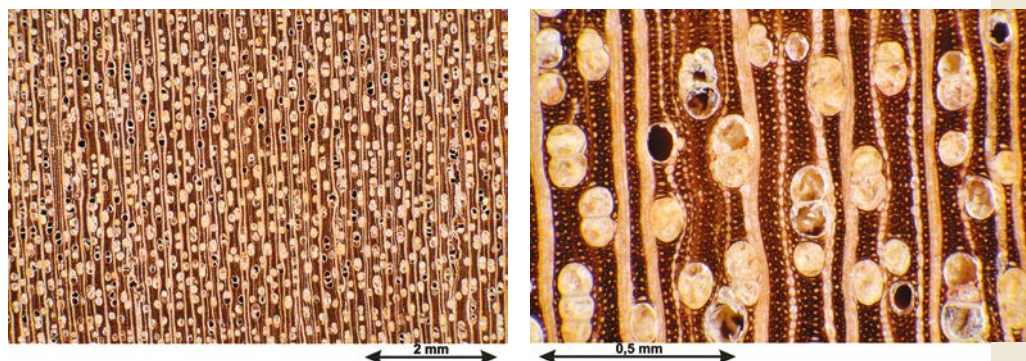
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Calycophyllum spruceanum*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Tool handles (resilient woods)
- Interior joinery
- Flooring
- Sculpture
- Marquetry

Common names

Country	Local name
Argentina	Palo banco, Ibira-moroti
Bolivia	Gayabochi
Brazil	Capirona, Pau mulato, Mulateiro
Ecuador	Corusicaa
Paraguay	Palo banco
Peru	Capirona

Pau roxo / Purpleheart*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Peltogyne catinae Ducke

Peltogyne confertiflora Benth.

Peltogyne lecointei Ducke

Peltogyne maranhensis Huber

Peltogyne paniculata Benth.

Peltogyne porphyrocardia Benth.

Peltogyne pubescens Benth.

Peltogyne venosa Benth.

Peltogyne p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Purple

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Purple wood turns to dark brown with light. Possible presence of internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	7.6
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	6.7 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.5
Fibre saturation point	23 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	18,120 kJ/kg
Crushing strength ⁽¹⁾	80 MPa
Static bending strength ⁽¹⁾	141 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,250 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Half-quarter sawn



Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Resistance to decay varies from moderate to good. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

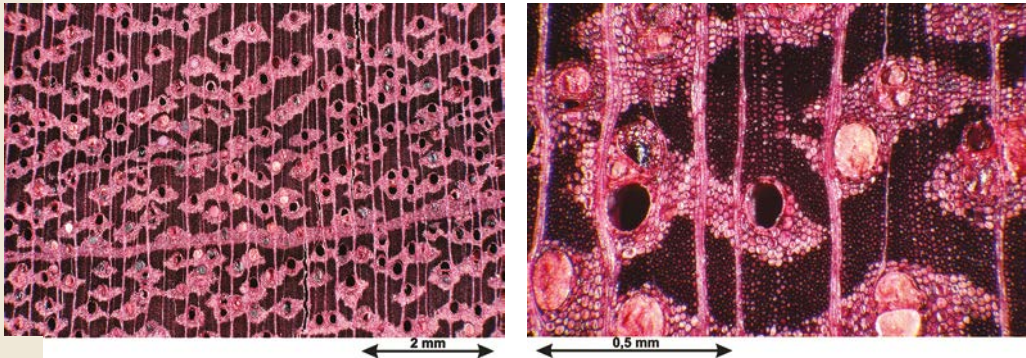
Notes. Sawing and machining requires powerful equipment.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Peltogyne venosa*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Amarante". Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2015), strength class D50 can be provided by visual grading for Pau roxo in French Guiana (Amarante).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. C-s2, d0

Grading for solid wood, according to requirements of European standard NF EN 14081-1 (April 2016): structural graded timber with a minimal thickness of 22 mm. Assigned according to procedures of the standard NF EN 13501-1. Assigned according to the procedures of the European grading report No. RA05-0238C prepared by the CSTB (Scientific and Technical Centre for Building).

Main end uses

- Turned goods
- Coffins
- Heavy carpentry
- Ship building (planking and deck)
- Ship building (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Musical instruments
- Panelling
- Glued Laminated
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Sculpture
- Marquetry

Notes. In the United States, Pao roxo is used to make deluxe coffins.

Common names

Country	Local name
Germany	Violetholz
Brazil	Guarabu, Ipe roxo, Jatobazinho, Pau roxo, Pau violeta, Roxinho
Colombia	Tananeo
United States	Amaranth
Guyana	Koroborelli, Merawayana, Purpleheart, Saka
French Guiana	Amarante, Bois violet
Mexico	Palo de rosa, Palo morado
Panama	Nazanero
Suriname	Dastan, Kocolorelli, Malako, Purperhart
Venezuela	Morado, Zapatero



Decking on a bridge over Comté river (French Guiana).

Perupok

Family. Celastraceae

Botanical names

Lophopetalum javanum Turcz.

Lophopetalum multinervium Ridl.

Lophopetalum wightianum Arn.

Lophopetalum p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. Not demarcated

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Yellow brown

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellow. Heartwood light straw/yellow or pink when fresh, light yellow/brown when dry after planing, darker grain, planed surface lustrous.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	1.7
Coefficient of volumetric shrinkage	0.43 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	30 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	39 MPa
Static bending strength ⁽¹⁾	70 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,380 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Very prone to splits.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

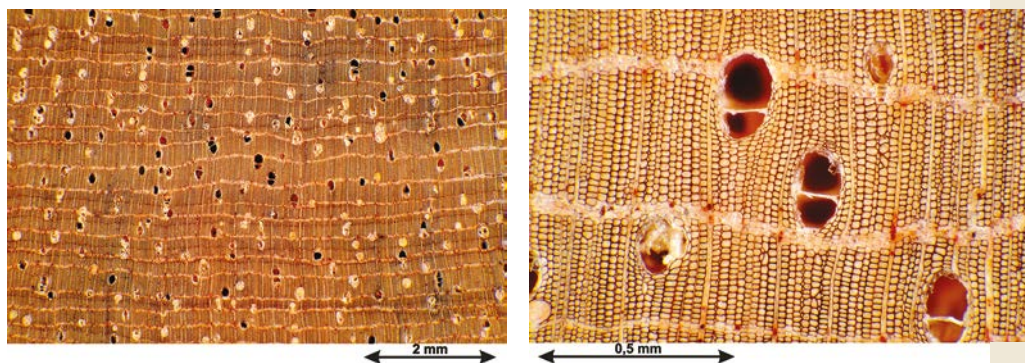
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Lophopetalum torricellense*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Sliced veneer
- Seats
- Rolling shutters

Common names

Country	Local name
India	Banati
Indonesia	Perupok
Malaysia	Perupok
Thailand	Song-salung
Viet Nam	Songtrang

Pinho Paraná

Family. Araucariaceae

Botanical name

Araucaria angustifolia Kuntze

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Frequent purplish pink veins in heartwood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.54
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	7.4 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1, 9
Fibre saturation point	27 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	18,330 kJ/kg
Crushing strength ⁽¹⁾	54 MPa
Static bending strength ⁽¹⁾	89 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,980 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4-5 – poorly durable to not durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Sapwood often very important; end-uses under use class 4 possible with an adequate preservation treatment. Prone to blue stain.



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Darker coloured wood dries slowly. Very prone to cracks and distortions.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Internal stresses in the wood may cause distortion in machining.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

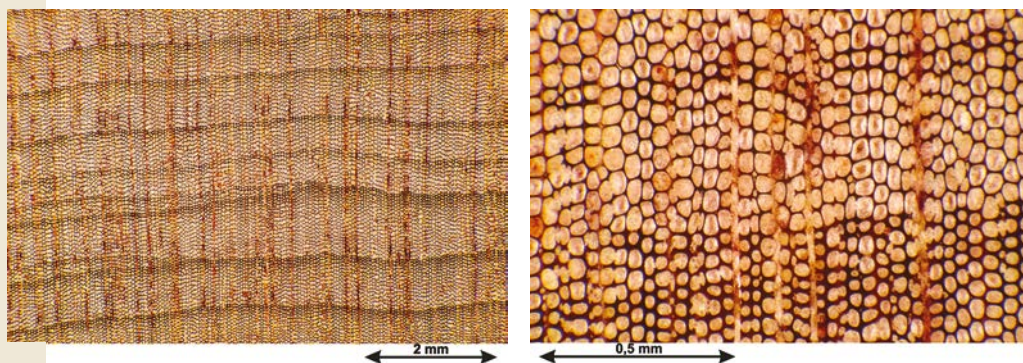
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C16 and C24 can be provided by visual grading.

Cross sections of *Araucaria angustifolia*



Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Cabinetry (high-end furniture)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Flooring
- Sliced veneer
- Poles
- Pulp
- Cooperage

Common names

Country	Local name
Argentina	Pino Paraná, Curiy
Brazil	Pinho brasileiro, Pinheiro de Paraná, Pinheiro, Pinheiro do Brasil, Pinho Paraná
Chile	Araucaria
France	Pin Paraná
Paraguay	Pino blanco, Pinheiro do Brasil
United Kingdom	Araucaria, Chilean pine, Paraná pine

Pinus kesiya* / Kesiya Pine

* Common commercial name

Family. Pinaceae

Botanical name

Pinus kesiya Royle

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to South-East Asia, this fast-growing species has been widely planted throughout the tropical and subtropical world. Woods presently commercialised are almost exclusively from plantations.

Log description

Diameter. 50 to 60 cm

Thickness of sapwood. 4 to 5 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Orange yellow

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Pinkish white. Numerous resin canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	2.8
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	8.9 %
Total radial shrinkage (Rs):	6.1 %
T/R anisotropy ratio	1.5
Fibre saturation point	35 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	18,700 kJ/kg
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties vary according to individual tree's age and plantation site.

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn

Quarter sawn



Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Sapwood often very important; end-uses under use class 4 possible with an adequate preservation treatment.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of blue stain and resin exudation. Wood must be sawn quickly.

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Risks of clogging of tools in sawing and machining due to resin.

Assembling

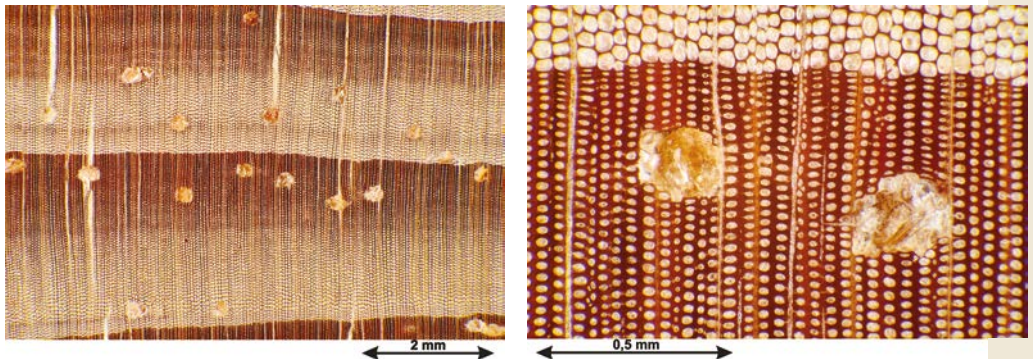
Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Pinus kesiya*



Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Poles
- Pulp

Common names

Country	Local name
Cambodia	Sral, Srâl
United States	Khasi-pine
France	<i>Pinus kesiya</i>
India	Khasya-pine
Indonesia	Tusam
Madagascar	Kesica, Pin kesiya, <i>Pinus kesiya</i>
Myanmar	Tinyu
Philippines	Saleng
United Kingdom	Kesiya pine
Thailand	Son
Viet Nam	Thong

Pinus merkusii* / Merkusii Pine

* Common commercial name

Family. Pinaceae

Botanical name

Pinus merkusii Jungh. & de Vriese

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. This species can be found at altitudes between 150 m and 650 m.

Log description

Diameter. 60 to 80 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood light brown with dark red veins. Numerous resin canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.73
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	1.6
Fibre saturation point	32 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	51 MPa
Static bending strength ⁽¹⁾	90 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,370 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from fairly hard to hard. Physical and mechanical properties vary according to individual tree's age and plantation site.

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable



Flat sawn

Quarter sawn



Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. End-uses under use class 4 possible with an adequate preservation treatment.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risks of blue stain and resin exudation. Wood must be sawn quickly.

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Risks of clogging of tools due to resin.

Assembling

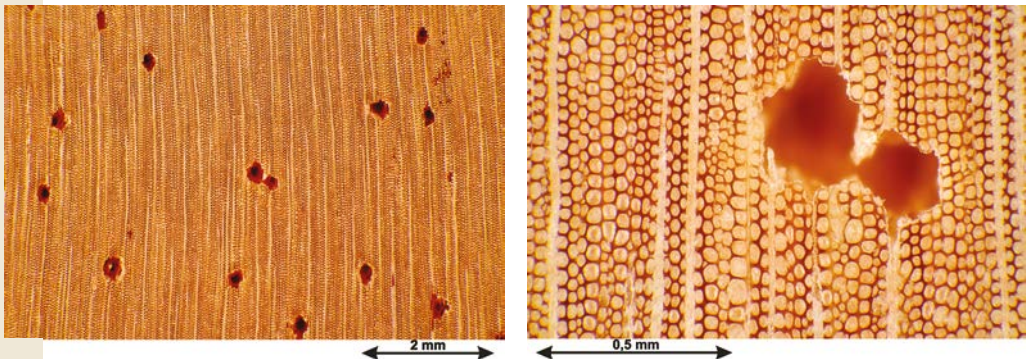
Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Pinus merkusii*



Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Poles
- Pulp

Common names

Country	Local name
Cambodia	Srâl
United States	Merkus-pine
France	Pinus merkusii
Indonesia	Tusam
Laos	May pek
Myanmar	Tenasserim-pine, Tinyu
Philippines	Tapulau, Mindoro-pine
United Kingdom	Merkus-pine
United Kingdom	Merkusii pine
Viet Nam	Thong, Kia

Pinus patula* / Patula Pine

* Common commercial name

Family. Pinaceae

Botanical name

Pinus patula Schiede

Continent. Africa, Latin America, Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to Mexico, this fast-growing species has been widely planted throughout the tropical and subtropical world. Woods presently commercialised are almost exclusively from plantations.

Log description

Diameter. 40 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Mainly plantation wood. Presence of more or less knots and resin canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.49
Monnin hardness ⁽¹⁾	2.2
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	3.4 %
T/R anisotropy ratio	2.4
Fibre saturation point	31 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	18,660 kJ/kg
Crushing strength ⁽¹⁾	39 MPa
Static bending strength ⁽¹⁾	69 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,350 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Physical and mechanical properties vary according to individual tree's age and plantation site.

Natural durability and treatability

Resistance to decay. Class 5 - non-durable



Flat sawn

Quarter sawn



Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. End-uses under use class 4 possible with an adequate preservation treatment.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Prone to blue stain.

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Assembling

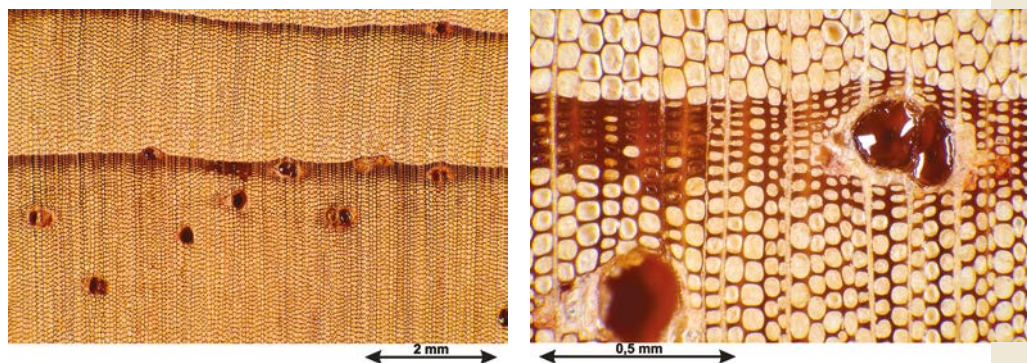
Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Pinus patula*



Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Fibre or particle boards
- Poles
- Pulp

Common names

Country	Local name
Colombia	Pátula, Pino candelabro
France	<i>Pinus patula</i> , Pin argenté, Pin du Mexique
Mexico	Jelocote, Ocote, Ocote liso, Pin jelecote, Pino
United Kingdom	Jelecote pine, Patula pine

Piquia

Family. Caryocaraceae

Botanical names

Caryocar nuciferum L.

Caryocar villosum Pers.

Caryocar p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 90 to 180 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Sapwood whitish to creamy white. Heartwood yellowish white to pale beige.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.81
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	5.7 %
T/R anisotropy ratio	1.4
Fibre saturation point	29 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	100 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,270 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Risks of internal stresses releasing during sawing. Woolly surface due to tension wood.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

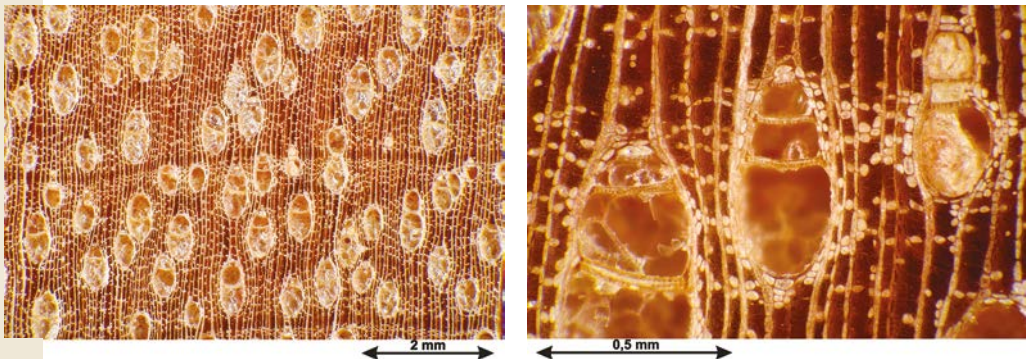
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Caryocar villosum*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Heavy carpentry
- Shipbuilding
- Boxes and crates
- Vehicle or container flooring
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring

Common names

Country	Local name
Brazil	Piquia
Costa Rica	Ajillo
Guyana	Pekia
Peru	Almendro
Suriname	Sawarie



Table in Piquia and Electric guitar top in Palm – Design by Cosmik Guitare, Lille (France).



Half-quarter sawn



Quarter sawn

Piquiarana

Family. Caryocaraceae

Botanical name

Caryocar glabrum Pers.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood yellow brown to light brown. Presence of internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	9.6 %
Total radial shrinkage (Rs):	5.2 %
T/R anisotropy ratio	1.8
Fibre saturation point	29 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,090 kJ/kg
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	109 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,640 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Wood not resistant to some cubical rot fungi under tropical climate.

According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Must be dried slowly to reduce defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Keep tools sharp to avoid a fuzzy surface due to interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

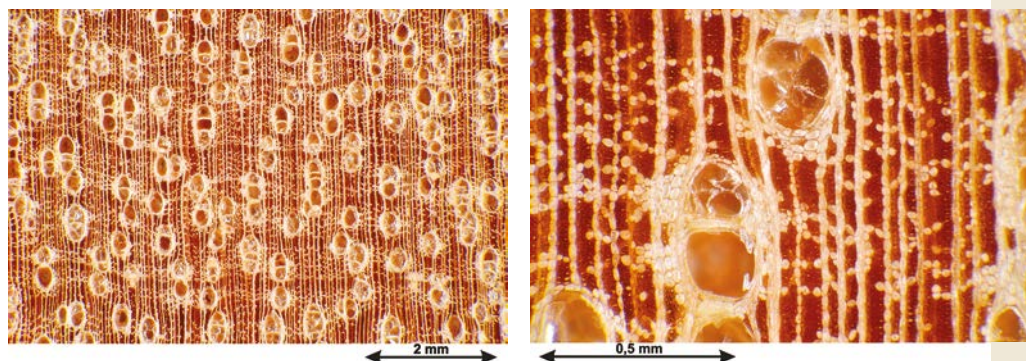
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Caryocar glabrum*



In French Guiana, the local name of this species is “Chawari”. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

Strength classes D35 can be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Ship building (planking and deck)
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring
- Exterior panelling
- Cooperage

Common names

Country	Local name
Bolivia	Biqui, Huevo de burro
Brazil	Pequi, Piquia, Piquia bravo, Piquia roxo, Piquiarana
Colombia	Almendron
Guyana	Sawarie
French Guiana	Chawari, Kassagnan
Peru	Almendra con espinas, Almendro
Suriname	Sawari, Sawarie, Sopo oedoe
Venezuela	Almendra

Poplar

Family. Salicaceae

Botanical name

Populus p.p.

Continent. North America, Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Poplars come from the temperate area of the northern hemisphere. Their growth is rapid; numerous uses; frequently used in plantations, far from their original growing area. In these plantations, several cultivars are used (varieties obtained by culture).

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. White

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Wood is white, often greyish or very pale brown. Sapwood poorly to not demarcated depending on species. Sometimes slightly wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.3
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	30 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	18,430 kJ/kg
Crushing strength ⁽¹⁾	35 MPa
Static bending strength ⁽¹⁾	62 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Treatability of heartwood is variable.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. Yes

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Keep tools very sharp to prevent fuzzy surfaces.

Assembling

Nailing/screwing. Good

Notes. Not prone to splits when nailing. Very absorbent when gluing.

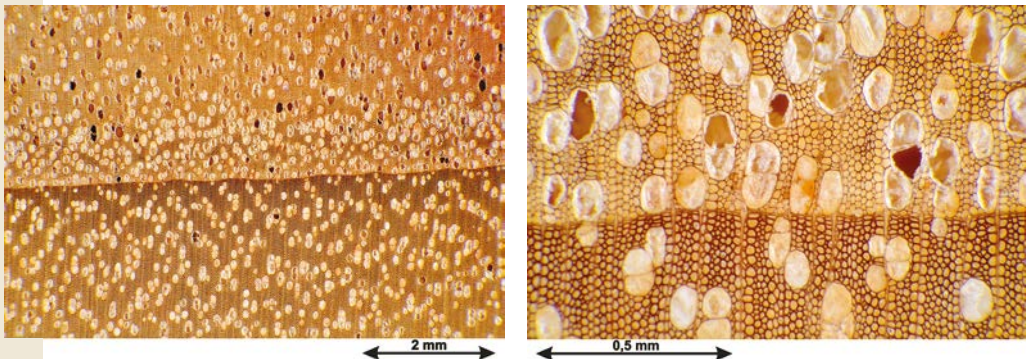
Commercial grading

Sawn timber appearance grading

According to French standard NF EN 975-2 (November 2004)

Possible grading for square-edged timber: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Populus alba*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C18, C22, C24 or C27 can be provided by visual grading. Strength classes C18 or C24 can be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Built-in furniture or mobile item
- Moulding
- Fibre or particle boards
- Pulp

Notes. The strong tendency of Poplar to be woolly makes its finish delicate.

Common names

Country	Local name
Germany	Pappel
Spain	Alamo
United States	Cottonwood
France	Peuplier
Italy	Pioppo
United Kingdom	Poplar



Outdoor covering (sheltered) in heat-treated Poplar, regional forestry and timber centre, Châlons-en-Champagne (France).

Preciosa

Family. Lauraceae

Botanical name

Aniba canelilla Mez

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 60 cm

Thickness of sapwood. 2 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight to entangled

Interlocked grain. Slight

Notes. Sapwood brownish yellow. Heartwood dark brown or blackish. Pleasant scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.12
Monnin hardness ⁽¹⁾	15.8
Coefficient of volumetric shrinkage	0.64 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.3
Fibre saturation point	20 %
Thermal conductivity (λ)	0.35 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	106 MPa
Static bending strength ⁽¹⁾	208 MPa
Longitudinal modulus of elasticity ⁽¹⁾	30,230 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity and extractive content: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

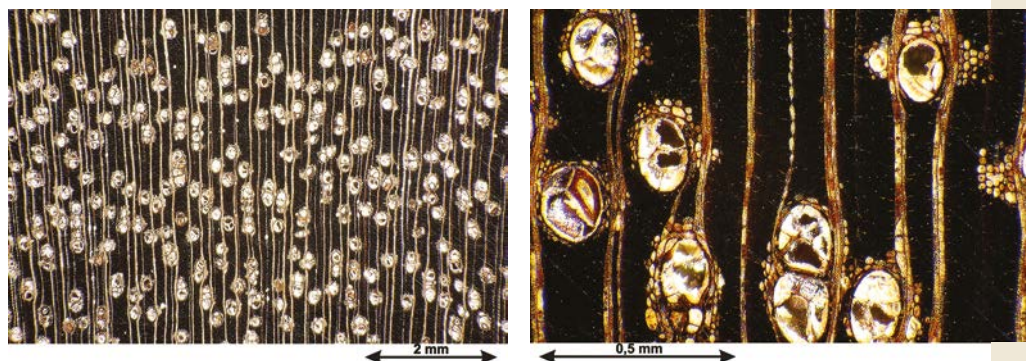
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Aniba canelilla*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Interior joinery
- Flooring
- Sculpture
- Marquetry
- Cooperage

Notes. Outdoor uses and deluxe indoor uses. This wood is popular for its essential oils.

Common names

Country	Local name
Brazil	Casca preciosa, Casca do maranhão, Canela do maranhão, Louro precioso, Pau precioso, Preciosa, Precioso

Pulai

Family. Apocynaceae

Botanical names

Alstonia pneumatophora Baker

Alstonia scholaris R. Br.

Alstonia spatulata Blume

Alstonia p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 75 cm

Thickness of sapwood. n.d.

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood cream white to light yellow, aspect slightly lustrous. Grain sometimes irregular or oblique. Presence of latex canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.5
Coefficient of volumetric shrinkage	0.33 % per %
Total tangential shrinkage (Ts):	6.1 %
Total radial shrinkage (Rs):	3.4 %
T/R anisotropy ratio	1.8
Fibre saturation point	35 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	40 MPa
Static bending strength ⁽¹⁾	63 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,930 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of blue stain during drying.

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Keep tools sharp to avoid a fuzzy surface. Filling is recommended to obtain a good finish.

Assembling

Nailing/screwing. Poor

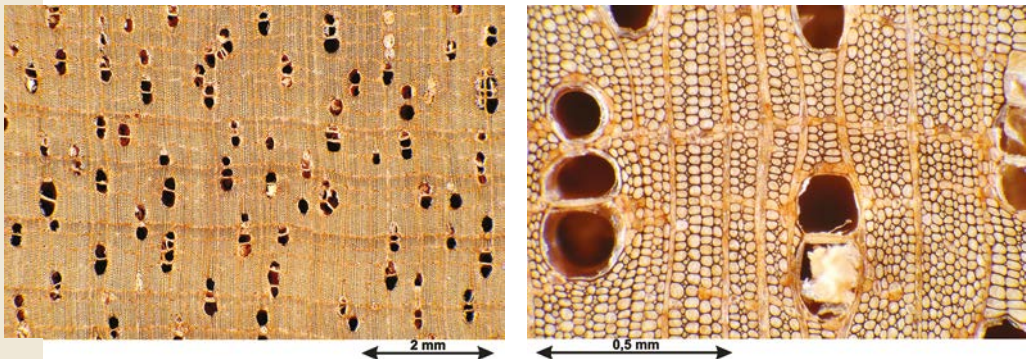
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Alstonia pneumatophora*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding

Common names

Country	Local name
Australia	Milk wood, White cheese wood
India	Chatian, Chatiyan, Shaitanwood
Indonesia	Pulai, Pulai, Sepati
Laos	Mai tin pet
Malaysia	Pulai
Myanmar	Letok, Sega, Taun me ok
Papua New Guinea	Milk wood, White cheese wood
Philippines	Dita, Linog
United Kingdom	Pagoda tree, Pattern wood
Sri Lanka	Rukattana
Thailand	Thia
Viet Nam	Mo-cua

Punah

Family. Tetrameristaceae

Botanical name

Tetramerista glabra Miq.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 4 to 7 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light yellow to light brown often with pink glints. Presence of red and white deposits in the pores. Unpleasant odour when green. Sometimes oblique grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.73
Monnin hardness ⁽¹⁾	3.1
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	9.2 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	66 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Drying requires care in order to reduce defects (application of end-coating against cracks and top weighting of the piles).

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. In planing, surface tends to be fibrous and requires a careful sanding. Slight gumming of sawteeth (resin).

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Pre-boring necessary for thin material in order to avoid splits when nailing.

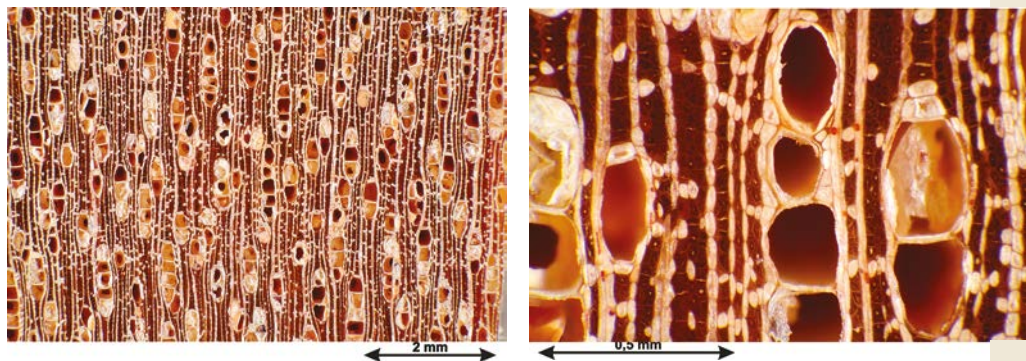
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Tetramerista glabra*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Boxes and crates
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring

Notes. Filling is required to obtain a good finish.

Common names

Country	Local name
Indonesia	Bang kalis, Paya, Punal
Malaysia	Amat, Entuyut, Peda, Ponga, Punah, Punam, Tuyot
United Kingdom	Punah

Pyinkado

Family. Leguminosae (Mimosaceae)

Botanical names

Xylia xylocarpa Taub. (Syn. *Xylia dolabriformis*) (Syn. *Xylia kerrii*)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 100 to 120 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight to entangled

Interlocked grain. Slight

Notes. Sapwood pale yellowish brown to reddish white. Heartwood reddish brown, partly marked with dark veins. Growth ring visible. Sometimes oily or resinous flecks.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	6.9
Coefficient of volumetric shrinkage	0.48 % per %
Total tangential shrinkage (Ts):	6.7 %
Total radial shrinkage (Rs):	3.3 %
T/R anisotropy ratio	2.0
Fibre saturation point	31 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	68 MPa
Static bending strength ⁽¹⁾	115 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn



Half-quarter sawn

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Dulling effect caused by mineral deposits and resin. Machining and sanding dust may cause irritation.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

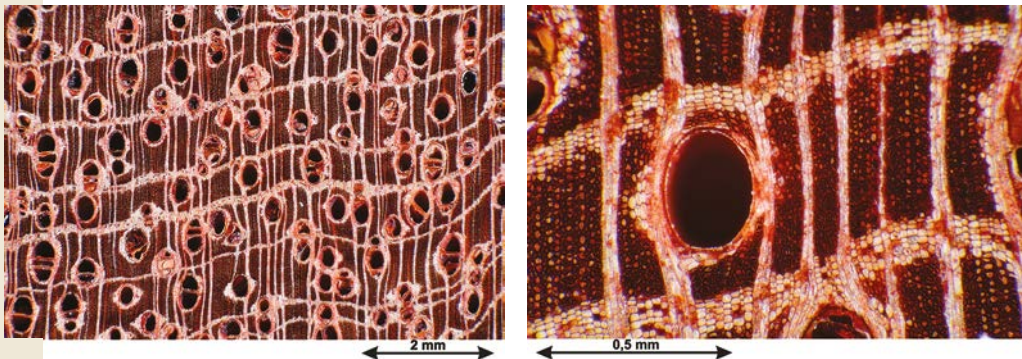
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Xylia xylocarpa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Cooperage
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. Wood is resistant to acids. Substitute for Greenheart, Azobé (Eki) and Tali.

Common names

Country	Local name
Cambodia	Sokram
India	Irul
Myanmar	Pyinkado
Thailand	Abura
Viet Nam	Cam-xe, Dà-tà

Quaruba

Family. Vochysiaceae

Botanical names

Vochysia bracedliniae Standl.

Vochysia guatemalensis Donn. Sm. (Syn. *Vochysia hondurensis*)

Vochysia guianensis Aubl.

Vochysia maxima Ducke

Vochysia tetraphylla DC.

Vochysia tomentosa DC.

Vochysia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish white

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood pinkish white to pinkish brown. Sometimes lined up traumatic canals.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	1.7
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	9.8 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	2.6
Fibre saturation point	31 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	18,070 kJ/kg
Crushing strength ⁽¹⁾	43 MPa
Static bending strength ⁽¹⁾	74 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,980 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard. Poorly to moderately resistant to fungi depending on the species.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Notes. Must be dried slowly in order to reduce defects, especially collapse with thick board.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Keep cutters sharp to avoid a fuzzy surface.

Assembling

Nailing/screwing. Poor

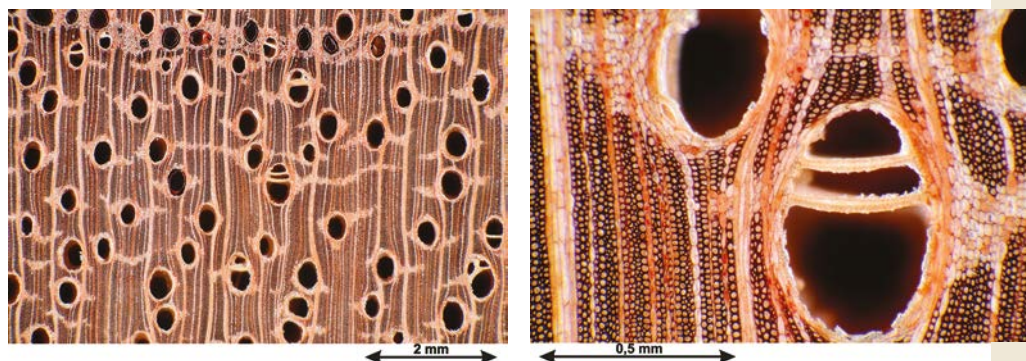
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Vochysia maxima*



In French Guiana, the local names of this species are Kouali, Wana Kouali and Moutende Kouali. Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

Strength classes D24 can be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards

Common names

Country	Local name
Belize	Yemeri
Bolivia	Cambara, Plumero
Brazil	Quaruba, Quarabu jasmirana, Quarabu rem, Quarubatinga, Quaricica
Colombia	Dormilon, Gomo, Soroga
Ecuador	Bella maria, Chimbulla, Laguno
Guyana	Iteballi
French Guiana	Kouali, Moutendé
Honduras	Quaruba
Paraguay	Quarabu
Peru	Goma amarilla, Quillo, Quillosisa
United Kingdom	Yemeri
Suriname	Wanakwari, Watrakwari, Wiswiskwari, Kwari
Venezuela	Saladillo

Ramin

Family. Thymeleaceae

Botanical names

Gonystylus bancanus Kurz

Gonystylus macrophyllus Airy Shaw

Gonystylus maingayi Hook. f.

Gonystylus p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

Species listed in CITES appendix II (see note)

Notes. All Ramin species (*Gonystylus* spp.) are listed in CITES appendix II (all wood products).

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light yellow

Sapwood. Not demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heart shakes in some logs. Wood cream white to light yellow. Unpleasant odour when green. Presence of tension wood.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	9.1 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.9
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	67 MPa
Static bending strength ⁽¹⁾	112 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,020 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Very prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Risks of checks, end checks and blue stain with thick material.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Risk of splinters in cross cutting.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing.

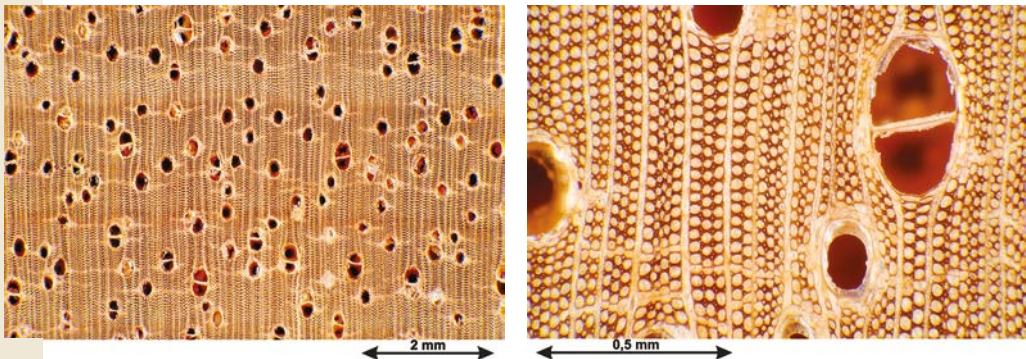
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Gonystylus bancanus*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Exterior panelling
- Rolling shutters

Common names

Country	Local name
Germany	Ramin
Fiji	Mavota
France	Ramin
Îles Salomon	Ainunura, Fungunigalo, Latareko, Petata
Indonesia	Akenia, Garu buaja, Medang keram, Ramin
Italy	Ramin
Malaysia	Ahmin, Melawis, Ramin, Ramin batu, Ramin telur
Philippines	Lanutan bagio

Red Cedar

Family. Cupressaceae

Botanical name

Thuja plicata Donn

Continent. North America, Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. This species, appreciated for its durability, comes from the west coast of the United States and from Canada. It is widely planted and regularly exported. Widely planted in Great Britain and New Zealand.

Log description

Diameter. 50 to 120 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Floats

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. The texture for plantation woods is often less fine. Wood may have numerous small knots.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.38
Monnin hardness ⁽¹⁾	1.1
Coefficient of volumetric shrinkage	0.29 % per %
Total tangential shrinkage (Ts):	5.5 %
Total radial shrinkage (Rs):	2.2 %
T/R anisotropy ratio	2.5
Fibre saturation point	24 %
Thermal conductivity (λ)	0.14 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	33 MPa
Static bending strength ⁽¹⁾	59 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Red Cedar is prone to splitting.

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible



Flat sawn

Half-quarter sawn



Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Use class 3 only covers wood components without sapwood. Plantation woods, which are exploited younger, are less resistant to fungi (Class 3: moderately durable). According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

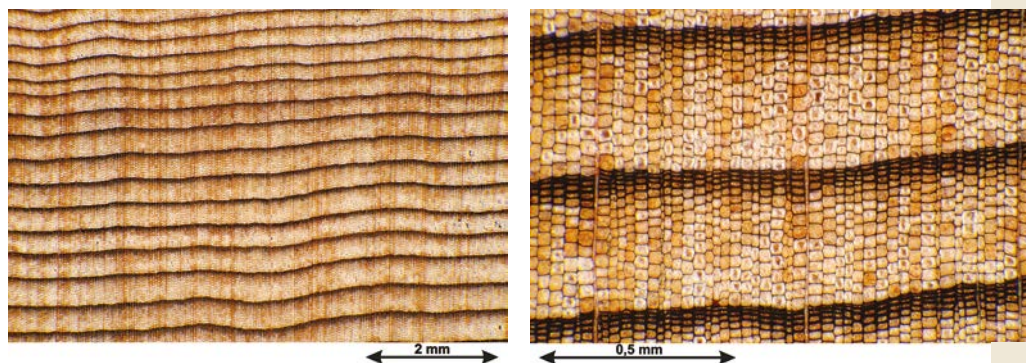
Notes. Use of stellite-tipped saw blades is recommended for sawing green wood. The presence of chemical corrosive agents has a pronounced blunting effect.

Assembling

Nailing/screwing. Poor

Notes. Very prone to splitting: pre-holes are needed for nailing and screwing. For uses in humid areas and because of wood's acidity, it is recommended to have stainless nails or screws.

Cross sections of *Thuja plicata*



Commercial grading

Sawn timber appearance grading

According to Export R-List Grading and Dressing Rules (Pacific Lumber Inspection Bureau, 2003):

Possible grading: # 2 Better Clear, # 4 Clear

According to NLGA rules (National Lumber Grades Authority, 2014):

Possible grading: Clear Heart, Grade A, Grade B

Other possible grading: Select Knotty, Quality Knotty

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C14 and C18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Open boats
- Musical instruments
- Stringed instruments
- Panelling
- Exterior joinery
- Interior joinery
- Moulding
- Poles
- Exterior panelling
- Sculpture
- Marquetry

Notes. Wood used for outside fittings: terrace, play grounds, pool decking etc. Low density and sensitive to stamping, but offers interesting mechanical properties and durability.

Common names

Country	Local name
Germany	Riesenlebensbaum
Spain	Cedro canadiense
United States	Western red cedar
France	Red cedar, Cèdre rouge d'Amérique



Cladding on roof overhang next to a stone-covered wall, Argelès-sur-Mer (France).

Rengas

Family. Anacardiaceae

Botanical names

Gluta beccarii Ding Hou

Gluta malayana Ding Hou

Gluta renghas L.

Gluta p.p. (Syn. *Melanorrhoea* p.p.)

Continent. Asia, Oceania, Madagascar

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 30 to 80 cm

Thickness of sapwood. 10 to 20 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight to entangled

Interlocked grain. Slight

Notes. Sapwood white to pale yellow. Heartwood dark reddish brown/deep blood red shiny marked with dark, almost black stripes, darkening on exposure, lustrous. Silica deposits. Poisonous resin exudation.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.70
Monnin hardness ⁽¹⁾	2.5
Coefficient of volumetric shrinkage	0.29 % per %
Total tangential shrinkage (Ts):	5.3 %
Total radial shrinkage (Rs):	2.9 %
T/R anisotropy ratio	1.8
Fibre saturation point	25 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	49 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class M - moderately durable



Flat sawn



Quarter sawn

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Dulling effect caused by resin and silica.

Assembling

Nailing/screwing. Good but pre-boring necessary

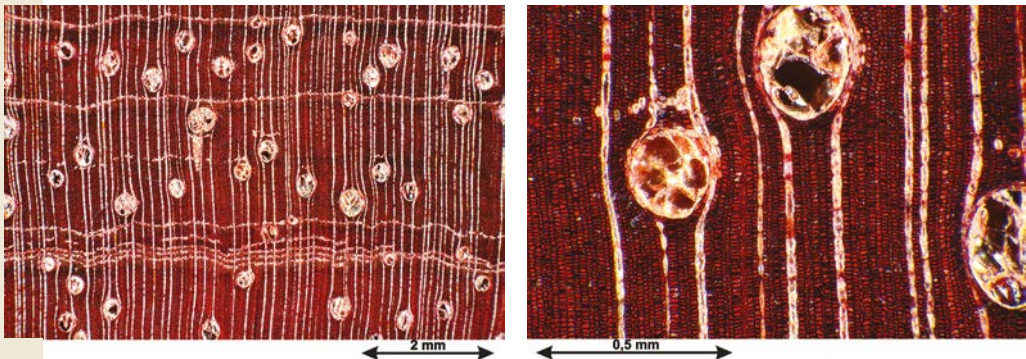
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Gluta* sp.



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Flooring
- Sliced veneer
- Sculpture
- Seats
- Marquetry

Notes. Contains deposits which are allergenic.

Common names

Country	Local name
India	Gluta
Indonesia	Rengas, Tembaga
Magadascar	Torotoro
Malaysia	Jalang, Kerbau, Rengas
Myanmar	Thayet-thitsi
Thailand	Rakban
Viet Nam	Son



Half-quarter sawn



Quarter sawn

Resak

Family. Dipterocarpaceae

Botanical names

<i>Cotylelobium burckii</i> Heim	<i>Cotylelobium</i> p.p.
<i>Cotylelobium lanceolatum</i> Craib	<i>Vatica maingayi</i> Dyer
<i>Cotylelobium melanoxyton</i> Pierre	<i>Vatica mangachapoi</i> Blanco
	<i>Vatica rassak</i> Blume
	<i>Vatica</i> p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Commercial species gathering 2 genus and a large number of botanical species. Properties sometimes variable from one genus or species to another.

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood more or less distinct depending on the species, whitish to yellowish. Heartwood pale yellow when fresh, darkens to deep reddish chocolate brown to brown with a greenish tinge. Silver figure visible. Resin exudations. Silica deposits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	4.7 %
Total radial shrinkage (Rs):	2.6 %
T/R anisotropy ratio	1.8
Fibre saturation point	22 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	18240 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	85 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

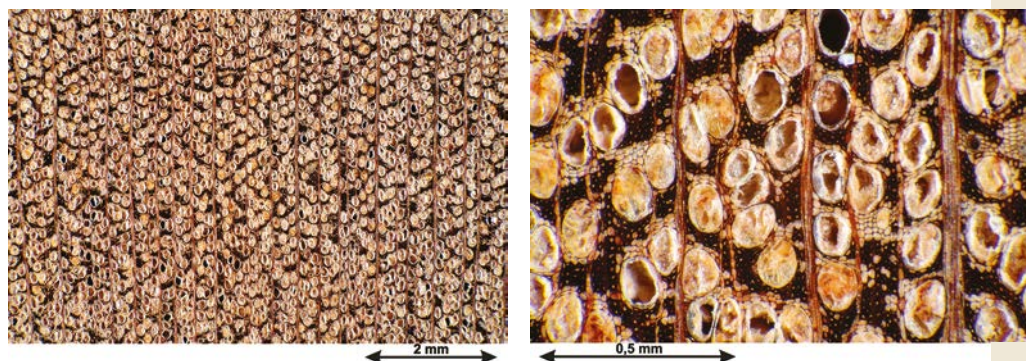
Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Vatica rassak*



Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Shipbuilding
- Open boats
- Stairs (inside)
- Glued Laminated
- Exterior joinery
- Interior joinery
- House framing
- Flooring
- Decking

Notes. Difficulties with finishing caused by resin. Possible substitute for Red Balau and Giam. Technological properties variable depending on the species.

Common names

Country	Local name
Cambodia	Chramas
Indonesia	Resak
Malaysia	Resak
Myanmar	Pan-thya
Philippines	Narig
Thailand	Pau cham
Viet Nam	Tâu

Rosewood, Para

Family. Leguminosae (Fabaceae)

Botanical name

Dalbergia spruceana Benth.

Continent. Latin America

CITES (Washington Convention of 2017)

Rosewood Para is listed in CITES Appendix II

Log description

Diameter. 30 to 50 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Undulating

Interlocked grain. Slight

Notes. Sapwood white to pale cream. Heartwood deep rouge or reddish-brown with black striping or mottling.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.04
Monnin hardness ⁽¹⁾	14.0
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	2.6
Fibre saturation point	21 %
Thermal conductivity (λ)	0.33 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	97 MPa
Static bending strength ⁽¹⁾	183 MPa
Longitudinal modulus of elasticity ⁽¹⁾	26,150 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Half-quarter sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Good for turning.

Assembling

Nailing/screwing. Good but pre-boring necessary

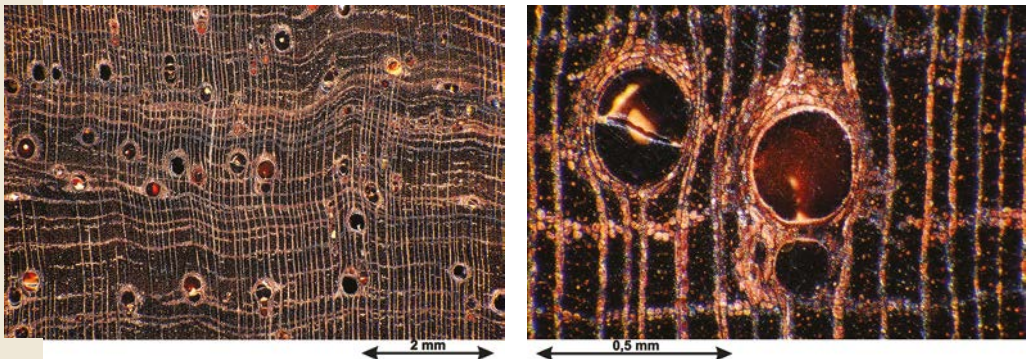
Notes. Very high specific gravity and extractive content: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Cross sections of *Dalbergia spruceana*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Tool handles (resilient woods)
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Top-market applications as with all *Dalbergia* species.

Common names

Country	Local name
Brazil	Jacaranda, Jacarandá do pará, Saboarana
Portugal	Jacaranda preto
United Kingdom	Rosewood, Para,



Bassoon –
By Buffet Crampon,
Mantes-la-Ville (France).

Rosewood, Sonokeling

Family. Leguminosae (Fabaceae)

Botanical name

Dalbergia latifolia Roxb.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

Rosewood Sonokeling is listed in CITES Appendix II

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Sapwood light yellowish white. Heartwood dark pink/violet or purple/brown, turns dark after drying. Regular dark violet veins. Marked and large silver figure. Pleasant scent when fresh.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.89
Monnin hardness ⁽¹⁾	7.1
Coefficient of volumetric shrinkage	-
Total tangential shrinkage (Ts):	5.8 %
Total radial shrinkage (Rs):	2.7 %
T/R anisotropy ratio	2.1
Fibre saturation point	-
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	65 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,600 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Half-quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Machining and sanding dust may cause irritation. Marked dulling effect caused by resin.

Assembling

Nailing/screwing. Good but pre-boring necessary

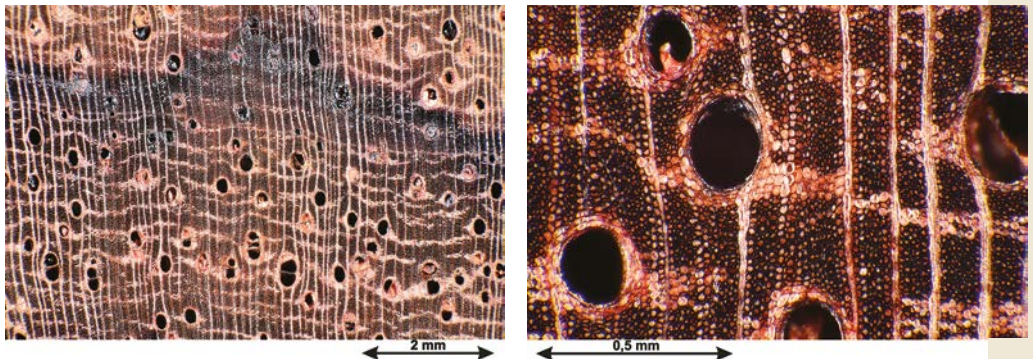
Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Cross sections of *Dalbergia latifolia*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading.

D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Fruit bowl in Indian Rosewood (1950s) – Éric Orsini, Pézenas (France).

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Percussion instruments
- Panelling
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Needs filling before polishing.

Common names

Country	Local name
France	Palissandre des Indes
India	Indian rosewood, Itti, Todagatti
Indonesia	Sonokeling
United Kingdom	Rosewood, Sonokeling

Rosewood, Tamalan

Family. Leguminosae (Fabaceae)

Botanical name

Dalbergia oliveri Gamble

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

Rosewood Tamalan is listed in CITES Appendix II

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark red

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood greenish white to yellowish grey. Heartwood dark red or chocolate. Resinous reddish or dark brown deposits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.00
Monnin hardness ⁽¹⁾	9.3
Coefficient of volumetric shrinkage	-
Total tangential shrinkage (Ts):	6.0 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	2.0
Fibre saturation point	-
Thermal conductivity (λ)	0.32 W/(m.K)
Lower heating value	18,540 kJ/kg
Crushing strength ⁽¹⁾	84 MPa
Static bending strength ⁽¹⁾	210 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Half-quarter sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Machining and sanding dust may cause irritation. Marked dulling effect caused by resin.

Assembling

Nailing/screwing. Good but pre-boring necessary

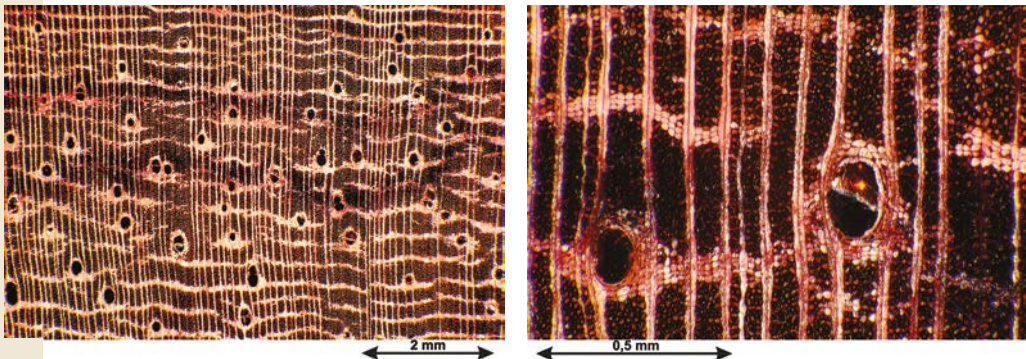
Notes. Very high specific gravity and high extract content. Gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Cross sections of *Dalbergia oliveri*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Percussion instruments
- Panelling
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Needs filling before polishing.

Common names

Country	Local name
Cambodia	Neang nuon
Myanmar	Tamalan
United Kingdom	Rosewood, Tamalan
Thailand	Ching chan

Safukala

Family. Burseraceae

Botanical names

Dacryodes heterotricha H.J. Lam

Dacryodes pubescens H.J. Lam (Syn. *Pachylobus pubescens*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 7 to 15 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Can be commercialized blended with Ozigo (*Dacryodes buettneri*). Wood pinkish white to light brown. Possible presence of wind shakes (internal fractures in wood).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.68
Monnin hardness ⁽¹⁾	5.2
Coefficient of volumetric shrinkage	0.49 % per %
Total tangential shrinkage (Ts):	7.9 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	1.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	17,120 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	112 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,090 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Difficulties in sawing and machining due to interlocked grain and silica content.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

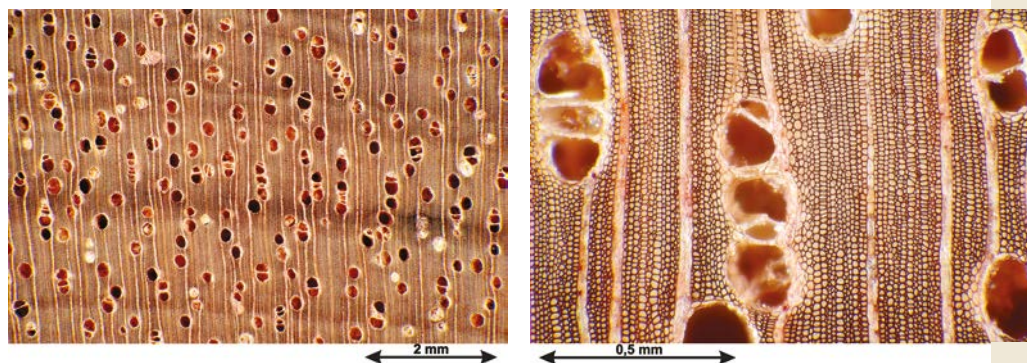
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Dacryodes pubescens*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Flooring

Common names

Country	Local name
Angola	Safoukala, Safucala,
Congo	Safoukala, Safucala
Gabon	Mouganga
Democratic Republic of Congo	Mouguengeri, Mouquenquéri, M'Bidinkala, N'safu-nkala

Sandé

Family. Moraceae

Botanical names

Brosimum potabile Ducke

Brosimum utile Oken

Brosimum p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Note Sandé refers to light coloured *Brosimum* species.

Log description

Diameter. 70 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Heartwood varies from greyish white to light brown with golden shades. Sometimes, presence of internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.69
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.59 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	5.8 %
T/R anisotropy ratio	1.4
Fibre saturation point	28 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	18,770 kJ/kg
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	95 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,380 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Prone to blue stain.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. Risk of distortion increases with highly interlocked grain. In this case, air drying is recommended.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Some difficulties with sawing and machining due to internal stresses (overheating of sawblades) and highly interlocked grain. Keep sharp tools.

Assembling

Nailing/screwing. Good

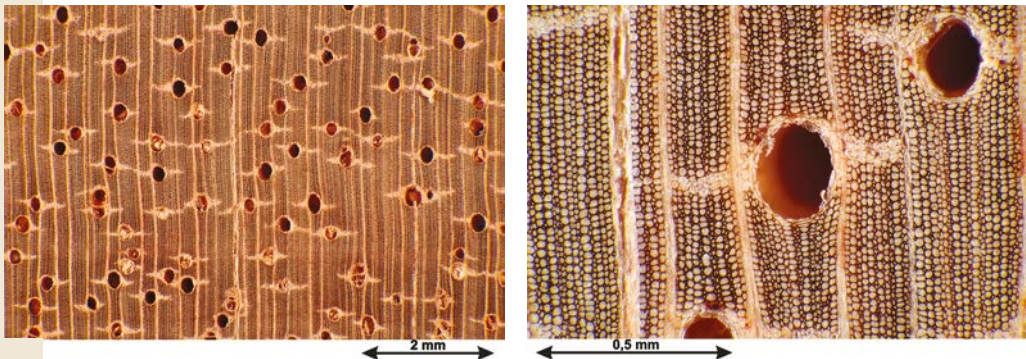
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Brosimum utile*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Fibre or particle boards
- Flooring
- Sliced veneer

Common names

Country	Local name
Brazil	Amapa, Amapa doce, Arbol vaca, Leiteira
Colombia	Arbol vaca, Guaimaro, Lechero, Sande
Costa Rica	Palo de vaca
Ecuador	Sande
France	Sandé
French Guiana	Dokali, Takina
Panama	Palo de vaca, Sandy
Peru	Panguana
United Kingdom	Cow tree
Venezuela	Marina, Sande, Vaca

Sapelli / Sapele*

* Common commercial name

Family. Meliaceae

Botanical name

Entandrophragma cylindricum Sprague

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 4 to 8 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Interlocked grain

Interlocked grain. Slight to very marked

Notes. Wood pinkish brown to copper red brown. Cedar scent. Possible presence of ring shakes and blister grains (longitudinal fissures in the shape of barley grain on the curved surface of round timber, generally concealed by the bark and linked to a dysfunction in tree growth).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.69
Monnin hardness ⁽¹⁾	4.2
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	7.2 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	1.4
Fibre saturation point	29 %
Thermal conductivity (λ)	0.23 W/(m.K)
Lower heating value	17,810 kJ/kg
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	102 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,960 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Drying of quartersawn products is much slower.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Prone to tearing in planing (interlocked grain).

Assembling

Nailing/screwing. Good

Notes. Can stain when gluing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

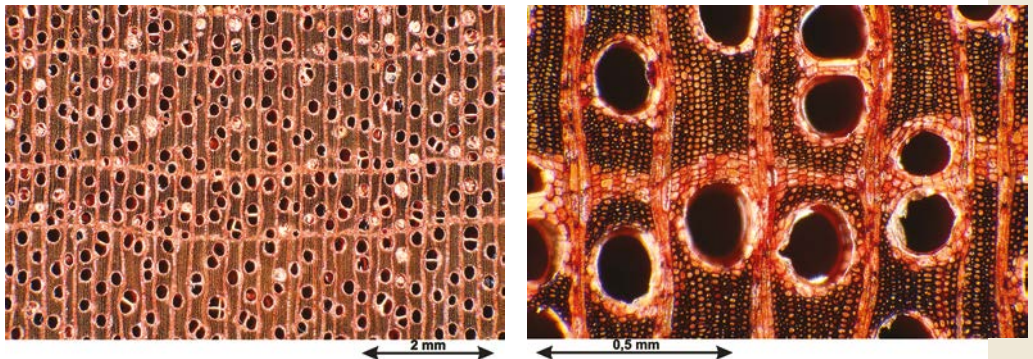
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Entandrophragma cylindricum*



- For the “Special Market” Possible grading for strips and small boards: choice I, choice II, choice III
- Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D40 can be provided by visual grading. Strength class D35 can be provided by visual grading according to French standard NF B 52-001-1 (2011).



Benches in Sapelli – Design by J.Y. Riaux, Mindourou (Cameroon).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Coffins
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer

Notes. Light and regular interlocked grain: appreciated for slicing. Highly interlocked grain: troublesome for some end-uses.

Common names

Country	Local name
Germany	Sapelli-mahogany
Angola	Undianuno
Cameroon	Assié, Assié-sapelli, Sapelli
Congo	Undianuno
Côte d'Ivoire	Aboudikro
Gabon	Undianuno
Ghana	Penkwa, Sapelewood
Nigeria	Sapele
Uganda	Muyovu
Central African Republic	M'boyo
Democratic Republic of Congo	Lifaki
United Kingdom	Sapele

Sapucaia

Family. Lecythidaceae

Botanical name

Lecythis p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Sapucaia groups *Lecythis* species together. Its properties can vary from one species to another.

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. 2 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.96
Monnin hardness ⁽¹⁾	8.4
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	9.8 %
Total radial shrinkage (Rs):	6.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	28 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	18,970 kJ/kg
Crushing strength ⁽¹⁾	71 MPa
Static bending strength ⁽¹⁾	137 MPa
Longitudinal modulus of elasticity ⁽¹⁾	20,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. Informations given in the «Natural durability» and «Preservation treatment» parts are relative to the *Lecythis*



Flat sawn

Quarter sawn



pisonis species. Some species of the same genus (such as *Lecythis idatimon* or *Lecythis persistens*) are sometimes marketed under the name of SAPUCAIA despite a weak durability (durability class 3 or 4).

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Must be dried slowly to prevent defects. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

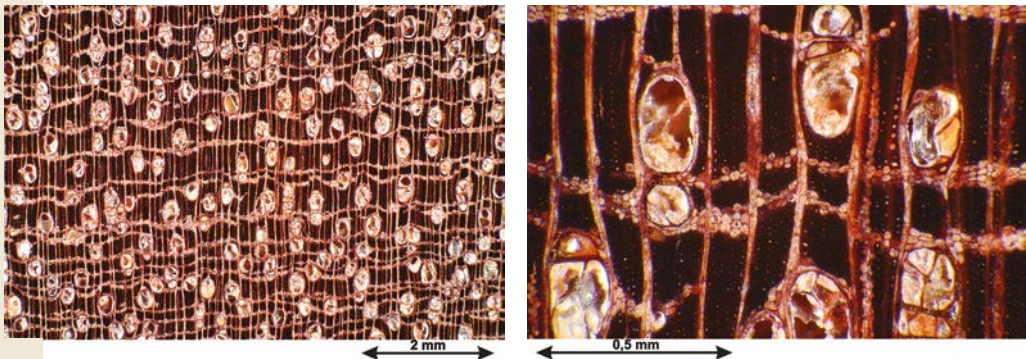
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Lecythis idatimon*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Shipbuilding
- Stairs (inside)
- Vehicle or container flooring
- Tool handles (resilient woods)
- Exterior joinery
- House framing
- Flooring
- Decking
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Brazil	Castanha sapucaia, Sapucaia, Sapucaia vermelha
Colombia	Coco cristal, Coco mono
Ecuador	Guabillo, Yunjua
Guyana	Monkey pot, Tobago, Wadaduri
French Guiana	Canari macaque, Kouatapatou, Maho jaune
Peru	Machin mango
Suriname	Kouatapatoe
Venezuela	Coco de mono, Olla de mono

Satin, Ceylon

Family. Rutaceae

Botanical name

Chloroxylon swietenia DC.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 60 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Not clearly demarcated

Texture. Fine

Grain. Undulating

Interlocked grain. Absent

Notes. Sapwood pale yellow. Heartwood golden yellow to greenish yellow when fresh, sometimes brownish, lustrous. Characteristic silver figure, long narrow rays in storied pattern, plain-sawn surfaces have fine cross-hatching.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.98
Monnin hardness ⁽¹⁾	9.2
Coefficient of volumetric shrinkage	0.33 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	5.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	32 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	59 MPa
Static bending strength ⁽¹⁾	125 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Flat sawn

Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Machining and sanding dust may cause irritation. Marked dulling effect caused by resin.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

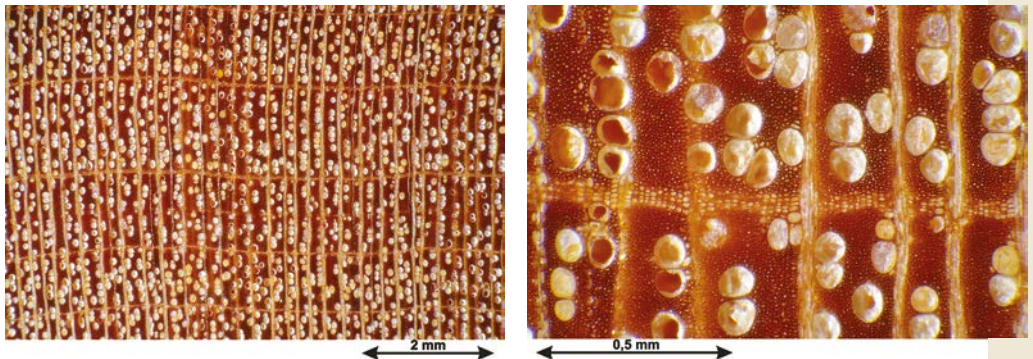
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Chloroxylon swietenia*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Panelling
- Interior joinery
- Moulding
- Flooring
- Sliced veneer
- Marquetry

Notes. Needs filling before polishing. Difficulties during finishing caused by resin. Very decorative appearance, popular in cabinetry.

Common names

Country	Local name
France	Citronnier ceylan
India	Ceylan, Satin, Satin ceylon
United Kingdom	Satin ceylon
Sri Lanka	Buruta, Satin wood

Scots Pine

Family. Pinaceae

Botanical name

Pinus sylvestris L.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. European species from temperate to very cold areas. In France, when using the name «Sapin rouge du Nord», one designates woods with a slow growth coming from Scandinavia and Russia (after latitude 57° north).

Log description

Diameter. 30 to 80 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Not applicable

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Clearly demarcated

Texture. Fine to medium.

Grain. Straight

Interlocked grain. Absent

Notes. From pinkish to reddish brown. Rings form contrasting veins. Sapwood has a wide span and is yellowish. Shows less contrasted veins. Texture is fine for slow growing trees.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	2.6
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	8.3 %
Total radial shrinkage (Rs):	5.2 %
T/R anisotropy ratio	1.6
Fibre saturation point	30 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	19,130 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	97 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible



Flat sawn

Half-quarter sawn



Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. Use class 3 only covers wood components without sapwood. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Notes. Sometimes resin exudations: to be taken into account when gluing.

Commercial grading

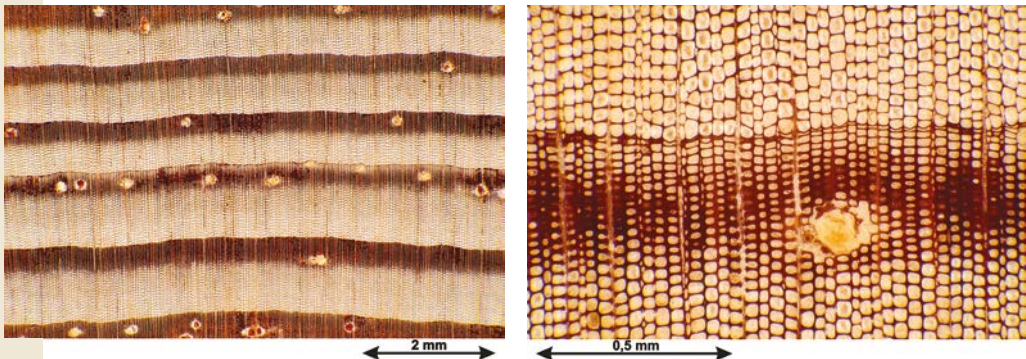
Sawn timber appearance grading

According to French standard NF EN 1611-1 (October 1999)

Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Cross sections of *Pinus sylvestris*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C14, C16, C22, C24, C27 and C30 can be provided by visual grading. However, strength classes C14, C18, C24 and C30, can be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Pit props
- Coffins
- Framing
- Heavy carpentry
- Boxes and crates
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Poles
- Exterior panelling

Common names

Country	Local name
Germany	Fohre, Kiefer
Spain	Lapland pine
France	Pin de riga, Pin du Nord, Pin Sylvestre
United Kingdom	Northern pine, Red pine

Bridge in Scots Pine, treated for use class 4 – Design by Bois et loisirs, Loon-Plage (France).



Sepetir

Family. Leguminosae (Caesalpiaceae)

Botanical names

Pseudosindora palustris Symington (Syn. *Copaifera palustris*)

Sindora leiocarpa Baker

Sindora siamensis Teijsm.

Sindora sumatrana Miq.

Sindora velutina Baker

Sindora p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 7 to 20 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood whitish grey to light brown or beige/pink. Heartwood light brown to golden brown depending on the species, darkens on exposure to light. Black stripes. Oily exudations. Pleasant scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	5.4
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	3.5 %
T/R anisotropy ratio	2.1
Fibre saturation point	26 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	82 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable



Flat sawn

Quarter sawn



Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Marked dulling effect caused by resin.

Assembling

Nailing/screwing. Good but pre-boring necessary

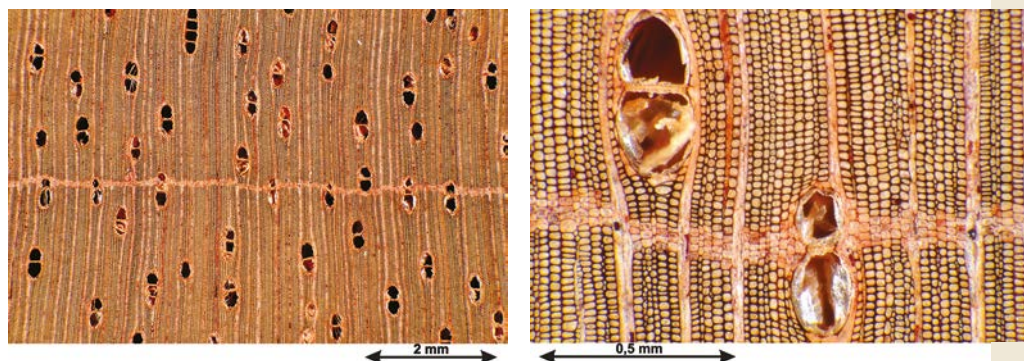
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Sindora leiocarpa*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cabinetry (high-end furniture)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Sliced veneer
- Decking
- Seats

Notes. Difficulties with finishing caused by oily exudations. Substitute for Walnut. Oils used to make pharmaceutical products.

Common names

Country	Local name
Cambodia	Krakas
Indonesia	Sindur
Malaysia	Meketil, Petir, Saputi, Sepeteh, Sepetir, Sepetir nin-yaki, Sepetir pay
Philippines	Supa
Thailand	Krathon, Maka-tea

Seraya, White

Family. Dipterocarpaceae

Botanical names

Parashorea malaanonan Merr.

Parashorea tomentella Meijer

Parashorea p.p.

Shorea contorta S. Vidal (Syn. *Pentacme contorta*)

Shorea subgen. *Pentacme* p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Note The common name White Seraya is usually used for Malaysian species, Bagtikan for species from the Philippines.

Log description

Diameter. 80 to 130 cm

Thickness of sapwood. 2 to 7 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish white

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Frequent ring shakes and brittleheart (in large diameter trees). Wood pinkish white to light yellow or light brown with pink shades. More or less frequent white lines (resin canals). Numerous medium size regular rays.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	2.8
Coefficient of volumetric shrinkage	0.54 % per %
Total tangential shrinkage (Ts):	8.5 %
Total radial shrinkage (Rs):	4.3 %
T/R anisotropy ratio	2.0
Fibre saturation point	28 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	18,620 kJ/kg
Crushing strength ⁽¹⁾	50 MPa
Static bending strength ⁽¹⁾	84 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,370 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable



Flat sawn



Quarter sawn

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. Durability low to moderate. Possible presence of black holes.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Risk of tearing. Prone to woolliness in edging. Keep sharp tools. Interlocked grain produces a broad stripe figure on quartersawn.

Assembling

Nailing/screwing. Good

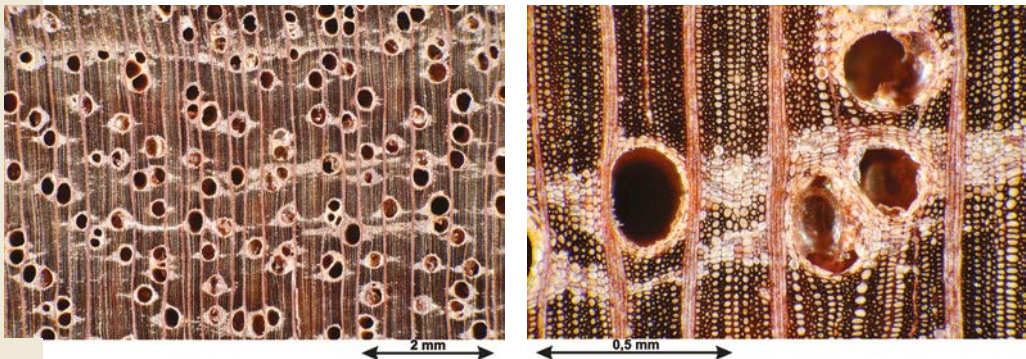
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Parashorea malaanonan*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Fibre or particle boards
- Sliced veneer

Notes. Filling is recommended to obtain a good finish.

Common names

Country	Local name
France	Seraya white
Indonesia	Pendan, Urat mata
Malaysia	Belutu, Urat mata, White seraya
Philippines	Bagtikan, Lauan malaanonan, White lauan

Sesendok

Family. Euphorbiaceae

Botanical names

Endospermum diadenum Airy Shaw

Endospermum medullosum L.S. Sm.

Endospermum peltatum Merr.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 65 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possible brittleheart. Presence of tension wood in some logs. Sometimes wavy grain. Lustrous surface.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	1.4
Coefficient of volumetric shrinkage	0.35 % per %
Total tangential shrinkage (Ts):	4.3 %
Total radial shrinkage (Rs):	2.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	40 MPa
Static bending strength ⁽¹⁾	60 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,280 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Half-quarter sawn



Quarter sawn

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #3 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. The presence of tension wood may cause overheating and blunting of saw blades. Risks of woolliness, keep sharp edges.

Assembling

Nailing/screwing. Poor

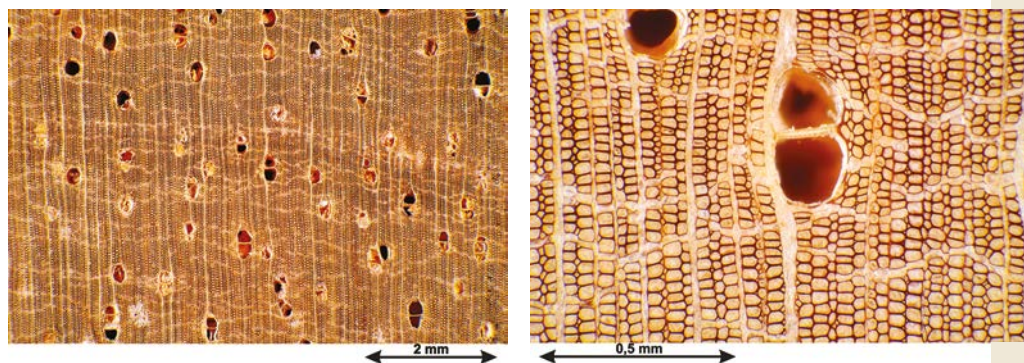
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Endospermum medullosum*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Turned goods
- Framing
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard

Notes. Can be used for shingles if treated.

Common names

Country	Local name
Fiji	Kauvula
Îles Salomon	Endospermum-sasa, Hongopo
India	Bakota
Indonesia	Sendok-sendok
Malaysia	Ekor, Sesendok, Sendok-sendok, Terbulan
Papua New Guinea	Basswood, New guinea basswood
Philippines	Gubas

Simpoh

Family. Dilleniaceae

Botanical names

Dillenia aurea Sm.

Dillenia excelsa Martelli

Dillenia eximia Miq.

Dillenia grandifolia Wall.

Dillenia indica L.

Dillenia ovata Wall.

Dillenia papuana Martelli

Dillenia p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 3 to 5 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood light yellowish brown to reddish brown. Heartwood reddish brown with a violet tinge, darkens to chocolate brown. Decorative silver figure on quartersawn faces. Silica deposits.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.71
Monnin hardness ⁽¹⁾	4.2
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	7.6 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.7
Fibre saturation point	27 %
Thermal conductivity (λ)	0.24 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	39 MPa
Static bending strength ⁽¹⁾	71 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,700 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²



Flat sawn

Quarter sawn



Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Important dulling effect due to high silica content.

Assembling

Nailing/screwing. Good but pre-boring necessary

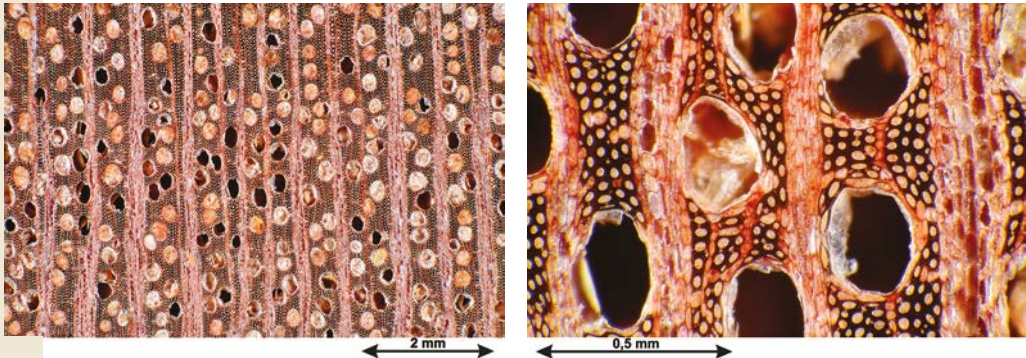
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Dillenia papuana*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Moulding
- Blockboard
- Flooring
- Sliced veneer

Notes. Filling is needed. Substitute for Cedro.

Common names

Country	Local name
Îles Salomon	Simpoh
Indonesia	Simpur jangkang
Malaysia	Simpoh
Myanmar	Zinbyun
Papua New Guinea	Dillenia



Flat sawn



Quarter sawn

Sipo / Utile*

* Common commercial name

Family. Meliaceae

Botanical name

Entandrophragma utile Sprague

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 120 cm

Thickness of sapwood. 2 to 6 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood pinkish brown to red brown slightly purplish with moiré shades. Ribbon-like aspect on quartersawn. Irregular grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	3.0
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.4 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.4
Fibre saturation point	30 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	18,290 kJ/kg
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	91 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,240 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from soft to fairly hard.

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. This species is listed in the NF EN 350 standard. The French standard NF P 23-305 (December 2014) indicates that this species covers the use class 3.2 for untreated heartwood.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Risk of distortion increases with highly interlocked grain, particularly during kiln drying.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Prone to tearing due to interlocked grain.

Assembling

Nailing/screwing. Good

Notes. Wood fairly acidic: tendency to stain with gluing.

Commercial grading

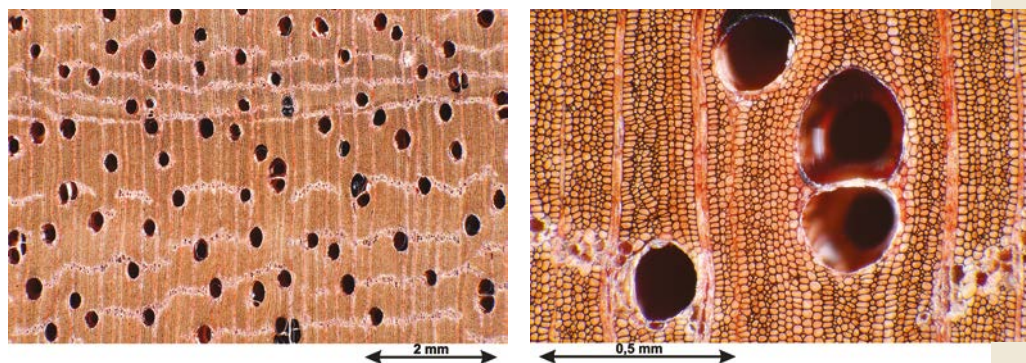
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Entandrophragma utile*



Possible grading for short-length lumbers: choice I, choice II
 Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III
 Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Semi-spiral, suspended staircase, Argelès-sur-Mer (France).

Main end uses

- Framing
- Cabinetry (high-end furniture)
- Open boats
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Sliced veneer
- Rolling shutters

Notes. Filling is recommended to obtain a better finish.

Common names

Country	Local name
Germany	Sipo-mahogany
Angola	Kalungi
Cameroon	Asseng-assié
Congo	Kalungi
Côte d'Ivoire	Sipo / Utile
Gabon	Assi
Ghana	Utile
Equatorial Guinea	Sipo / Utile
Nigeria	Utile
Uganda	Mufumbi
Central African Republic	Bokoi
Democratic Republic of Congo	Kalungi, Liboyo
United Kingdom	Utile

Sougué

Family. Chrysobalanaceae

Botanical names

Parinari excelsa Sabine (Syn. *Parinari holstii*) (Syn. *Parinari tenuifolia*)

Parinari p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight to entangled

Interlocked grain. Slight

Notes. Sapwood pale yellow. Heartwood pale red or chocolate brown. Sapwood has a scent of honey when freshly sawn, which disappears on seasoning. Silica deposits in ray cells.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.89
Monnin hardness ⁽¹⁾	6.6
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	10.1 %
Total radial shrinkage (Rs):	6.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	34 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	18,910 kJ/kg
Crushing strength ⁽¹⁾	74 MPa
Static bending strength ⁽¹⁾	135 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,340 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class D - durable

Treatability. Class 2 - moderately treatable.



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its hardness and high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

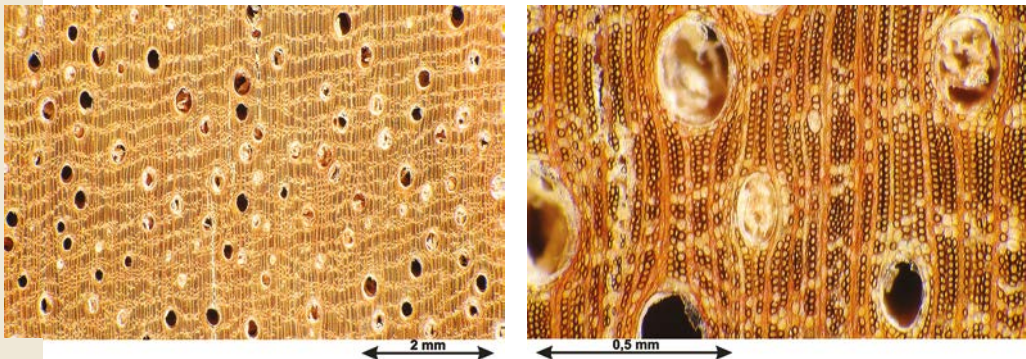
Notes. High silica content causes dulling of tool edges.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Parinari excelsa*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Formwork
- Shipbuilding
- Stairs (inside)
- Vehicle or container flooring
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Industrial or heavy flooring
- Hydraulic works (seawater)

Notes. This species naturally covers the use class 5 (end uses submerged in salt water, sea water or brackish water) but only class 2 for other uses.

Common names

Country	Local name
Cameroon	Assila
Côte d'Ivoire	Sougué
Liberia	Kpar
Nigeria	Eshago, Inyi
Uganda	Mubura
Senegal	Mampata
Tanzania	Mula

Spruce

Family. Pinaceae

Botanical names

Picea abies H. Karst. (Syn. *Picea excelsa*)

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Spruce comes from cold areas of Europe. Outside of its natural growing area (temperate areas), its growth is quicker when planted. Spruce is often erroneously referred to as 'Sapin'. 'Sapin blanc du Nord' is used to speak of Spruce coming from Scandinavia and Eastern Europe.

Log description

Diameter. 40 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. Creamy white wood with sometimes a thin reddish coloured heartwood. Narrow and regular rings on woods coming from cold areas but large and irregular rings on planted trees from other areas. Resin pockets are rather common.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.45
Monnin hardness ⁽¹⁾	2.2
Coefficient of volumetric shrinkage	0.39 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	2.1
Fibre saturation point	33 %
Thermal conductivity (λ)	0.16 W/(m.K)
Lower heating value	18,520 kJ/kg
Crushing strength ⁽¹⁾	46 MPa
Static bending strength ⁽¹⁾	78 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Mechanic properties are directly linked to growing rings' width and to the proportion of summer wood inside the rings. Visual grading of structure woods (EC marking) takes into account the growth speed of the woods.



Flat sawn



Quarter sawn

Natural durability and treatability

Resistance to decay. Class 4-5 – poorly durable to not durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Common spruce is poorly durable and is used with sapwood (not demarcated). Preservation treatment is therefore imperative.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. For naturally dried woods there can be some resin exudation if the structure is exposed to heat. Kiln drying of common spruce above 70° C prevents this problem.

Suggested drying schedule. Schedule #1 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Ordinary or alloy steel

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

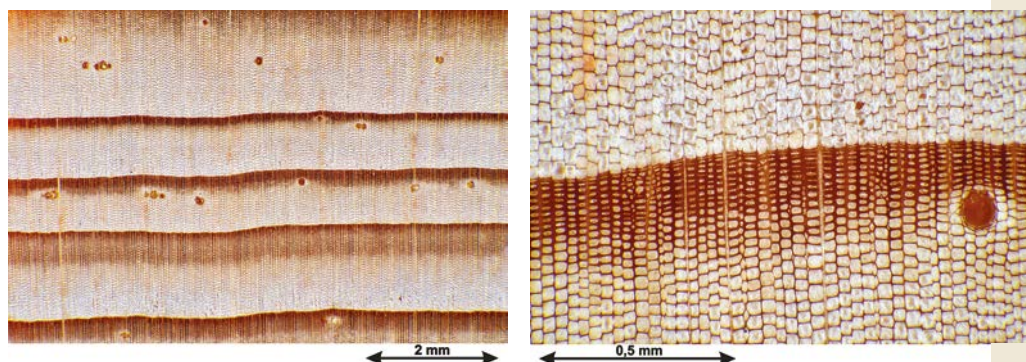
Notes. Presence of hard, more or less adhesive, knots.

Assembling

Nailing/screwing. Poor

Notes. Strong tendency to split when nailing. Risk of splitting when nailing.

Cross sections of *Picea abies*



Commercial grading

Sawn timber appearance grading

According to French standard NF EN 1611-1 (October 1999)

Possible grading (on 2 sides): G2-0, G2-1, G2-2, G2-3, G2-4

Possible grading (on 4 sides): G4-0, G4-1, G4-2, G4-3, G4-4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength classes C14, C16, C18, C24, and C30 can be provided by visual grading. Strength classes C18, C24 and C30 can be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 18 mm: M3 (moderately flammable)

Thickness < 18 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Coffins
- Framing
- Heavy carpentry
- Shipbuilding (mast)
- Boxes and crates
- Veneer for back or face of plywood
- Stringed instruments (sounding board)
- Panelling
- Glued Laminated
- Interior joinery
- Moulding
- House framing
- Fibre or particle boards
- Poles
- Pulp

Common names

Country	Local name
Germany	Fichte
France	Épicéa
Italy	Abete rosso
United Kingdom	Common spruce

Crocodylus niloticus (from the Musée de l'École nationale vétérinaire in Alfort, 1920) on a three-ply panel base in common spruce – CIRAD library, Montpellier (France).



Sucupira preta

Family. Leguminosae (Fabaceae)

Botanical names

Bowdichia nitida Benth.

Bowdichia virgilioides Kunth

Bowdichia p.p.

Diploptropis martiusii Benth.

Diploptropis purpurea Amshoff (Syn. *Bowdichia guianensis*)
(Syn. *Diploptropis guianensis*)

Diploptropis p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 60 cm

Thickness of sapwood. 1 to 2 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood dark brown to reddish brown with lighter thin veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	9.4
Coefficient of volumetric shrinkage	0.61 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	4.9 %
T/R anisotropy ratio	1.4
Fibre saturation point	24 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,490 kJ/kg
Crushing strength ⁽¹⁾	88 MPa
Static bending strength ⁽¹⁾	141 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,300 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2 - durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Flat sawn



Quarter sawn

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 3 - not in ground contact, outside

Notes. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Must be dried slowly to prevent defects. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

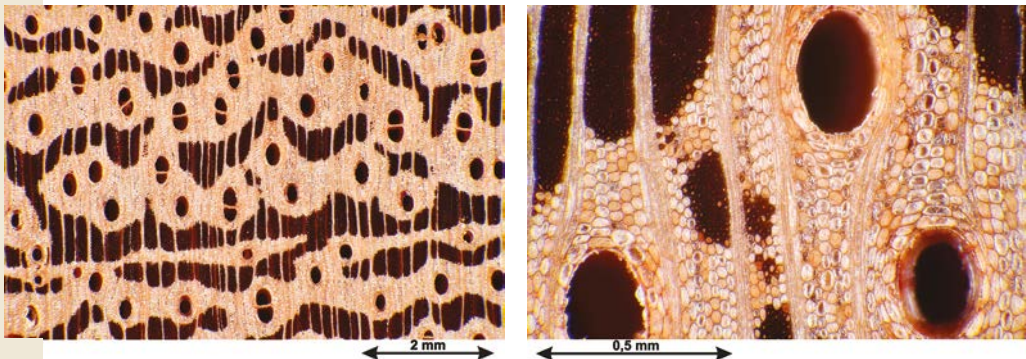
Notes. Sometimes difficulties with sawing and machining due to interlocked grain. Good finish with filling.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Diploptropis martiusii*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is Coeur dehors. Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4



“Simply” bench made of Coeur dehors – Design by Sous le Fromager, Kourou (French Guiana).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Marquetry

Notes. Wood in high demand for deluxe end uses.

Common names

Country	Local name
Brazil	Cutiuba, Macaniba, Sapupira, Sucupira, Sucupira amarela, Sucupira preta
Colombia	Arenillo, Zapan negro
Guyana	Tatabu
French Guiana	Baaka kiabici, Cœur dehors
Peru	Chontaquiro, Huasai-caspi
Suriname	Zwarte kabbes
Venezuela	Alcornoque, Congrio

Sumauma

Family. Malvaceae (Bombacaceae)

Botanical names

Ceiba pentandra Gaertn. (Syn. *Bombax pentandrum*) (Syn. *Ceiba thoningii*)

Ceiba samauma K. Schum.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The species *Ceiba pentandra* is found in Africa by the name of “Fuma” or “Fromager”.

Log description

Diameter. 70 to 180 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Logs must be treated, extracted, sawn and dried as soon as possible after felling. Wood cream white to light yellow, often with greyish veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.32
Monnin hardness ⁽¹⁾	0.8
Coefficient of volumetric shrinkage	0.36 % per %
Total tangential shrinkage (Ts):	6.3 %
Total radial shrinkage (Rs):	3.0 %
T/R anisotropy ratio	2.1
Fibre saturation point	34 %
Thermal conductivity (λ)	0.12 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	22 MPa
Static bending strength ⁽¹⁾	36 MPa
Longitudinal modulus of elasticity ⁽¹⁾	5,080 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible



Flat sawn



Quarter sawn

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. Use of this wood is not recommended

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A rather slow drying is recommended due to the important moisture content when green.

Suggested drying schedule. Schedule #2 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Fuzzy surface. Frequent sharpening recommended.

Assembling

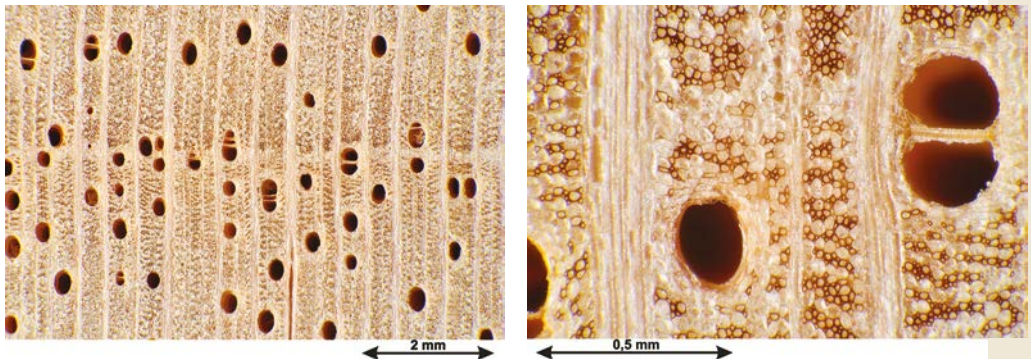
Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

NHLA grading rules are infrequently applied due to specific technological properties and uses of this species.

Cross sections of *Ceiba pentandra*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. Ungraded

Average density under 0.35.

Main end uses

- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Insulation
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Pulp

Common names

Country	Local name
Bolivia	Ceiba, Mapajo, Taborochi
Brazil	Paneira, Sumauma, Sumauna
Colombia	Bonga, Ceiba
Ecuador	Ceiba uchuputu, Guambush
Guyana	Kumaka, Silk cotton
French Guiana	Fromager, Mahot coton
Peru	Ceiba, Huimba
Suriname	Kankantrie, Koemaka
Venezuela	Ceiba, Ceiba yucca

Suren

Family. Meliaceae

Botanical names

Toona calantas Merr. & Rolfe

Toona ciliata M. Roem. (Syn. *Cedrela toona*)

Toona sureni Merr. (Syn. *Toona febrifuga*)

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 70 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood pink to grey/white yellowish. Heartwood brown/red, sometimes dark brown stripes. Visible growth rings. Resin exudations. Pleasant scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.50
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	6.3 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	23 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	45 MPa
Static bending strength ⁽¹⁾	75 MPa
Longitudinal modulus of elasticity ⁽¹⁾	8,400 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

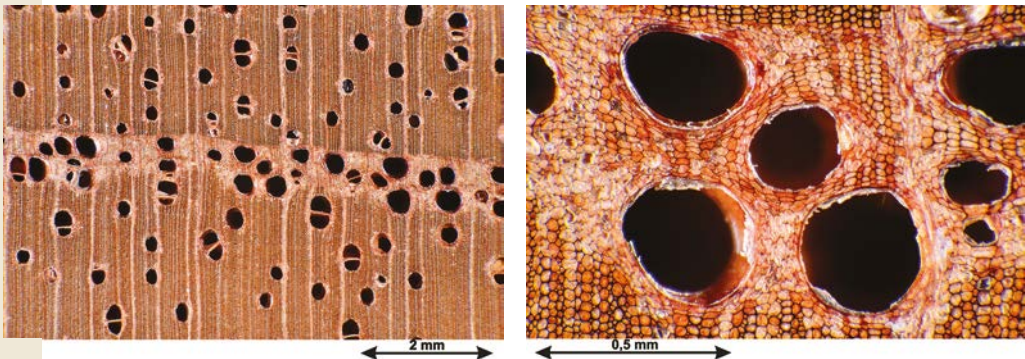
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Toona calantas*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Cigar boxes
- Shipbuilding
- Open boats
- Veneer for back or face of plywood
- Musical instruments
- Veneer for interior of plywood
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Sliced veneer

Notes. Needs filling before polishing.

Common names

Country	Local name
Australia	Red Cedar
Cambodia	Chomcha
India	Limpagna, Malarveppu, Mandurike Santhanavembu, Toon
Indonesia	Suren, Surian
Malaysia	Surea-bawang
Myanmar	Petsut yetama, Thitkado
Papua New Guinea	Red Cedar
Philippines	Calantas
Thailand	Toon, Yomham
Viet Nam	Xoan moc

Sycamore Maple

Family. Sapindaceae

Botanical name

Acer pseudoplatanus L.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Notes. This species from Western and Central Europe is present in France up to an altitude of approximately 1500 meters.

Log description

Diameter. 30 to 100 cm

Thickness of sapwood. Not applicable

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. White

Sapwood. Not demarcated

Texture. Fine

Grain. Straight

Interlocked grain. Absent

Notes. White wood with slight yellowish shades and sometimes veins or greenish stains. The silver figure is well visible. Woods with wavy grain (e.g. wavy sycamore) are very sought-after for string instrument making.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	4.7
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	7.8 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	27 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	17,400 kJ/kg
Crushing strength ⁽¹⁾	55 MPa
Static bending strength ⁽¹⁾	100 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

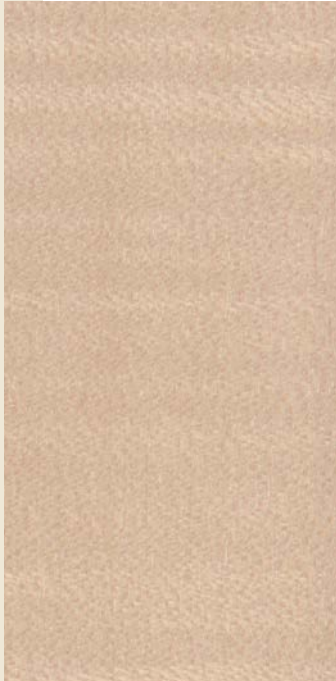
Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard. Only sapwood is sensitive to dry wood borer attacks but it is not separate. Wood is used with sapwood and hence must be treated.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Kiln drying may stain the wood. To minimise that effect, dry temperatures of 40-45°C must not be exceeded.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Tooth for sawing. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sawing and machining can be difficult due to the presence of irregular grain (wavy sycamore). In this case the feed rate and cutting angle should be reduced.

Assembling

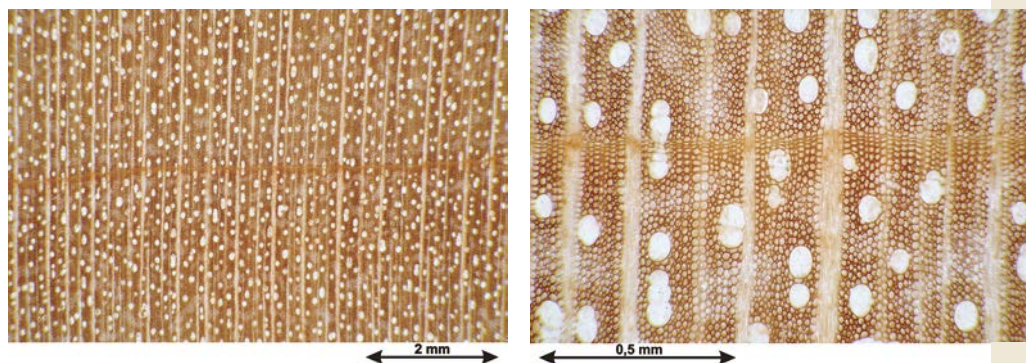
Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

No conventional grading rules. Sawn products are graded according to final uses.

Cross sections of *Acer pseudoplatanus*



Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D30 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Back and neck of violon, Montpellier (France).

Main end uses

- Arched goods
- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Stringed instruments (back and case)
- Interior joinery
- Flooring
- Sliced veneer
- Marquetry

Common names

Country	Local name
Germany	Bergahorn
Spain	Arce blanco
France	Érable blanc, Érable sycomore, Sycomore
Italy	Acero bianco, Sicomoro
United Kingdom	Great maple, Harewood, Sycamore

Tachi / Djedoe*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Tachigali albiflora Zarucchi & Herend.

Tachigali chrysophylla Zarucchi & Herend.

Tachigali myrmecophila Ducke

Tachigali paniculata Aubl.

Tachigali p.p. (Syn. *Sclerolobium* p.p.)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 100 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	3.5
Coefficient of volumetric shrinkage	0.51 % per %
Total tangential shrinkage (Ts):	8.2 %
Total radial shrinkage (Rs):	4.8 %
T/R anisotropy ratio	1.7
Fibre saturation point	26 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	18,940 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	105 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,100 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable



Half-quarter sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Kiln drying must be carried out with caution to prevent checks and internal checking.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Machining dust is very irritating.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Wood prone to splits.

Commercial grading

Sawn timber appearance grading

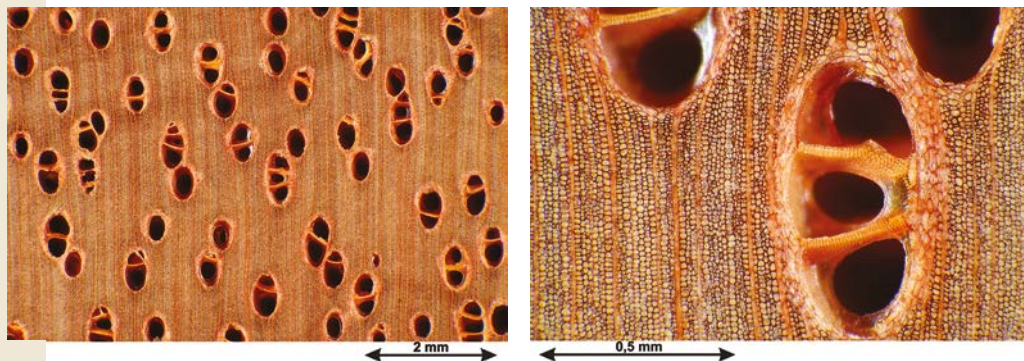
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Diaguidia". Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Cross sections of *Tachigali paniculata*



Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D35 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Boxes and crates
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Moulding

Common names

Country	Local name
Brazil	Aparaçu, Pacuare, Tachi, Tachigalia, Tachi preto
Ecuador	Guabillo, Matapalo
Guyana	Kaditiri, Djedoe
French Guiana	Cèdre remi, Diaguidia
Suriname	Djarkidja, Roode djedoe
Venezuela	Congrio, Guamillo



Flat sawn

Quarter sawn



Tali / Missanda*

* Common commercial name

Family. Leguminosae (Caesalpinieae)

Botanical names

Erythrophleum guineense G. Don

Erythrophleum ivorense A. Chev.

Erythrophleum suaveolens Brenan

Erythrophleum p.p.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 90 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood orangey yellow brown to reddish brown. Tali from East Africa is lighter in colour.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	9.2
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	8.4 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.6
Fibre saturation point	26 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	18,280 kJ/kg
Crushing strength ⁽¹⁾	79 MPa
Static bending strength ⁽¹⁾	128 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. Tali must be dried slowly to reduce defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Bad

Suitability for slicing. Not recommended or without interest

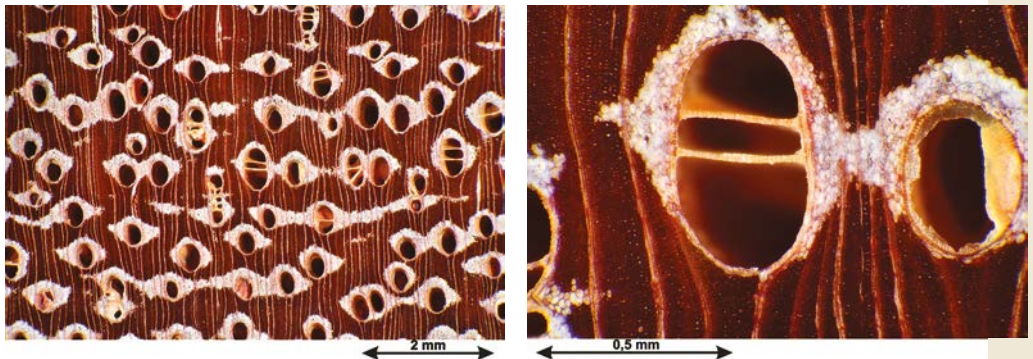
Notes. Sawing and machining requires powerful equipment. Some difficulties due to interlocked grain during planing.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Avoid direct contact with nails, screws and other iron fasteners due to risks of local chemical degradation of wood and iron, combined with blackish stains. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Erythrophleum ivorense*



Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the “General Purpose Market”

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), as well as French standard NF B 52-001-1 (2011), strength class D40 can be also provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Vehicle or container flooring
- Exterior joinery
- Industrial or heavy flooring
- Stakes
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Hydraulic works (fresh water)
- Sleepers

Common names

Country	Local name
Cameroon	Élone
Congo	N'kassa
Côte d'Ivoire	Alui, Tali
Gabon	Éloum
Ghana	Potrodom
Equatorial Guinea	Elondo
Guinea-Bissau	Mancone
Mozambique	Missanda
Nigeria	Erun, Sasswood
Democratic Republic of Congo	Kassa
United Kingdom	Missanda
Senegal	Tali / Missanda
Sierra Leone	Gogbei
Tanzania	Mwavi
Zambia	Muave



Posts in Tali (0.6 m in diameter, 8.5 m in length), door in Moabi, framework in Kosipo, vertical thin timber cladding in Mukulungu – J.Y. Riaux, Mindourou (Cameroon).

Tamboril

Family. Leguminosae (Mimosaceae)

Botanical names

Enterolobium contortisiliquum Morong

Enterolobium cyclocarpum Griseb.

Enterolobium maximum Ducke

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 3 to 6 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood light brown to brown. Possible presence of tension wood in *Enterolobium cyclocarpum*. Presence of tension wood in *Enterolobium cyclocarpum*.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.49
Monnin hardness ⁽¹⁾	2.1
Coefficient of volumetric shrinkage	0.35 % per %
Total tangential shrinkage (Ts):	4.5 %
Total radial shrinkage (Rs):	2.3 %
T/R anisotropy ratio	2.0
Fibre saturation point	24 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	40 MPa
Static bending strength ⁽¹⁾	63 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,650 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable



Flat sawn

Half-quarter sawn



Use class covered by natural durability Class 1 - inside (no risk of dampness)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sometimes fuzzy surface and irritant sawdust for the species *E. cyclocarpum*.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

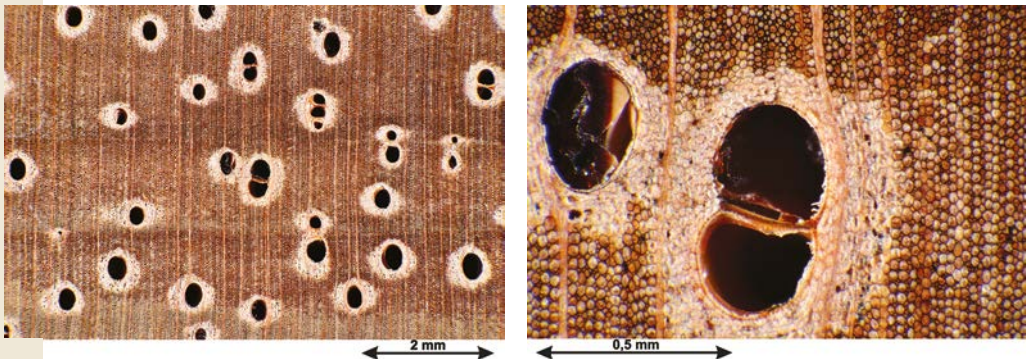
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Enterolobium contortisiliquum*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Framing
- Boxes and crates
- Open boats
- Veneer for back or face of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Blockboard
- Sliced veneer
- Exterior panelling

Common names

Country	Local name
Argentina	Camba-camby, Oreja de negro, Para, Timbo, Timbo colorado
Brazil	Timbauba, Timbauva, Timbo, Tamboril, Timbóuba
Colombia	Carito, Orejero
Paraguay	Timbo, Timbo colorado
Venezuela	Caro-caro



Flat sawn



Quarter sawn

Tanimbuca / Yellow Sanders*

* Common commercial name

Family. Combretaceae

Botanical names

Buchenavia p.p.

Terminalia amazonia Exell

Terminalia guyanensis Eichler

Terminalia oblonga Steud.

Terminalia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Light yellow to yellow brown wood. Sometimes, presence of reddish veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.93
Monnin hardness ⁽¹⁾	9.6
Coefficient of volumetric shrinkage	0.57 % per %
Total tangential shrinkage (Ts):	9.2 %
Total radial shrinkage (Rs):	5.9 %
T/R anisotropy ratio	1.6
Fibre saturation point	25 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	18,690 kJ/kg
Crushing strength ⁽¹⁾	77 MPa
Static bending strength ⁽¹⁾	151 MPa
Longitudinal modulus of elasticity ⁽¹⁾	22,380 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. The species *Buchenavia tetraphylla* (called Gindya udu in Surinam) is reported to have a higher natural durability than the other Tanimbuca species.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

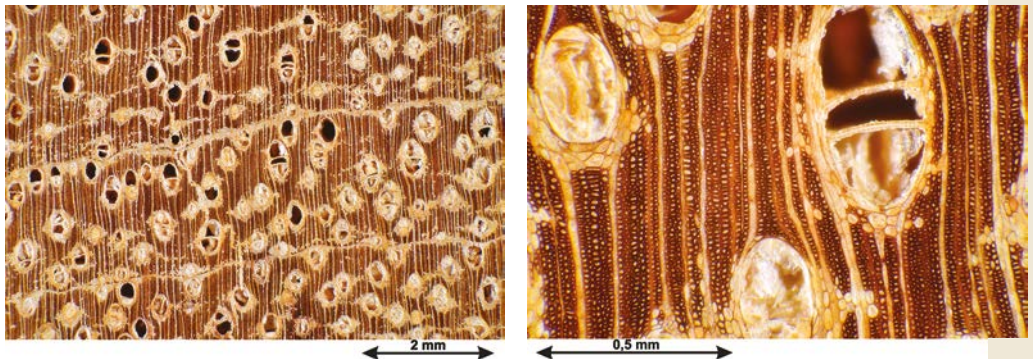
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Buchenavia fanshawei*



In French Guiana, the local name of this species is “Anangossi”. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Tool handles (resilient woods)
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Flooring
- Industrial or heavy flooring
- Sliced veneer

Common names

Country	Local name
Bolivia	Verdolago amarillo
Brazil	Carara, Cuiarana, Guarajuba, Jatai-amarello, Loirinho, Mirindiba, Pau mulato branco, Periquiteira, Tanimbuca, Timburita
Ecuador	Guayabillo, Guayabon, Yuyun
Guatemala	Naranjo, Volador
Guyana	Alasoabo, Coffee mortar, Cokerwood, Fukadi, Naharu, Simia chimi, Yellow sanders
French Guiana	Anangossi, Anangossiti, Angouchy
Honduras	Naranjo, Nargusta, Volador
Panama	Amarillo
Paraguay	Amarillo, Palo amarillo
Peru	Chamisa, Rifari, Yacushapana
Suriname	Boes'amandra, Bosamandel, Kalebashout
Uruguay	Guyabi amarillo
Venezuela	Chicharron, Guayabo, Pata de dando amarillo

Tasmanian Oak

Family. Myrtaceae

Botanical names

Eucalyptus delegatensis F. Muell. (Syn. *Eucalyptus gigantea*)

Eucalyptus obliqua L'Hér.

Eucalyptus regnans F. Muell.

Eucalyptus p.p.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. In spite of its pilot name, this species should not be confused with a real Oak.

Log description

Diameter. 50 to 100 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood pale rose. Heartwood light brown to pink brown depending on the species. Distinct growth rings. Sometimes latex veins (Kino).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	7.6
Coefficient of volumetric shrinkage	0.52 % per %
Total tangential shrinkage (Ts):	10.0 %
Total radial shrinkage (Rs):	5.0 %
T/R anisotropy ratio	2.0
Fibre saturation point	29 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	18,540 kJ/kg
Crushing strength ⁽¹⁾	70 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)



Half-quarter sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood requires preservation treatment for termites.

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

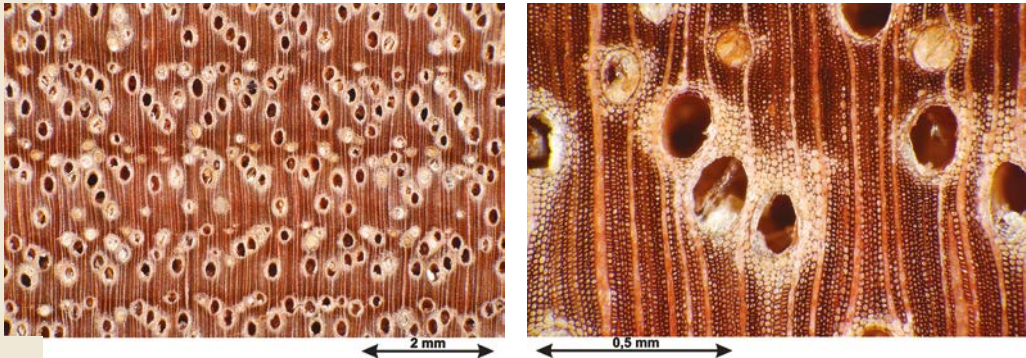
Commercial grading

Sawn timber appearance grading

According to MGR grading rules (2009)

Possible grading: Prime, Select, Standard, Sound, Serviceable, Utility

Cross sections of *Eucalyptus delegatensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Stairs (inside)
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Flooring
- Sliced veneer
- Seats
- Marquetry

Notes. Difficulties during finishing caused by resin or tannin exudations.

Common names

Country	Local name
Australia	Alpin ash, Blue leaf, Messmate, Mountain ash, Tasmanian oak, White gum

Tatajuba

Family. Moraceae

Botanical names

Bagassa guianensis Aubl. (Syn. *Bagassa tiliifolia*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. 2 to 4 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. When freshly cut, heartwood is yellow. It becomes yellow brown to dark brown with age.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	6.4
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	5.2 %
Total radial shrinkage (Rs):	3.7 %
T/R anisotropy ratio	1.4
Fibre saturation point	20 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,180 kJ/kg
Crushing strength ⁽¹⁾	78 MPa
Static bending strength ⁽¹⁾	109 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,490 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or



Flat sawn



Quarter sawn

regularly submerged in salt water, sea water or brackish water) due to its high silica content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. High risk of distortion in case of highly interlocked grain. During drying, spacer sticks may stain the wood.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawdust is an irritant. Presence of internal stresses.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

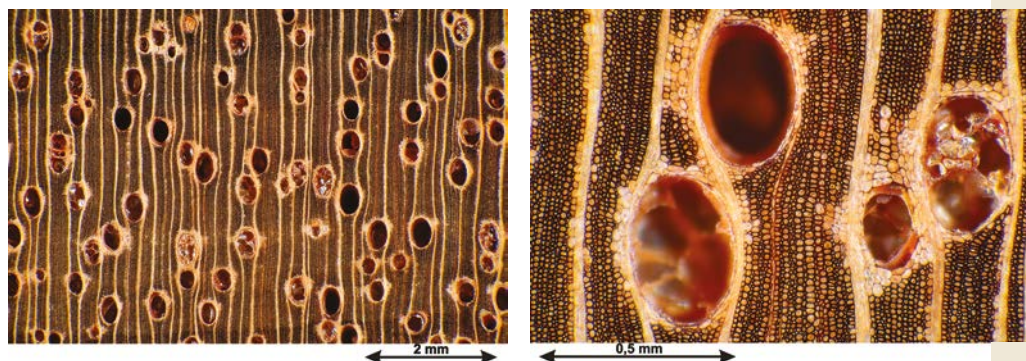
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Bagassa guianensis*



In French Guiana, the local name of this species is “Bagasse”. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1

(April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Wooden structure in Chemin des savanes in Bagasse – by Copeaux and Co, Sinnamary (French Guiana).

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Vehicle or container flooring
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Flooring
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Sleepers

Notes. Interlocked grain may be troublesome in the use of this wood.

Common names

Country	Local name
Brazil	Amarelao, Bagaceira, Tatajuba
Ecuador	Moral
Guyana	Cow-wood, Fustic
French Guiana	Bagasse, Bois jaune, Kaw oudou, Odoun, Tatajuba
Paraguay	Tatagva
United Kingdom	Bagasse
Suriname	Jawahedan, Kaw-oedoe
Venezuela	Mora amarillo

Tauari

Family. Lecythidaceae

Botanical names

Couratari guianensis Aubl.

Couratari macrosperma A.C. Sm.

Couratari multiflora Eyma (Syn. *Couratari fagifolia*)

Couratari oblongifolia Ducke & R. Knuth

Couratari p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Notes. The name Tauari covers several species of the genus *Couratari* whose properties and appearance can vary widely.

Log description

Diameter. 50 to 80 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Creamy white

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood cream white, pinkish white or yellowish grey white depending on the species. Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.62
Monnin hardness ⁽¹⁾	2.7
Coefficient of volumetric shrinkage	0.50 % per %
Total tangential shrinkage (Ts):	7.0 %
Total radial shrinkage (Rs):	4.5 %
T/R anisotropy ratio	1.6
Fibre saturation point	28 %
Thermal conductivity (λ)	0.21 W/(m.K)
Lower heating value	18,780 kJ/kg
Crushing strength ⁽¹⁾	48 MPa
Static bending strength ⁽¹⁾	87 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,500 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

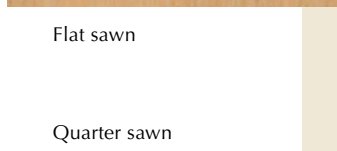
Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn



Resistance to termites. Class S - susceptible

Treatability. Class 1 – treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Several species, with different natural durability, are grouped under the name Tauari. Some species and origins could be used without preservation treatment for end-uses under use class 2. However, commercial lots are usually constituted by different species. Consequently, it is advisable to use the less durable woods as a point of reference.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. Must be dried as quickly as possible to prevent blue stain.

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

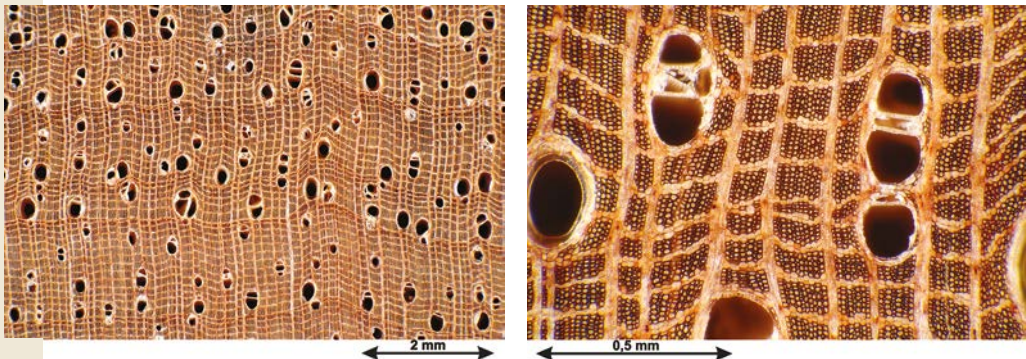
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Couratari multiflora*



In French Guiana, the local name of this species is Maho cigare. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Formwork
- Boxes and crates
- Stairs (inside)
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Flooring
- Sliced veneer
- Seats

Common names

Country	Local name
Brazil	Imbirema, Tauari
Guyana	Kakawalli, Wadara
French Guiana	Balata blanc, Couatari, Inguipipa, Maho cigare, Tabari
Suriname	Ingipipa
Venezuela	Capa de tabaco, Tampipio



Diamond carved front entrance door (sheltered), Teyran (France).



Flat sawn

Half-quarter sawn



Tchitola

Family. Leguminosae (Caesalpinieae)

Botanical names

Oxystigma oxyphyllum J. Léonard (Syn. *Pterygopodium oxyphyllum*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 6 to 10 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Heartwood copper red brown with blackish veins. Blackish resin exudations.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.64
Monnin hardness ⁽¹⁾	2.9
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	3.9 %
T/R anisotropy ratio	1.9
Fibre saturation point	28 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	19,830 kJ/kg
Crushing strength ⁽¹⁾	58 MPa
Static bending strength ⁽¹⁾	88 MPa
Longitudinal modulus of elasticity ⁽¹⁾	14,960 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class - 3-4 - poorly or not permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Resin tends to clog tools. Sawdust is an irritant.

Assembling

Nailing/screwing. Good

Notes. Resin exudations: to be taken into account when gluing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

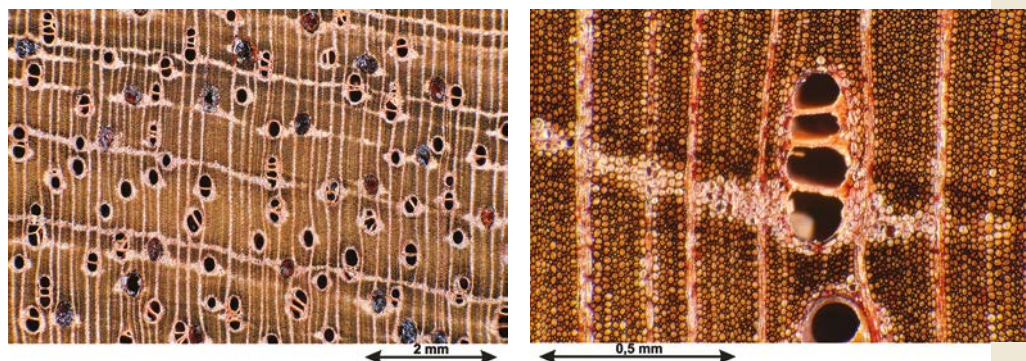
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Oxystigma oxyphyllum*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Exterior panelling

Notes. Due to resin exudations, objects made out of Tchitola are often painted. When the wood has little resin, it can be used as a substitute for Walnut.

Common names

Country	Local name
Angola	Tola chinfuta
Cameroon	Nom sinedon
Congo	Kitola, Tchitola
Gabon	Émola, M'babou
Nigeria	Lolagbola
Democratic Republic of Congo	Akwakwa, Tshibudimbu

Teak

Family. Lamiaceae (Verbenaceae)

Botanical name

Tectona grandis L. f.

Continent. Africa, Latin America, Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Native to South-East Asia, this species has been widely planted throughout the tropical and subtropical world.

Log description

Diameter. 25 to 100 cm

Thickness of sapwood. 2 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. The wood darkens and presents golden glints with age. Sometimes black brown veins. Oily to the touch.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.67
Monnin hardness ⁽¹⁾	4.2
Coefficient of volumetric shrinkage	0.34 % per %
Total tangential shrinkage (Ts):	4.7 %
Total radial shrinkage (Rs):	2.6 %
T/R anisotropy ratio	1.8
Fibre saturation point	24 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	19,270 kJ/kg
Crushing strength ⁽¹⁾	56 MPa
Static bending strength ⁽¹⁾	98 MPa
Longitudinal modulus of elasticity ⁽¹⁾	13,740 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. The properties of timbers grown in plantation or in naturel forest are often similar, except for durability.

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 4 – non-treatable



Flat sawn

Half-quarter sawn



Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. The durability of Teak wood from plantation is much lower than that of Teak from natural forest. It is moderately resistant to fungi and classified as sensible to durable against termites. This species is listed in the standard NF EN 350 which makes a difference between Teak from Asia (meaning natural forest) and Teak planted in Asia and other countries; the first one is classified in the natural durability class 1 towards fungi and in natural durability class M towards termites; the second is in the natural durability class 1-3 towards fungi and in natural durability class M-S towards termites. The use class mentioned corresponds to Teak from natural forest. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high silica content.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Notes. The drying rate may vary from one board to another due to the variation of specific gravity and the important differences of moisture content when green.

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

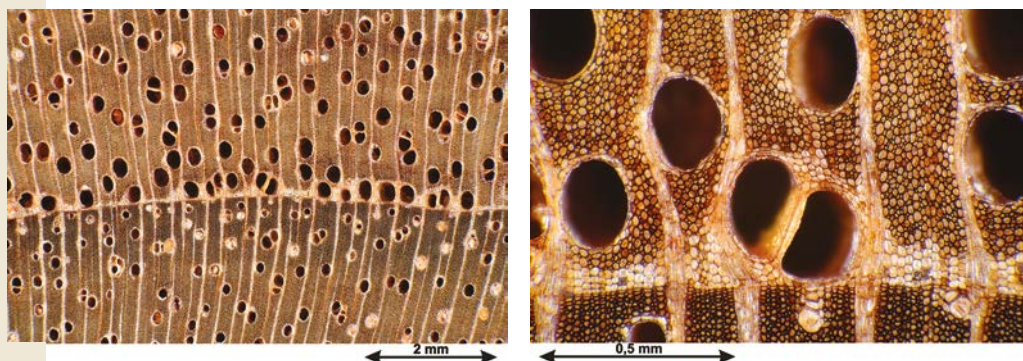
Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Silica content is variable. Sawdust is an irritant.

Cross sections of *Tectona grandis*



Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Pre-boring recommended due to a slight tendency to split when nailing. Satisfactory gluing on surfaces freshly machined or sanded just before application of the adhesive (the wood contains oleoresins).

Commercial grading

Sawn timber appearance grading

Grading depending on origin of woods and final uses. Grading rules for Teak from Myanmar depend on quality and geometric criteria for logs, sawn products and veneers. Four grades of log are defined for sliced veneers and six grades for sawn products (from SG1 to SG6 according to the number of defects).

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note), strength class D40 can be provided by visual grading. Strength class D30 can also be provided by visual grading according to French standard NF B 52-001-1 (2011).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Open boats
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Flooring
- Stakes
- Sliced veneer
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Cooperage
- Rolling shutters

Common names

Country	Local name
Germany	Java teak, Teak
Brazil	Teca
Costa Rica	Teca
Spain	Teca
France	Teck
India	Sagwan, Teak, Tega, Tekka, Thekku, Tekku maram
Indonesia	Jati, Tek

Country	Local name
Italy	Teck
Laos	May sak
Myanmar	Kyun
Panama	Teca
Netherlands	Teak
United Kingdom	Teak
Thailand	May sak, Teak
Viet Nam	Giati



Flat sawn

Quarter sawn



Tento

Family. Leguminosae (Fabaceae)

Botanical names

Ormosia coccinea Jacks.

Ormosia coutinhoi Ducke

Ormosia excelsa Benth.

Ormosia paraensis Ducke

Ormosia p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 3 to 15 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Marked but not frequent

Notes. Heartwood yellow brown to red brown with fine, light brown veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.77
Monnin hardness ⁽¹⁾	5.6
Coefficient of volumetric shrinkage	0.63 % per %
Total tangential shrinkage (Ts):	8.1 %
Total radial shrinkage (Rs):	4.4 %
T/R anisotropy ratio	1.8
Fibre saturation point	24 %
Thermal conductivity (λ)	0.25 W/(m.K)
Lower heating value	18,890 kJ/kg
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	125 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,940 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hardness varies from fairly hard to hard.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 2 - moderately treatable.

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Sometimes difficulties with sawing and machining due to interlocked grain. Surfaces are slightly fuzzy.

Assembling

Nailing/screwing. Good

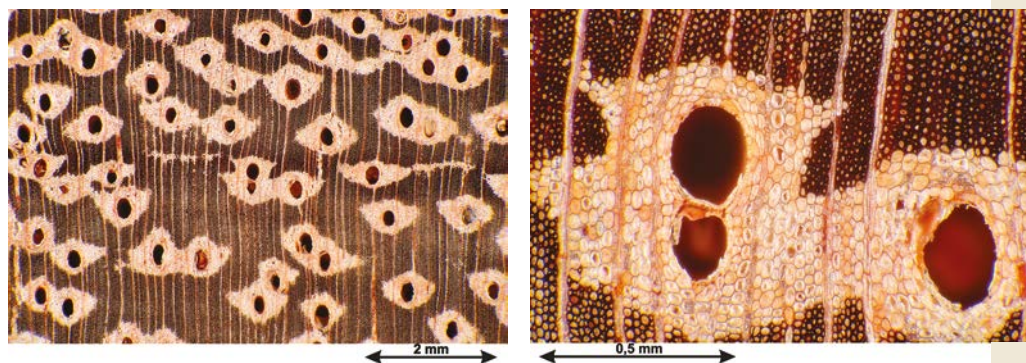
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Ormosia coccinea*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling

Notes. Light species can be used for peeling.

Common names

Country	Local name
Antilles	Caconnier rouge
Brazil	Buiucu, Tendo
Colombia	Chocho, Choco
Guyana	Barakaro
French Guiana	Agui, Banya, Wamara
Peru	Huaryoro
Puerto Rico	Palo de matos
Suriname	Kokriki
Venezuela	Peonia

Tiama / Gedu Nohor*

* Common commercial name

Family. Meliaceae

Botanical names

Entandrophragma angolense C. DC.

Entandrophragma congoense A. Chev.

Entandrophragma excelsum Sprague

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 120 cm

Thickness of sapwood. 6 to 10 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Marked

Notes. Wood red brown to dark brown with gold shades.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.55
Monnin hardness ⁽¹⁾	2.2
Coefficient of volumetric shrinkage	0.41 % per %
Total tangential shrinkage (Ts):	8.0 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.7
Fibre saturation point	32 %
Thermal conductivity (λ)	0.19 W/(m.K)
Lower heating value	18,650 kJ/kg
Crushing strength ⁽¹⁾	47 MPa
Static bending strength ⁽¹⁾	80 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,980 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class S - susceptible

Treatability. Class 4 – non-treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. In planing, if the grain is highly interlocked, a 15° cutting angle is necessary to avoid tearing.

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

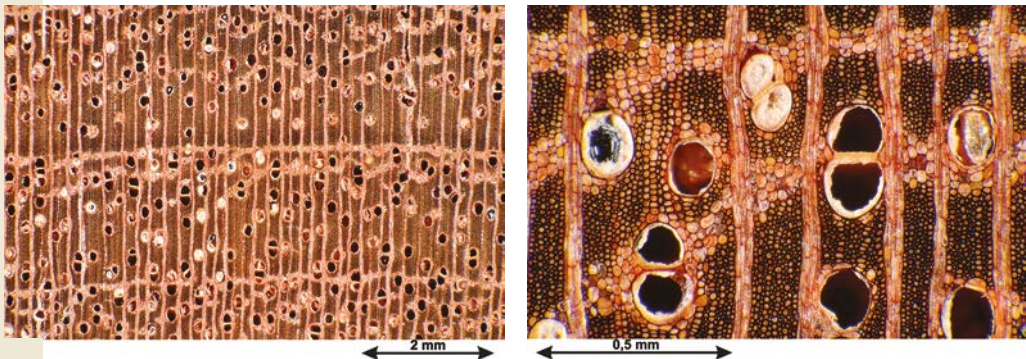
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Entandrophragma angolense*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Framing
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Veneer for back or face of plywood
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling

Common names

Country	Local name
Germany	Acuminata, Tiama mahogani
Angola	Acuminata, Livuite
Cameroon	Abeba, Abéba
Congo	Kilula
Côte d'Ivoire	Tiama
Gabon	Abeubègne, Abeubègne
Ghana	Edinam
Equatorial Guinea	Dongomanguila
Nigeria	Gedu nohor
Uganda	Mukusu
Central African Republic	Kanga
Democratic Republic of Congo	Lifaki, Vovo
United Kingdom	Gedu nohor



Office wardrobe, CIRAD, Montpellier (France).

Timborana

Family. Leguminosae (Mimosaceae)

Botanical names

Pseudopiptadenia suaveolens J.W. Grimes
(Syn. *Newtonia suaveolens*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 100 cm

Thickness of sapwood. 3 to 8 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Marked

Notes. Wood pinkish brown to red brown or light brown, sometimes with darker, thin veins. Sometimes wavy grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.80
Monnin hardness ⁽¹⁾	7.8
Coefficient of volumetric shrinkage	0.47 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	4.6 %
T/R anisotropy ratio	1.5
Fibre saturation point	23 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	19,430 kJ/kg
Crushing strength ⁽¹⁾	71 MPa
Static bending strength ⁽¹⁾	122 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,120 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. Yes

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

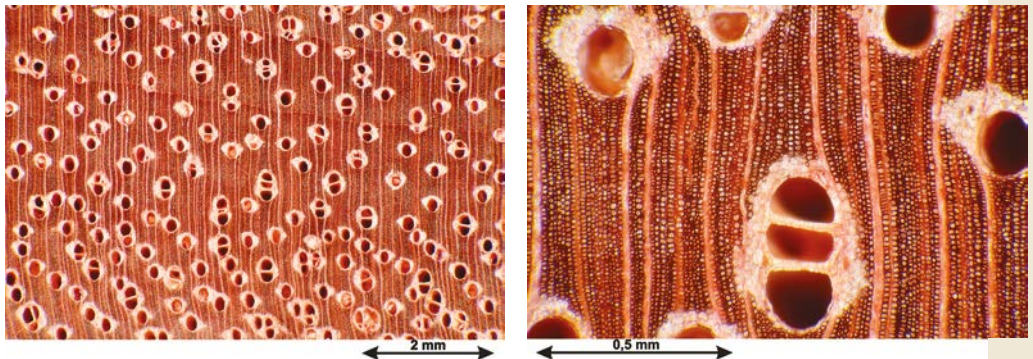
In French Guiana, the local name of this species is «Alimiao». Grading is done according to local rules «Bois guyanais classés" (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to European standard EN 1912 (2012) and associated national standards (see explanatory note) and French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading to Timborana in French Guiana (Alimiao).

Cross sections of *Pseudoptadenia suaveolens*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Deck components – Ebata Produtos Florestais Ltda, Bélem (Pará, Brazil).

Main end uses

- Turned goods
- Heavy carpentry
- Formwork
- Boxes and crates
- Vehicle or container flooring
- Musical instruments
- Interior joinery
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring

Common names

Country	Local name
Brazil	Angico, Angico preto, Angico vermelho, Caovi, Cobi, Fava folha fina, Fava de folha miuda, Parica, Parica branco, Pau-jacare, Timbauba, Timborana
Colombia	Golondrino
Ecuador	Masenkuanim
Guyana	Manari balli
French Guiana	Alimiao, Pikimissiki
Suriname	Pikin-misiki
Venezuela	Yiguire

Tola / Agba*

* Common commercial name

Family. Leguminosae (Caesalpinaceae)

Botanical names

Prioria balsamifera Breteler (Syn. *Gossweilerodendron balsamiferum*)

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 110 cm

Thickness of sapwood. 5 to 10 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Possibility of ring shakes or wind shakes in logs. Wood yellow brown to light brown. Resin exudations. Light peppery scent.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	2.3
Coefficient of volumetric shrinkage	0.33 % per %
Total tangential shrinkage (Ts):	5.4 %
Total radial shrinkage (Rs):	2.4 %
T/R anisotropy ratio	2.3
Fibre saturation point	27 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	19,260 kJ/kg
Crushing strength ⁽¹⁾	40 MPa
Static bending strength ⁽¹⁾	74 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,920 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 2-3 - durable to moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable



Flat sawn



Quarter sawn

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid to normal

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Resin tends to clog tools. Sawdust sometimes irritant.

Assembling

Nailing/screwing. Good

Notes. Wood fairly acidic: tendency to stain with gluing.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

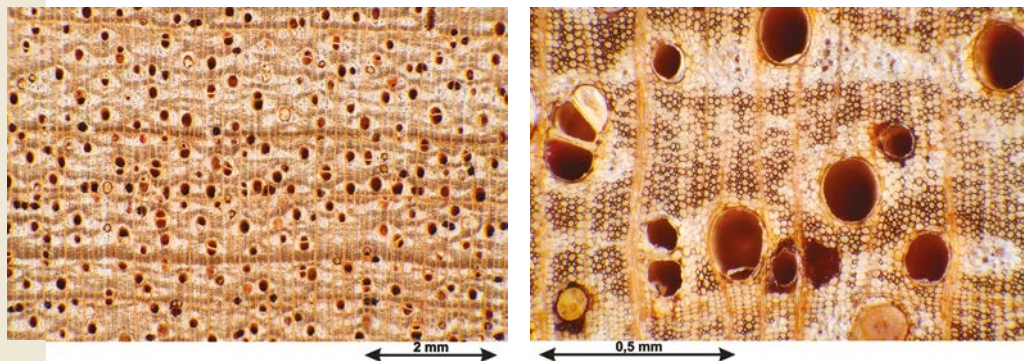
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Priora balsamifera*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Framing
- Formwork
- Ship building (planking and deck)
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Sliced veneer
- Exterior panelling
- Rolling shutters

Common names

Country	Local name
Germany	Agba, Tola branca
Angola	Tola branca
Cameroon	Sinedon
Congo	N'tola, Tola, Tola blanc
Gabon	Agba, Émolo
Nigeria	Agba
Democratic Republic of Congo	N'tola, Tola
United Kingdom	Agba



Vertical enclosure on a low wall without a guard rail, Teyran (France).



Flat sawn



Quarter sawn

Tornillo

Family. Leguminosae (Mimosaceae)

Botanical name

Cedrelinga cateniformis Ducke

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 70 to 120 cm

Thickness of sapwood. 5 to 8 cm

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not clearly demarcated

Texture. Coarse

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Wood light brown with pink or orangey glints. Sometimes oblique grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.51
Monnin hardness ⁽¹⁾	2.0
Coefficient of volumetric shrinkage	0.46 % per %
Total tangential shrinkage (Ts):	6.9 %
Total radial shrinkage (Rs):	3.8 %
T/R anisotropy ratio	1.8
Fibre saturation point	29 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	19,080 kJ/kg
Crushing strength ⁽¹⁾	38 MPa
Static bending strength ⁽¹⁾	70 MPa
Longitudinal modulus of elasticity ⁽¹⁾	10,900 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Properties vary depending on origin.

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 2-3 - poorly to moderately permeable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Rapid

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Not recommended or without interest

Notes. Fuzzy surface. Sawdust is an irritant. Filing is recommended to obtain a better finish.

Assembling

Nailing/screwing. Poor

Notes. Nail holding variable according to density.

Commercial grading

Sawn timber appearance grading

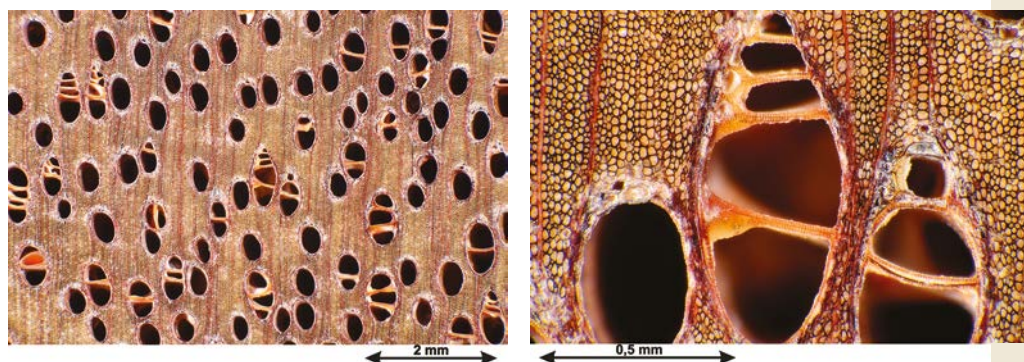
According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D18 can be provided by visual grading.

Cross sections of *Cedrelinga cateniformis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Kitchen storage element, Montpellier (France).

Main end uses

- Turned goods
- Formwork
- Boxes and crates
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- House framing
- Blockboard
- Fibre or particle boards
- Pulp
- Exterior panelling

Common names

Country	Local name
Brazil	Cedrorana
Colombia	Achapo, Cedrorana
Ecuador	Chuncho, Seique, Seiqui, Tsaik
French Guiana	Don cede
Peru	Cedro tornillo, Huayra caspi, Tornillo

Uchy

Family. Humiriaceae

Botanical name

Sacoglottis p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 6 to 20 cm

Buoyancy. Does not float

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Pinkish brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Sapwood light reddish brown. Heartwood reddish brown.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.96
Monnin hardness ⁽¹⁾	6.7
Coefficient of volumetric shrinkage	0.60 % per %
Total tangential shrinkage (Ts):	10.6 %
Total radial shrinkage (Rs):	6.4 %
T/R anisotropy ratio	1.7
Fibre saturation point	29 %
Thermal conductivity (λ)	0.31 W/(m.K)
Lower heating value	19,750 kJ/kg
Crushing strength ⁽¹⁾	87 MPa
Static bending strength ⁽¹⁾	177 MPa
Longitudinal modulus of elasticity ⁽¹⁾	25,550 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3-4 – moderately to poorly durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)



Flat sawn



Quarter sawn

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. This wood requires appropriate preservation treatment

Drying

Drying rate. Normal

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. Prone to warp and cup.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Very high specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

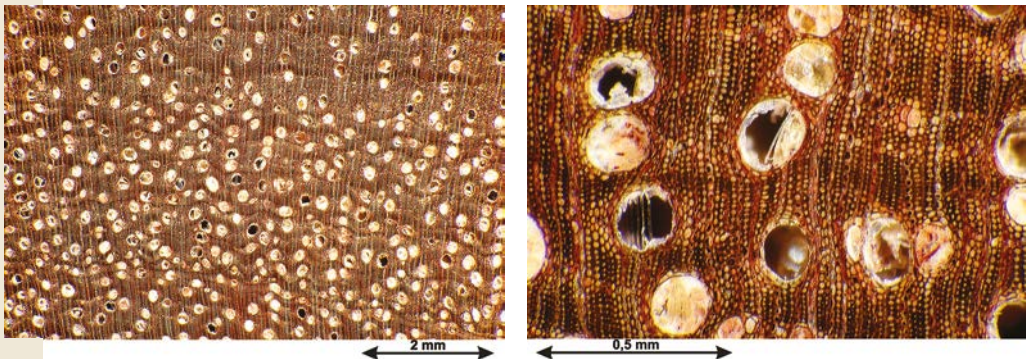
Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Cross sections of *Sacoglottis guianensis*



Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Framing
- Heavy carpentry
- Shipbuilding
- Stairs (inside)
- Vehicle or container flooring
- House framing
- Flooring
- Industrial or heavy flooring
- Sculpture

Common names

Country	Local name
Brazil	Uchi, Uchy
Guyana	Dukuria, Huriki, Sand dukuria
Suriname	Bofroe-oedoe
Venezuela	Ponsigue montanero

Vêne

Family. Leguminosae (Fabaceae)

Botanical name

Pterocarpus erinaceus Poir.

Continent. Africa

CITES (Washington Convention of 2017)

Vêne is listed in CITES Appendix II

Notes. Vêne is found in Sudano-Guinean dry forests.

Log description

Diameter. 30 to 60 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Yellow brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Bark is marked with red streaks and exudes reddish resin. Heartwood brown yellowish with purple-brown stripes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.89
Monnin hardness ⁽¹⁾	9.5
Coefficient of volumetric shrinkage	0.34 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	3.2 %
T/R anisotropy ratio	1.8
Fibre saturation point	21 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,940 kJ/kg
Crushing strength ⁽¹⁾	76 MPa
Static bending strength ⁽¹⁾	130 MPa
Longitudinal modulus of elasticity ⁽¹⁾	15,670 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Quarter sawn



Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. No known specific risk

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity and extracts: gluing must be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

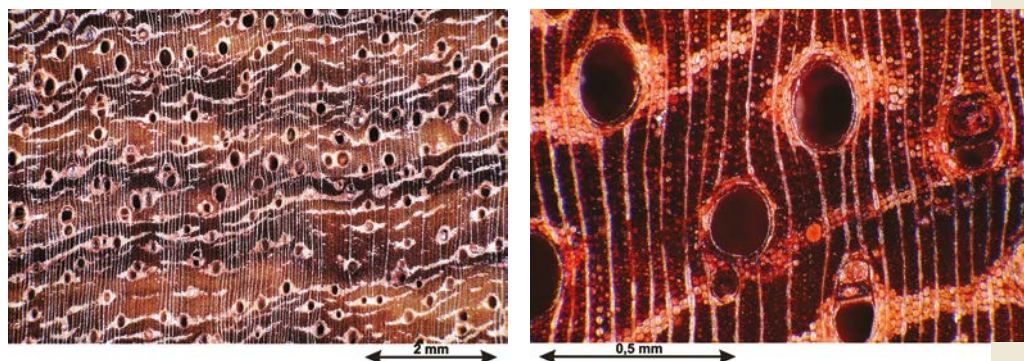
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Pterocarpus erinaceus*



- For the “Special Market”
Possible grading for strips and small boards: choice I, choice II, choice III
Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Shipbuilding (ribs)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Interior joinery
- Flooring
- Sliced veneer
- Sculpture
- Seats

Common names

Country	Local name
Burkina Faso	Goni, Guenin
Guinea	Ven
Equatorial Guinea	Pau sangue
Guinea-Bissau	Pau sangue
Mali	Goni, Ven, Vène
Nigeria	Vene, Kosso
Senegal	Ven, Vène



Traditional statues, Lomé (Togo).

Vésámbata

Family. Phyllanthaceae (Euphorbiaceae)

Botanical name

Oldfieldia africana Benth. & Hook. f.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 80 to 100 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight to entangled

Interlocked grain. Absent

Notes. Sapwood pale red. Heartwood red-brown with frequent purplish tinge.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.91
Monnin hardness ⁽¹⁾	8.1
Coefficient of volumetric shrinkage	0.53 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.7
Fibre saturation point	28 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	77 MPa
Static bending strength ⁽¹⁾	138 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,000 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or



Flat sawn



Quarter sawn

brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

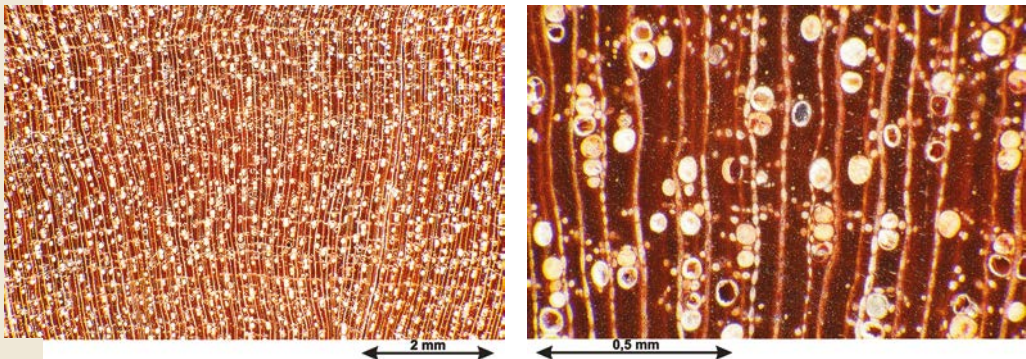
- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

Cross sections of *Oldfieldia africana*



- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Arched goods
- Turned goods
- Ship building (planking and deck)
- Stairs (inside)
- Stringed instruments (bows)
- Exterior joinery
- Interior joinery
- Flooring
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Hydraulic works (seawater)
- Sleepers

Notes. To be used more widely due to very good technological properties.

Common names

Country	Local name
Congo	Vésámbata
Côte d'Ivoire	Dantoué
Liberia	Kpaoli, Pauli
Sierra Leone	Kpaoli, Pauli, Turtosa

Virola / Dalli*

* Common commercial name

Family. Myristicaceae

Botanical names

Otoba p.p. (Syn. *Dialyanthera* p.p.)

Virola michelii Heckel

Virola multicostata Ducke

Virola surinamensis Warb.

Virola p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 50 to 90 cm

Thickness of sapwood. Not applicable

Buoyancy. Floats

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Light brown

Sapwood. Not demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Logs must be sawn, stored under water or treated as soon as possible after felling (very low durability).

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.52
Monnin hardness ⁽¹⁾	1.4
Coefficient of volumetric shrinkage	0.58 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	5.6 %
T/R anisotropy ratio	1.7
Fibre saturation point	34 %
Thermal conductivity (λ)	0.18 W/(m.K)
Lower heating value	18,570 kJ/kg
Crushing strength ⁽¹⁾	37 MPa
Static bending strength ⁽¹⁾	65 MPa
Longitudinal modulus of elasticity ⁽¹⁾	12,430 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 5 - non-durable

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)



Flat sawn



Quarter sawn

Resistance to termites. Class S - susceptible

Treatability. Class 1-2 - moderately treatable to treatable.

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. This species is listed in the NF EN 350 standard.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. Yes

Notes. Kiln drying must be handled carefully and slowly in order to reduce defects, especially with thick material.

Suggested drying schedule. Schedule #8 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Notes. Surface sometimes fuzzy.

Assembling

Nailing/screwing. Poor

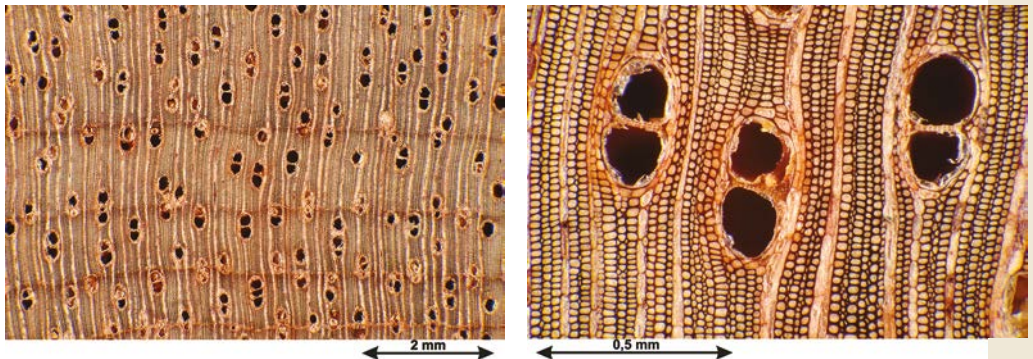
Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

Cross sections of *Viola surinamensis*



In French Guiana, the local name of this species is “Yayamadou”. Grading is done according to local rules «Bois guyanais classés” (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2015), strength class C27 can be provided by visual grading for Virola in French Guiana (Yayamadou).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Shingles
- Cigar boxes
- Framing
- Formwork
- Boxes and crates
- Veneer for back or face of plywood
- Veneer for interior of plywood
- Panelling
- Glued Laminated
- Interior joinery
- Built-in furniture or mobile item
- Moulding
- Blockboard
- Fibre or particle boards
- Sliced veneer
- Pulp
- Marquetry

Notes. Substitute for Okoumé and Ilomba in plywood industry.

Common names

Country	Local name
Brazil	Ucuuba, Virola
Colombia	Nuanamo, Sebo
Ecuador	Chaliviande, Shempo
Guyana	Dalli
French Guiana	Moulomba, Yayamadou, Yayamadou marécage, Yayamadou montagne
Honduras	Banak
Peru	Cumala
United Kingdom	Dalli
Suriname	Baboen, Pintri
Trinidad and Tobago	Cajuea
Venezuela	Camaticaro, Cuajo, Otivo, Sangrino, Virola

Wacapou

Family. Leguminosae (Caesalpinaceae)

Botanical names

Vouacapoua americana Aubl.

Vouacapoua macropetala Sandwith

Vouacapoua pallidior Ducke

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 100 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood dark brown, with thin light brown lines, which produce an attractive aspect. Presence of internal stresses.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.92
Monnin hardness ⁽¹⁾	6.9
Coefficient of volumetric shrinkage	0.65 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	4.2 %
T/R anisotropy ratio	1.5
Fibre saturation point	22 %
Thermal conductivity (λ)	0.30 W/(m.K)
Lower heating value	20,270 kJ/kg
Crushing strength ⁽¹⁾	82 MPa
Static bending strength ⁽¹⁾	148 MPa
Longitudinal modulus of elasticity ⁽¹⁾	19,780 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 3 - poorly treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high specific gravity and its repulsive extract content. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended.

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

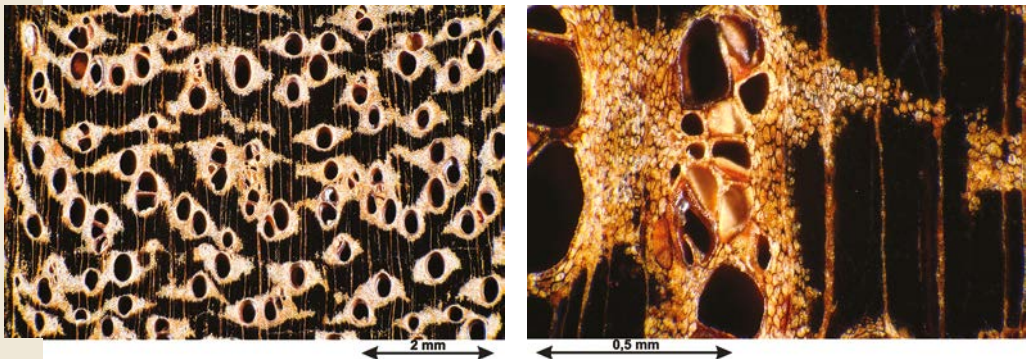
Notes. Sawing and machining requires powerful equipment. Veneers quite brittle.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Vouacapoua americana*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local names of this species are "Wacapou" and "Wacap".

Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4



Saramaca bench (French Guiana).

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Heavy carpentry
- Ship building (planking and deck)
- Cabinetry (high-end furniture)
- Stairs (inside)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Marquetry
- Hydraulic works (seawater)
- Sleepers

Notes. Due to its attractive appearance and low availability in forests, this wood should be used for decorative end-uses or in small quantities.

Common names

Country	Local name
Brazil	Acapu, Ritangueira
United States	Partridgewood
Guyana	Sara, Sarabebballi, Tatbu
French Guiana	Bois perdrix, Bounaati, Épi de blé, Wacapou
United Kingdom	Tatbu
Suriname	Bruinhart, Wakapoe

Wallaba

Family. Leguminosae (Caesalpinieae)

Botanical names

Eperua falcata Aubl.

Eperua jenmanii Oliv.

Eperua rubiginosa Miq.

Eperua p.p.

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 4 to 6 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Wood red brown to dark brown with lighter veins.

Very pronounced internal stresses. Presence of resin veins.

Unpleasant odour when green.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.88
Monnin hardness ⁽¹⁾	7.0
Coefficient of volumetric shrinkage	0.42 % per %
Total tangential shrinkage (Ts):	6.5 %
Total radial shrinkage (Rs):	2.3 %
T/R anisotropy ratio	2.8
Fibre saturation point	29 %
Thermal conductivity (λ)	0.29 W/(m.K)
Lower heating value	19,720 kJ/kg
Crushing strength ⁽¹⁾	72 MPa
Static bending strength ⁽¹⁾	120 MPa
Longitudinal modulus of elasticity ⁽¹⁾	18,450 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable



Flat sawn

Quarter sawn



Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. Natural durability classes and use class mentioned are those of *Eperua falcata*. *Eperua grandiflora* and *Eperua rubiginosa* have a poorer durability. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its high density.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. A period of air drying prior to kiln drying is recommended to reduce defects.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

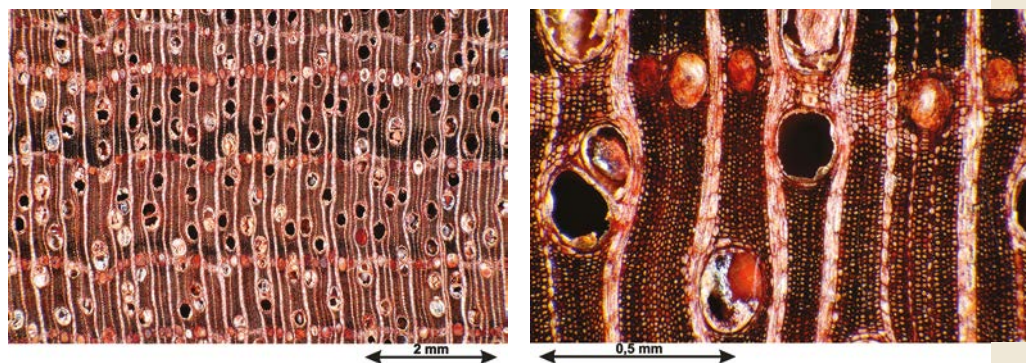
Notes. Sawing and machining requires powerful equipment. Resin may clog saw teeth of saws and cutters. Resin exudations are no more problematic on dry wood. Internal stresses released limits yield with sawing.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Tends to split with nailing. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Cross sections of *Eperua rubiginosa*



Commercial grading

Sawn timber appearance grading

According to NHLA grading rules (2015)

Possible grading: FAS, Select, Common 1, Common 2, Common 3

In French Guiana, the local name of this species is "Wapa". Grading is done according to local rules «Bois guyanais classés» (1990).

Possible grading: Choice 1, choice 2, choice 3, choice 4

Visual structure grading

According to French standard NF B 52-001-1 (2011), strength class D40 can be provided by visual grading.

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Shingles
- Heavy carpentry
- Exterior joinery
- Built-in furniture or mobile item
- House framing
- Industrial or heavy flooring
- Stakes
- Decking
- Bridges (parts in contact with water or ground)
- Bridges (parts not in contact with water or ground)
- Poles
- Exterior panelling
- Cooperage
- Hydraulic works (fresh water)
- Sleepers

Notes. Careful sanding and filling are recommended.

Common names

Country	Local name
Argentina	Timbo-y-alta
Brazil	Apa, Apazeiro, Copahyba, Copaibarana, Espadeira
Guyana	Ituri wallaba, Wallaba
French Guiana	Bioudou, Wapa
Panama	Cabino blanco, Camiba
Suriname	Bijlhout, Walaba
Venezuela	Palo machete, Uapa



Shingling – by Woods Direct International, LLC (Jamaica).

Walnut

Family. Juglandaceae

Botanical name

Juglans regia L.

Continent. Europe

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 30 to 80 cm

Thickness of sapwood. 2 to 5 cm

Buoyancy. Not applicable

Log conservation. Low (treatment necessary)

Wood description

Reference colour. Brown

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Straight

Interlocked grain. Absent

Notes. Sometimes brown more or less yellow or pinkish brown, sometimes greyish, often with darker veins.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.66
Monnin hardness ⁽¹⁾	3.2
Coefficient of volumetric shrinkage	0.37 % per %
Total tangential shrinkage (Ts):	7.5 %
Total radial shrinkage (Rs):	5.5 %
T/R anisotropy ratio	1.4
Fibre saturation point	27 %
Thermal conductivity (λ)	0.22 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	64 MPa
Static bending strength ⁽¹⁾	117 MPa
Longitudinal modulus of elasticity ⁽¹⁾	11,800 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (heartwood durable but sapwood not clearly demarcated)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Notes. This species is listed in the NF EN 350 standard.



Flat sawn

Quarter sawn



Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Normal to slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. Yes

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

Nailing/screwing. Good

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this species. Sawn products are graded according to final uses.

Fire safety

Conventional French grading

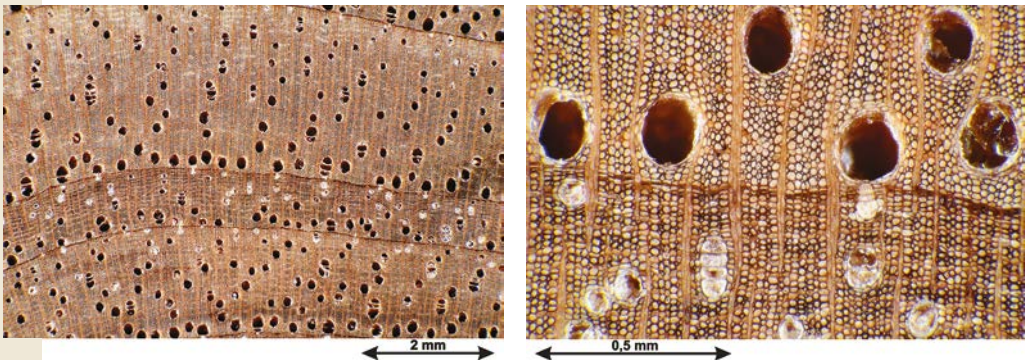
Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Cross sections of *Juglans regia*



Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Interior joinery
- Sliced veneer
- Sculpture
- Marquetry

Notes. Walnut is characterised by a good dimensional stability and a great transverse cohesion. It is very sought after for the fabrication of top-range hunting rifle butts. It has a good aptitude for bending.

Common names

Country	Local name
Germany	Nussbaum, Walnuss
Spain	Nogal
France	Noyer
Italy	Noce commune
United Kingdom	European walnut, Walnut



Double sideboard, Paris region – 16th century, Manoir de la Possonnière (birthplace of Pierre de Ronsard), Couture-sur-Loir (France).

Wamara

Family. Leguminosae (Caesalpinieae)

Botanical names

Bocoa prouacensis Aubl. (Syn. *Swartzia prouacensis*)

Continent. Latin America

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 40 to 70 cm

Thickness of sapwood. 4 to 13 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown to black

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood yellowish. Heartwood dark brown or grey-black, often with narrow lighter veins on tangential face.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	1.22
Monnin hardness ⁽¹⁾	19.3
Coefficient of volumetric shrinkage	0.70 % per %
Total tangential shrinkage (Ts):	10.6 %
Total radial shrinkage (Rs):	7.1 %
T/R anisotropy ratio	1.5
Fibre saturation point	24 %
Thermal conductivity (λ)	0.38 W/(m.K)
Lower heating value	20,060 kJ/kg
Crushing strength ⁽¹⁾	115 MPa
Static bending strength ⁽¹⁾	214 MPa
Longitudinal modulus of elasticity ⁽¹⁾	30,530 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1 - very durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or



Flat sawn

Quarter sawn



brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #7 (see explanatory note)

Sawing and machining

Blunting effect. High

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Low sawing recovery due to small diameter logs. Good for turning.

Assembling

Nailing/screwing. Good but pre-boring necessary

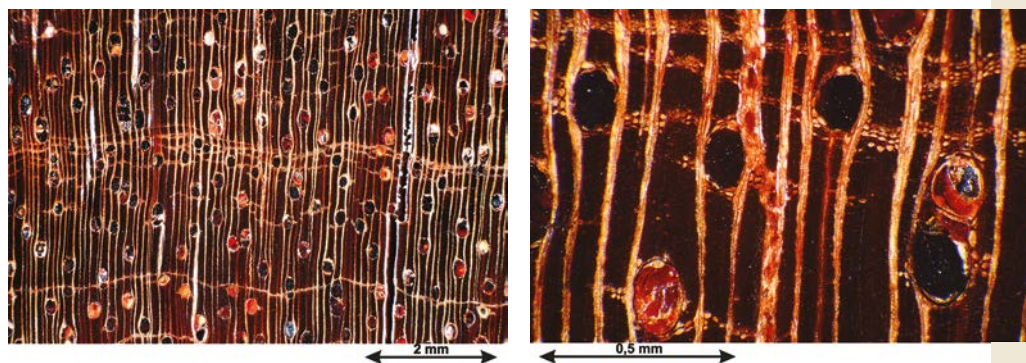
Notes. Very high specific gravity and high extractive content: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

Sawn timber appearance grading

No conventional grading rules for this cabinet work species. Sawn products are graded according to final uses.

Cross sections of *Bocoa prouacensis*



Fire safety

Conventional French grading

Thickness > 14 mm: M3
(moderately flammable)

Thickness < 14 mm: M4
(readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.



Wamara cladding on a private home – Durable Wood Products, Georgetown (Guyana).

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Musical instruments
- Tool handles (resilient woods)
- Flooring
- Sliced veneer
- Sculpture
- Marquetry

Notes. Precious wood for top market applications, like Ebony.

Common names

Country	Local name
Guyana	Wamara, Womara
French Guiana	Boco
Suriname	Zwart parelhout

Wamba

Family. Leguminosae (Caesalpinaceae)

Botanical names

Tessmannia africana Harms.

Tessmannia anomala Harms

Tessmannia lescrauwaetii Harms

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 7 to 10 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Red brown

Sapwood. Clearly demarcated

Texture. Fine

Grain. Straight or interlocked

Interlocked grain. Slight

Notes. Sapwood pale yellow or pink-grey. Heartwood pink, red-brown or dark brown, with stripes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	6.2
Coefficient of volumetric shrinkage	0.55 % per %
Total tangential shrinkage (Ts):	9.5 %
Total radial shrinkage (Rs):	5.1 %
T/R anisotropy ratio	1.9
Fibre saturation point	27 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	73 MPa
Static bending strength ⁽¹⁾	169 MPa
Longitudinal modulus of elasticity ⁽¹⁾	16,120 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact



Flat sawn

Half-quarter sawn



Notes. This species naturally covers the use class 5 (wood permanently or regularly submerged in salt water, sea water or brackish water) due to its pronounced hardness. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. Slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Not recommended or without interest

Notes. Logs must be extracted and sawn as soon as possible after felling to limit the risks of splits and distortions.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. High specific gravity: important that gluing be performed in compliance with the code of practice and instructions for the glue used.

Commercial grading

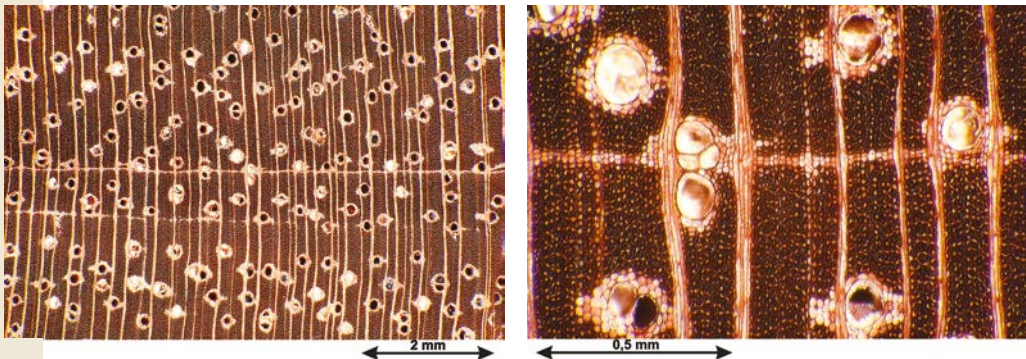
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Tessmannia africana*



Possible grading for short-length lumbers: choice I, choice II

Possible grading for short-length rafters: choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Heavy carpentry
- Shipbuilding
- Stairs (inside)
- Exterior joinery
- Industrial or heavy flooring
- Decking
- Bridges (parts in contact with water or ground)
- Exterior panelling
- Hydraulic works (fresh water)
- Hydraulic works (seawater)

Notes. Resin exudations: to be taken into account when finishing.

Common names

Country	Local name
Gabon	N'kagha, N'kara
Democratic Republic of Congo	Waka, Wamba



Flat sawn

Half-quarter sawn



Wengé

Family. Leguminosae (Fabaceae)

Botanical names

Millettia laurentii De Wild.

Millettia stuhlmannii Taub.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 2 to 3 cm

Buoyancy. Does not float

Log conservation. Good

Wood description

Reference colour. Dark brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Straight

Interlocked grain. Absent

Notes. Sometimes brittleheart and grub hole. Wood yellow when fresh, becoming dark brown to black brown with light. Presence of alternate light and dark stripes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.87
Monnin hardness ⁽¹⁾	9.1
Coefficient of volumetric shrinkage	0.69 % per %
Total tangential shrinkage (Ts):	9.1 %
Total radial shrinkage (Rs):	5.9 %
T/R anisotropy ratio	1.5
Fibre saturation point	22 %
Thermal conductivity (λ)	0.28 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	85 MPa
Static bending strength ⁽¹⁾	144 MPa
Longitudinal modulus of elasticity ⁽¹⁾	21,050 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Hard to very hard.

Natural durability and treatability

Resistance to decay. Class 1-2 – very durable to durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class D - durable

Treatability. Class 4 – non-treatable

Use class covered by natural durability Class 4 - in ground or fresh water contact

Notes. This species is listed in the NF EN 350 standard. According to the European standard NF EN 335 of May 2013, performance length might be modified by conditions in which it is used.

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood does not require any preservation treatment

In case of permanent humidification. This wood does not require any preservation treatment

Drying

Drying rate. Slow

Risk of distortion. Slight risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Notes. In general, little risk of distortion, except with thick material.

Suggested drying schedule. Schedule #6 (see explanatory note)

Sawing and machining

Blunting effect. Fairly high

Sawteeth recommended. Stellite-tipped

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Sawing and machining requires powerful equipment. Polishing is difficult. Apply a finishing wax by preference.

Assembling

Nailing/screwing. Good but pre-boring necessary

Notes. Risk of splitting when nailing. High specific gravity and wood tends to stain: gluing must be performed in compliance with the code of practice.

Commercial grading

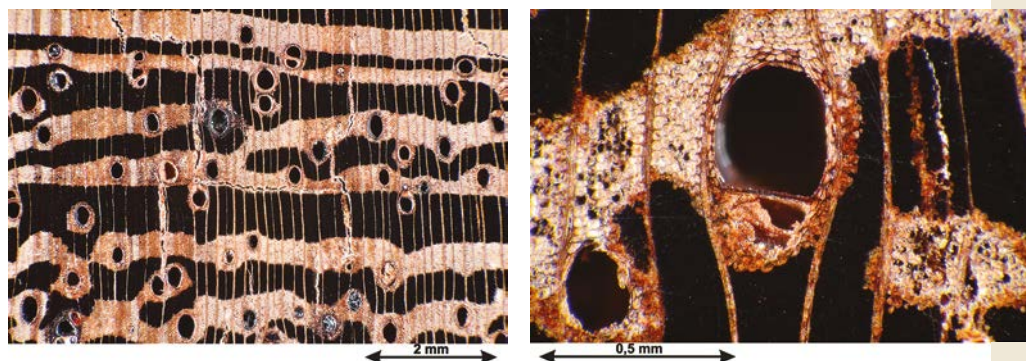
Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Cross sections of *Millettia laurentii*



Possible grading for short-length

lumbers: choice I, choice II

Possible grading for short-length rafters:
choice I, choice II, choice III

- For the “Special Market”

Possible grading for strips and small

boards: choice I, choice II, choice III

Possible grading for rafters: choice I,
choice II, choice III

Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Panelling
- Exterior joinery
- Interior joinery
- Built-in furniture or mobile item
- Flooring
- Sliced veneer
- Exterior panelling
- Sculpture

Notes. Resistant to one or several acids.

Common names

Country	Local name
Germany	Panga-panga, Wenge
Cameroon	Awoung
Congo	Wengé
France	Panga-panga, Wengé
Gabon	Awong
Mozambique	Jambiré
Democratic Republic of Congo	Wengé
United Kingdom	Panga-panga, Wengé
Tanzania	Mpande



Parquet flooring of an exhibition gallery at Parc de la Villette – Paris (France).

Yemane

Family. Lamiaceae (Verbenaceae)

Botanical name

Gmelina arborea Roxb.

Continent. Asia, Oceania

CITES (Washington Convention of 2017)

No trade restrictions

Notes. Also called Gmelina, used for reforestation outside its native area. This species is used very widely in plantations in Africa.

Log description

Diameter. 40 to 80 cm

Thickness of sapwood. 5 to 7 cm

Buoyancy. Floats

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light yellow

Sapwood. Not clearly demarcated

Texture. Medium

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood light yellow to light brown with reddish or brownish veins. Oily to the touch. Presence of knots of variable sizes.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.49
Monnin hardness ⁽¹⁾	1.9
Coefficient of volumetric shrinkage	0.45 % per %
Total tangential shrinkage (Ts):	5.9 %
Total radial shrinkage (Rs):	2.8 %
T/R anisotropy ratio	2.1
Fibre saturation point	26 %
Thermal conductivity (λ)	0.17 W/(m.K)
Lower heating value	18,660 kJ/kg
Crushing strength ⁽¹⁾	32 MPa
Static bending strength ⁽¹⁾	64 MPa
Longitudinal modulus of elasticity ⁽¹⁾	9,120 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Notes. Properties of plantation timbers and timbers from natural forests are often similar, provided that planted trees have reached sufficient maturity.

Natural durability and treatability

Resistance to decay. Class 4 - poorly durable



Flat sawn



Quarter sawn

Resistance to dry wood borers. Class S - susceptible (risk in all the wood)

Resistance to termites. Class S - susceptible

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 1 - inside (no risk of dampness)

Notes. Wood poorly to moderately resistant to rot.

Preservation treatment

Against dry wood borer attacks. This wood requires appropriate preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. No risk or very slight risk

Risk of case hardening. Yes

Risk of checking. No risk or very slight risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #4 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Ordinary

Suitability for peeling. Good

Suitability for slicing. Good

Assembling

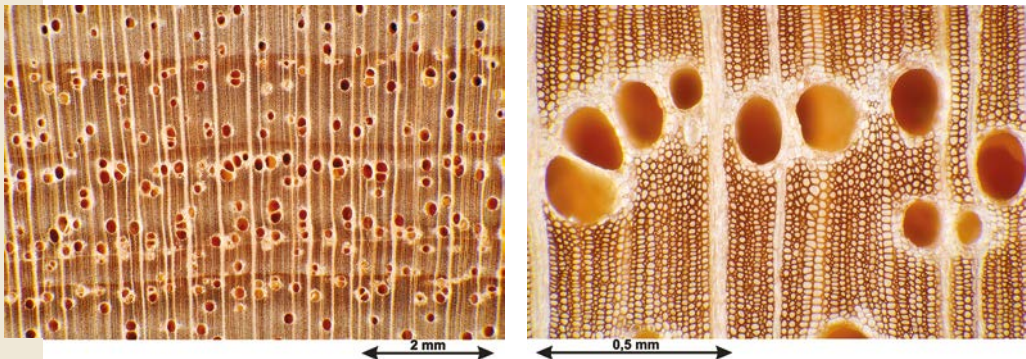
Nailing/screwing. Poor

Commercial grading

Sawn timber appearance grading

Different grading rules applied according to the country or continent of origin.

Cross sections of *Gmelina arborea*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Matches
- Pencils
- Boxes and crates
- Musical instruments
- Veneer for interior of plywood
- Panelling
- Interior joinery
- Built-in furniture or mobile item
- Fibre or particle boards
- Sliced veneer
- Pulp
- Sculpture

Common names

Country	Local name
Bangladesh	Gamar, Gamari, Gomari, Gumbar
France	Gmelina
India	Gamari, Gambhar, Gomari, Gumari, Gumbar, Gumhar, Gumhu, Khabhari, Sewan
Laos	Mai so
Myanmar	Mai Saw, Yemane
Nepal	Gamari
Thailand	Gumari, Saw, So, Sor, So-maeo



Flat sawn

Quarter sawn



Zingana / Zebrano*

* Common commercial name

Family. Leguminosae (Caesalpinieaceae)

Botanical names

Microberlinia bisulcata A. Chev.

Microberlinia brazzavillensis A. Chev.

Continent. Africa

CITES (Washington Convention of 2017)

No trade restrictions

Log description

Diameter. 60 to 100 cm

Thickness of sapwood. 6 to 10 cm

Buoyancy. Does not float

Log conservation. Moderate (treatment recommended)

Wood description

Reference colour. Light brown

Sapwood. Clearly demarcated

Texture. Coarse

Grain. Interlocked grain

Interlocked grain. Slight

Notes. Wood yellow brown to light brown, with dark brown veins. Sometimes highly interlocked grain.

Physical and mechanical properties

Property	Mean value
Density ⁽¹⁾	0.79
Monnin hardness ⁽¹⁾	5.0
Coefficient of volumetric shrinkage	0.56 % per %
Total tangential shrinkage (Ts):	11.0 %
Total radial shrinkage (Rs):	8.8 %
T/R anisotropy ratio	1.3
Fibre saturation point	30 %
Thermal conductivity (λ)	0.26 W/(m.K)
Lower heating value	-
Crushing strength ⁽¹⁾	62 MPa
Static bending strength ⁽¹⁾	110 MPa
Longitudinal modulus of elasticity ⁽¹⁾	17,520 MPa

⁽¹⁾ at 12% moisture content, with 1 MPa = 1 N/mm²

Natural durability and treatability

Resistance to decay. Class 3 - moderately durable

Resistance to dry wood borers. Class D - durable (sapwood demarcated, risk limited to sapwood)

Resistance to termites. Class M - moderately durable

Treatability. Class 3 - poorly treatable

Use class covered by natural durability Class 2 - inside or under cover (dampness possible)

Preservation treatment

Against dry wood borer attacks. This wood does not require any preservation treatment

In case of temporary humidification. This wood requires appropriate preservation treatment

In case of permanent humidification. Use of this wood is not recommended

Drying

Drying rate. Slow

Risk of distortion. High risk

Risk of case hardening. No known specific risk

Risk of checking. High risk

Risk of collapse. No known specific risk

Suggested drying schedule. Schedule #5 (see explanatory note)

Sawing and machining

Blunting effect. Normal

Sawteeth recommended. Ordinary or alloy steel

Machining tools. Tungsten carbide

Suitability for peeling. Not recommended or without interest

Suitability for slicing. Good

Notes. Risk of tearing in the presence of highly interlocked grain.

Assembling

Nailing/screwing. Good but pre-boring necessary

Commercial grading

Sawn timber appearance grading

According to SATA grading rules (1996)

- For the "General Purpose Market"

Possible grading for square-edged timbers: choice I, choice II, choice III, choice IV

Possible grading for short-length lumbers: choice I, choice II

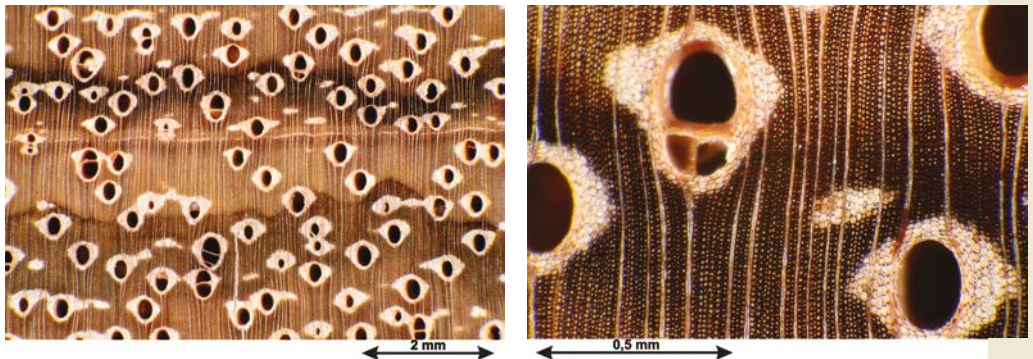
Possible grading for short-length rafters: choice I, choice II, choice III

- For the "Special Market"

Possible grading for strips and small boards: choice I, choice II, choice III

Possible grading for rafters: choice I, choice II, choice III

Cross sections of *Microberlinia bisulcata*



Fire safety

Conventional French grading

Thickness > 14 mm: M3 (moderately flammable)

Thickness < 14 mm: M4 (readily flammable)

Euroclass grading. D-s2, d0

Default grading for solid wood that meets requirements of European standard NF EN 14081-1 (April 2016): structural graded timber in vertical uses and ceilings with minimal mean density of 0.35 and minimal thickness of 22 mm.

Main end uses

- Turned goods
- Cabinetry (high-end furniture)
- Panelling
- Tool handles (resilient woods)
- Built-in furniture or mobile item
- House framing
- Sliced veneer
- Marquetry

Common names

Country	Local name
Germany	Zebrano
Cameroon	Allen élé, Amouk
Gabon	Zingana / Zebrano
United Kingdom	Zebrano, Zebrawood



Indoor restaurant décor – by Brenco Exotic Woods (United States).

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Index of botanical names

Botanical name(s)	Family	Continent	Pilot name / Commercial name*
<i>Abies alba</i> Mill.	Pinaceae	Europe	Spruce
<i>Abies pectinata</i> Gilib. (cf. <i>Abies alba</i>)	Pinaceae	Europe	Spruce
<i>Acacia mangium</i> Willd.	Leguminosae (Mimosaceae)	Africa, Latin America, Asia, Oceania	Acacia mangium
<i>Acer pseudoplatanus</i> L.	Sapindaceae	Europe	Sycamore Maple
<i>Adina cordifolia</i> Hook. f. (cf. <i>Haldina cordifolia</i>)	Rubiaceae	Asia, Oceania	Haldu
<i>Adina fagifolia</i> Teijsm. & Binn. (cf. <i>Adinauclea fagifolia</i>)	Rubiaceae	Asia, Oceania	Haldu
<i>Adina rubescens</i> Hemsl. (cf. <i>Pertusadina eurhyncha</i>)	Rubiaceae	Asia, Oceania	Haldu
<i>Adinauclea fagifolia</i> Ridsdale	Rubiaceae	Asia, Oceania	Haldu
<i>Afromosia elata</i> Harms (cf. <i>Pericopsis elata</i>)	Leguminosae (Fabaceae)	Africa	Afromosia
<i>Afzelia africana</i> Sm.	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Afzelia bella</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Afzelia bijuga</i> A. Gray (cf. <i>Intsia bijuga</i>)	Leguminosae (Caesalpiniaceae)	Asia, Oceania (+ Madagascar)	Merbau
<i>Afzelia bipindensis</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Afzelia cuanzensis</i> Oliv. (cf. <i>A. quanzensis</i>)	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Afzelia pachyloba</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Afzelia quanzensis</i> Welw.	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Agathis</i> p.p.	Araucariaceae	Asia, Oceania	Kauri
<i>Albizia angolensis</i> Welw.	Leguminosae (Mimosaceae)	Africa	Iatandza
<i>Albizia antunesiana</i> Harms	Leguminosae (Mimosaceae)	Africa	Iatandza
<i>Albizia ferruginea</i> Benth.	Leguminosae (Mimosaceae)	Africa	Iatandza
<i>Albizia</i> p.p.	Leguminosae (Mimosaceae)	Africa	Iatandza
<i>Albizia versicolor</i> Welw.	Leguminosae (Mimosaceae)	Africa	Iatandza
<i>Aldina heterophylla</i> Benth.	Leguminosae (Fabaceae)	Latin America	Macucu de paca
<i>Alexa grandiflora</i> Ducke	Leguminosae (Fabaceae)	Latin America	Melancieira
<i>Alexa imperatricis</i> Baill.	Leguminosae (Fabaceae)	Latin America	Melancieira
<i>Alexa leiopetala</i> Sandw.	Leguminosae (Fabaceae)	Latin America	Melancieira
<i>Alexa wachenheimii</i> Benoist	Leguminosae (Fabaceae)	Latin America	Melancieira
<i>Allantoma integrifolia</i> S.A.Mori	Lecythidaceae	Latin America	Jequitiba
<i>Alstonia boonei</i> De Wild.	Apocynaceae	Africa	Émien / Alstonia*
<i>Alstonia congensis</i> Engl.	Apocynaceae	Africa	Émien / Alstonia*
<i>Alstonia gillettii</i> De Wild. (cf. <i>A. congensis</i>)	Apocynaceae	Africa	Émien / Alstonia*
<i>Alstonia</i> p.p.	Apocynaceae	Asia, Oceania	Pulai
<i>Alstonia pneumatophora</i> Baker	Apocynaceae	Asia, Oceania	Pulai
<i>Alstonia scholaris</i> R. Br.	Apocynaceae	Asia, Oceania	Pulai
<i>Alstonia spatulata</i> Blume	Apocynaceae	Asia, Oceania	Pulai
<i>Amburana cearensis</i> A.C. Sm.	Leguminosae (Fabaceae)	Latin America	Cerejeira
<i>Amphimas ferrugineus</i> Pellegr.	Leguminosae (Caesalpiniaceae)	Africa	Lati
<i>Amphimas pterocarpoides</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Lati
<i>Andira coriacea</i> Pulle	Leguminosae (Fabaceae)	Latin America	Andira
<i>Andira inermis</i> DC.	Leguminosae (Fabaceae)	Latin America	Andira
<i>Andira jamaicensis</i> Urb. (cf. <i>A. inermis</i>)	Leguminosae (Fabaceae)	Latin America	Andira

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<i>Andira</i> p.p.	Leguminosae (Fabaceae)	Latin America	Andira
<i>Andira parviflora</i> Ducke	Leguminosae (Fabaceae)	Latin America	Andira
<i>Andira wachenheimi</i> Benoist. (cf. <i>A. coriacea</i>)	Leguminosae (Fabaceae)	Latin America	Andira
<i>Androstachys johnsonii</i> Prain	Picrodendraceae (Euphorbiaceae)	Africa (including Madagascar)	Mecrussé
<i>Aniba canelilla</i> (Kunth) Mez	Lauraceae	Latin America	Preciosa
<i>Aningeria altissima</i> Aubrév. & Pellegr. (cf. <i>Pouteria altissima</i>)	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Aningeria</i> p.p. (cf. <i>Pouteria</i>)	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Aningeria robusta</i> Aubrév. & Pellegr. (cf. <i>Pouteria pierreii</i>)	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Aningeria superba</i> A. Chev. (cf. <i>Pouteria superba</i>)	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Anisoptera cochinchinensis</i> Pierre (cf. <i>A. costata</i>)	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera costata</i> Korth.	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera curtisii</i> Dyer	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera glabra</i> Kurz	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera laevis</i> Ridl.	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera marginata</i> Korth.	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera</i> p.p.	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera scaphula</i> Pierre	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anisoptera thurifera</i> Blume	Dipterocarpaceae	Asia, Oceania	Mersawa
<i>Anopyxis ealaensis</i> Sprague (cf. <i>A. klaineana</i>)	Rhizophoraceae	Africa	Bodioa
<i>Anopyxis klaineana</i> Engl.	Rhizophoraceae	Africa	Bodioa
<i>Antiaris africana</i> Engl. (cf. <i>A. toxicaria</i>)	Moraceae	Africa	Ako / Antiaris*
<i>Antiaris toxicaria</i> Lesch.	Moraceae	Africa	Ako / Antiaris*
<i>Antiaris welwitschii</i> Engl. (cf. <i>A. toxicaria</i>)	Moraceae	Africa	Ako / Antiaris*
<i>Antrocaryon klaineum</i> Pierre	Anacardiaceae	Africa	Onzabili
<i>Antrocaryon micraster</i> A. Chev.	Anacardiaceae	Africa	Onzabili
<i>Antrocaryon nannanii</i> De Wild.	Anacardiaceae	Africa	Onzabili
<i>Antrocaryon</i> p.p.	Anacardiaceae	Africa	Onzabili
<i>Aphanocalyx hedinii</i> Wieringa	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Aphanocalyx heitzii</i> Wieringa	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Apuleia leiocarpa</i> J.F. Macbr.	Leguminosae (Caesalpiniaceae)	Latin America	Garapa
<i>Apuleia molaris</i> Spruce (cf. <i>A. leiocarpa</i>)	Leguminosae (Caesalpiniaceae)	Latin America	Garapa
<i>Araucaria angustifolia</i> O. Ktze.	Araucariaceae	Latin America	Pinho Paraná
<i>Artocarpus anisophyllus</i> Miq.	Moraceae	Asia, Oceania	Keledang
<i>Artocarpus integer</i> Merr.	Moraceae	Asia, Oceania	Keledang
<i>Artocarpus lakoocha</i> Roxb.	Moraceae	Asia, Oceania	Keledang
<i>Artocarpus lanceifolius</i> Roxb.	Moraceae	Asia, Oceania	Keledang
<i>Artocarpus lowii</i> King	Moraceae	Asia, Oceania	Keledang
<i>Artocarpus</i> p.p.	Moraceae	Asia, Oceania	Keledang
<i>Artocarpus teysmannii</i> Miq.	Moraceae	Asia, Oceania	Keledang
<i>Aspidosperma album</i> Benoist	Apocynaceae	Latin America	Araracanga
<i>Aspidosperma desmanthum</i> Muell. Arg.	Apocynaceae	Latin America	Araracanga
<i>Aspidosperma</i> p.p.	Apocynaceae	Latin America	Araracanga
<i>Astronium fraxinifolium</i> Schott	Anacardiaceae	Latin America	Muiracatiara

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<i>Astronium gracile</i> Engl. (cf. <i>A. graveolens</i>)	Anacardiaceae	Latin America	Muiracatiara
<i>Astronium graveolens</i> Jacq.	Anacardiaceae	Latin America	Muiracatiara
<i>Astronium lecointei</i> Ducke	Anacardiaceae	Latin America	Muiracatiara
<i>Astronium</i> p.p.	Anacardiaceae	Latin America	Muiracatiara
<i>Aucoumea klaineana</i> Pierre	Burseraceae	Africa	Okoumé / Gaboon*
<i>Autranella congolensis</i> A. Chev.	Sapotaceae	Africa	Mukulungu
<i>Bagassa guianensis</i> Aubl.	Moraceae	Latin America	Tatajuba
<i>Bagassa tiliifolia</i> Benoist. (cf. <i>B. guianensis</i>)	Moraceae	Latin America	Tatajuba
<i>Baillonella toxisperma</i> Pierre	Sapotaceae	Africa	Moabi
<i>Balanocarpus heimii</i> King (cf. <i>Neobalanocarpus heimii</i>)	Dipterocarpaceae	Asia, Oceania	Chengal
<i>Balfourodendron riedelianum</i> Engl.	Rutaceae	Latin America	Guatambù
<i>Beilschmiedia congolana</i> Robyns & R. Wilczek	Lauraceae	Africa	Kanda brun
<i>Beilschmiedia corbisieri</i> Robyns & R. Wilczek	Lauraceae	Africa	Kanda brun
<i>Beilschmiedia gabonensis</i> Benth. & Hook.	Lauraceae	Africa	Kanda rose
<i>Beilschmiedia grandifolia</i> Robyns & R. Wilczek	Lauraceae	Africa	Kanda rose
<i>Beilschmiedia hutchinsonia</i> Robyns & R. Wilczek	Lauraceae	Africa	Kanda rose
<i>Beilschmiedia letouzeyi</i> Robyns & R. Wilczek	Lauraceae	Africa	Kanda brun
<i>Beilschmiedia mannii</i> Benth. & Hook.	Lauraceae	Africa	Kanda rose
<i>Beilschmiedia oblongifolia</i> Robyns & R. Wilczek	Lauraceae	Africa	Kanda brun
<i>Beilschmiedia obscura</i> A. Chev.	Lauraceae	Africa	Kanda rose
<i>Beilschmiedia</i> p.p.	Lauraceae	Africa	Kanda brun
<i>Beilschmiedia</i> p.p.	Lauraceae	Africa	Kanda rose
<i>Berlinia bifoliolata</i> Harms (cf. <i>Tetraberlinia bifoliolata</i>)	Leguminosae (Caesalpiniaceae)	Africa	Ékaba / Ekop*
<i>Berlinia bracteosa</i> Benth.	Leguminosae (Caesalpiniaceae)	Africa	Ébiara / Berlinia*
<i>Berlinia confusa</i> Hoyle	Leguminosae (Caesalpiniaceae)	Africa	Ébiara / Berlinia*
<i>Berlinia grandiflora</i> Hutch. & Dalziel	Leguminosae (Caesalpiniaceae)	Africa	Ébiara / Berlinia*
<i>Berlinia</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Ébiara / Berlinia*
<i>Berlinia seretii</i> De Wild. (cf. <i>Julbernardia seretii</i>)	Leguminosae (Caesalpiniaceae)	Africa	Alumbi
<i>Bertholletia excelsa</i> H.B.K.	Lecythidaceae	Latin America	Castanheiro
<i>Bikinia coriacea</i> Wieringa	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Bikinia durandii</i> Wieringa	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Bikinia le-testui</i> Wieringa	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Bikinia</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Bikinia pellegrini</i> Wieringa	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Bobgunnia fistuloides</i> J.H. Kirkbr. & Wiersema	Leguminosae (Caesalpiniaceae)	Africa	Pao rosa / Dina*
<i>Bocoa prouacensis</i> Aubl.	Leguminosae (Caesalpiniaceae)	Latin America	Wamara
<i>Bombax breviscupe</i> Sprague (cf. <i>Rhodognaphalon breviscupe</i>)	Malvaceae (Bombacaceae)	Africa	Kondroti / East African Bombax*
<i>Bombax buonopozense</i> P. Beauv.	Malvaceae (Bombacaceae)	Africa	Kapokier
<i>Bombax chevalieri</i> Pellegr. (cf. <i>Rhodognaphalon breviscupe</i>)	Malvaceae (Bombacaceae)	Africa	Kondroti / East African Bombax*

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<i>Bombax costatum</i> Pellegr. & Vuillet	Malvaceae (Bombacaceae)	Africa	Kapokier
<i>Bombax flammeum</i> Ulbr. (cf. <i>B. buonopozense</i>)	Malvaceae (Bombacaceae)	Africa	Kapokier
<i>Bombax pentandrum</i> L. (cf. <i>Ceiba pentandra</i>)	Malvaceae (Bombacaceae)	Africa	Fuma / Fromager*
<i>Bombax pentandrum</i> L. (cf. <i>Ceiba pentandra</i>)	Malvaceae (Bombacaceae)	Latin America	Sumauma
<i>Bombax rhodognaphalon</i> K. Schum. (cf. <i>Rhodognaphalon schumannianum</i>)	Malvaceae (Bombacaceae)	Africa	Kondroti / East African Bombax*
<i>Bowdichia guianensis</i> Ducke (cf. <i>Diploptropis purpurea</i>)	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Bowdichia nitida</i> Benth.	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Bowdichia</i> p.p.	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Bowdichia virgilioides</i> Kunth	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Brachylaena huillensis</i> O. Hoffm.	Asteraceae	Africa	Muhuhu
<i>Brachylaena hutchinsii</i> Hutch. (cf. <i>B. huillensis</i>)	Asteraceae	Africa	Muhuhu
<i>Brachystegia cynometroides</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Naga / Okwen*
<i>Brachystegia eurycoma</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Naga / Okwen*
<i>Brachystegia laurentii</i> Louis.	Leguminosae (Caesalpiniaceae)	Africa	Bomanga / Ariella*
<i>Brachystegia leonensis</i> Burt Davy & Hutch.	Leguminosae (Caesalpiniaceae)	Africa	Naga / Okwen*
<i>Brachystegia mildbraedii</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Bomanga / Ariella*
<i>Brachystegia nigerica</i> Hoyle & A.P.D. Jones	Leguminosae (Caesalpiniaceae)	Africa	Naga / Okwen*
<i>Brachystegia nzang</i> Pellegr. (cf. <i>B. mildbraedii</i>)	Leguminosae (Caesalpiniaceae)	Africa	Bomanga / Ariella*
<i>Brachystegia</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Bomanga / Ariella*
<i>Brachystegia</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Naga / Okwen*
<i>Brachystegia zenkeri</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Bomanga / Ariella*
<i>Brosimum lanciferum</i> Ducke (cf. <i>B. rubescens</i>)	Moraceae	Latin America	Muirapiranga
<i>Brosimum</i> p.p.	Moraceae	Latin America	Sandé
<i>Brosimum paraense</i> Huber (cf. <i>B. rubescens</i>)	Moraceae	Latin America	Muirapiranga
<i>Brosimum potabile</i> Ducke	Moraceae	Latin America	Sandé
<i>Brosimum rubescens</i> Taub.	Moraceae	Latin America	Muirapiranga
<i>Brosimum utile</i> Pitt.	Moraceae	Latin America	Sandé
<i>Buchenavia</i> p.p.	Combretaceae	Latin America	Tanimbuca / Yellow Sanders*
<i>Calophyllum brasiliense</i> Camb.	Calophyllaceae (Clusiaceae)	Latin America	Jacareúba
<i>Calophyllum ferrugineum</i> Ridl.	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calophyllum inophyllum</i> L.	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calophyllum neo-ebudicum</i> Guillaum.	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calophyllum</i> p.p.	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calophyllum papuanum</i> Lauterb.	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calophyllum teysmannii</i> Miq.	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calophyllum vitiense</i> Turrill	Calophyllaceae (Clusiaceae)	Asia, Oceania	Bintangor
<i>Calycophyllum spruceanum</i> Benth.	Rubiaceae	Latin America	Pau mulato
<i>Canarium euphyllum</i> Kurz	Burseraceae	Asia, Oceania	Kedondong
<i>Canarium</i> p.p.	Burseraceae	Asia, Oceania	Kedondong

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<i>Canarium schweinfurthii</i> Engl.	Burseraceae	Africa	Aiélé / African Canarium*
<i>Canarium strictum</i> Roxb.	Burseraceae	Asia, Oceania	Kedondong
<i>Carapa guianensis</i> Aubl.	Meliaceae	Latin America	Andiroba
<i>Carapa nicaraguensis</i> C. DC. (cf. <i>C. guianensis</i>)	Meliaceae	Latin America	Andiroba
<i>Carapa procera</i> DC.	Meliaceae	Latin America	Andiroba
<i>Cariniana brasiliensis</i> Casar. (cf. <i>C. legalis</i>)	Lecythidaceae	Latin America	Jequitiba
<i>Cariniana estrellensis</i> Kuntze	Lecythidaceae	Latin America	Jequitiba
<i>Cariniana legalis</i> Kuntze	Lecythidaceae	Latin America	Jequitiba
<i>Cariniana</i> p.p.	Lecythidaceae	Latin America	Jequitiba
<i>Cariniana pyriformis</i> Miers	Lecythidaceae	Latin America	Abarco
<i>Caryocar glabrum</i> Pers.	Caryocaraceae	Latin America	Piquiarana
<i>Caryocar nuciferum</i> L.	Caryocaraceae	Latin America	Piquia
<i>Caryocar</i> p.p.	Caryocaraceae	Latin America	Piquia
<i>Caryocar villosum</i> Pers.	Caryocaraceae	Latin America	Piquia
<i>Castanea sativa</i> Mill.	Fagaceae	Europe	Chesnut
<i>Cedrela angustifolia</i> C. DC.	Meliaceae	Latin America	Cedro
<i>Cedrela fissilis</i> Vell.	Meliaceae	Latin America	Cedro
<i>Cedrela mexicana</i> M. Roem. (cf. <i>C. odorata</i>)	Meliaceae	Latin America	Cedro
<i>Cedrela odorata</i> L.	Meliaceae	Latin America	Cedro
<i>Cedrela toona</i> Roxb. (cf. <i>Toona cialata</i>)	Meliaceae	Asia, Oceania	Suren
<i>Cedrelinga cateniformis</i> Ducke	Leguminosae (Mimosaceae)	Latin America	Tornillo
<i>Cedrus atlantica</i> (Endl.) Manetti ex Carrière	Pinaceae	Europe	Cedar
<i>Ceiba pentandra</i> Gaertn.	Malvaceae (Bombacaceae)	Africa	Fuma / Fromager*
<i>Ceiba pentandra</i> Gaertn.	Malvaceae (Bombacaceae)	Latin America	Sumauma
<i>Ceiba samauma</i> K. Schum.	Malvaceae (Bombacaceae)	Latin America	Sumauma
<i>Ceiba thonningii</i> A. Chev. (cf. <i>C. pentandra</i>)	Malvaceae (Bombacaceae)	Africa	Fuma / Fromager*
<i>Celtis adolfi-friderici</i> Rendle	Cannabaceae (Ulmaceae)	Africa	Diania
<i>Celtis brieiyi</i> De Wild. (cf. <i>C. tessmannii</i>)	Cannabaceae (Ulmaceae)	Africa	Diania
<i>Celtis gomphophylla</i> Baker	Cannabaceae (Ulmaceae)	Africa	Ohia
<i>Celtis mildbraedii</i> Engl.	Cannabaceae (Ulmaceae)	Africa	Ohia
<i>Celtis</i> p.p.	Cannabaceae (Ulmaceae)	Africa	Diania
<i>Celtis</i> p.p.	Cannabaceae (Ulmaceae)	Africa	Ohia
<i>Celtis soyauxii</i> Engl. (cf. <i>C. zenkeri</i>)	Cannabaceae (Ulmaceae)	Africa	Ohia
<i>Celtis tessmannii</i> Engl.	Cannabaceae (Ulmaceae)	Africa	Diania
<i>Celtis zenkeri</i> Engl.	Cannabaceae (Ulmaceae)	Africa	Ohia
<i>Cerasus avium</i> (L.) Moench	Rosaceae	Europe	Cherry wood
<i>Chlorocardium rodiei</i> Rohwer, H.G. Richt. & van der Werff	Lauraceae	Latin America	Greenheart
<i>Chlorophora excelsa</i> Benth. & Hook. (cf. <i>Milicia excelsa</i>)	Moraceae	Africa	Iroko
<i>Chlorophora regia</i> A. Chev. (cf. <i>Milicia regia</i>)	Moraceae	Africa	Iroko
<i>Chlorophora tinctoria</i> Gaud. (cf. <i>Maclura tinctoria</i>)	Moraceae	Latin America	Moral
<i>Chloroxylon swietenia</i> A. DC.	Rutaceae	Asia, Oceania	Satin, Ceylon

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<i>Chrysophyllum africanum</i> Baker	Sapotaceae	Africa	Longhi
<i>Chrysophyllum giganteum</i> A. Chev.	Sapotaceae	Africa	Aniégré / Anigeria*
<i>Chrysophyllum lacourtianum</i> De Wild.	Sapotaceae	Africa	Longhi
<i>Chrysophyllum lucentifolium</i> Cronq.	Sapotaceae	Latin America	Goiabao
<i>Chrysophyllum</i> p.p.	Sapotaceae	Africa	Longhi
<i>Chrysophyllum perpulchrum</i> Mildbr.	Sapotaceae	Africa	Longhi
<i>Chrysophyllum subnudum</i> Baker	Sapotaceae	Africa	Longhi
<i>Cistanthera papaverifera</i> A. Chev. (cf. <i>Nesogordonia papaverifera</i>)	Malvaceae (Sterculiaceae)	Africa	Kotibé / Danta*
<i>Clarisia racemosa</i> Ruiz & Pav.	Moraceae	Latin America	Guariúba
<i>Cocos nucifera</i> L.	Arecaceae	Africa, Latin America, Asia, Oceania	Coconut wood
<i>Coelocaryon botryoides</i> Vermeesen	Myristicaceae	Africa	Ékoune
<i>Coelocaryon preussii</i> Warb.	Myristicaceae	Africa	Ékoune
<i>Coelostegia griffithii</i> Benth.	Malvaceae (Bombacaceae)	Asia, Oceania	Durian
<i>Coelostegia</i> p.p.	Malvaceae (Bombacaceae)	Asia, Oceania	Durian
<i>Combretodendron africanum</i> Exell (cf. <i>Petersianthus macrocarpus</i>)	Lecythidaceae	Africa	Essia
<i>Copaifera duckei</i> Dwyer	Leguminosae (Caesalpiniaceae)	Latin America	Copaiba
<i>Copaifera letestui</i> Pellegr. (cf. <i>Sindoropsis letestui</i>)	Leguminosae (Caesalpiniaceae)	Africa	Ghéombi
<i>Copaifera martii</i> Hayne	Leguminosae (Caesalpiniaceae)	Latin America	Copaiba
<i>Copaifera mildbraedii</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Étimoé
<i>Copaifera multijuga</i> Hayne	Leguminosae (Caesalpiniaceae)	Latin America	Copaiba
<i>Copaifera officinalis</i> L.	Leguminosae (Caesalpiniaceae)	Latin America	Copaiba
<i>Copaifera</i> p.p.	Leguminosae (Caesalpiniaceae)	Latin America	Copaiba
<i>Copaifera palustris</i> Dewit (cf. <i>Pseudosindora palustris</i>)	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Copaifera religiosa</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Anzèm / Nténé*
<i>Copaifera reticulata</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Copaiba
<i>Copaifera salikounda</i> Heckel	Leguminosae (Caesalpiniaceae)	Africa	Étimoé
<i>Cordia abyssinica</i> R. Br. (cf. <i>C. africana</i>)	Boraginaceae	Africa	African Cordia* / Cordia d'Afrique
<i>Cordia africana</i> Lam.	Boraginaceae	Africa	African Cordia* / Cordia d'Afrique
<i>Cordia goeldiana</i> Huber	Boraginaceae	Latin America	Freijo / Laurel blanco*
<i>Cordia holstii</i> Gürke (cf. <i>C. africana</i>)	Boraginaceae	Africa	African Cordia* / Cordia d'Afrique
<i>Cordia millenii</i> Baker	Boraginaceae	Africa	African Cordia* / Cordia d'Afrique
<i>Cordia</i> p.p.	Boraginaceae	Africa	African Cordia* / Cordia d'Afrique
<i>Cordia</i> p.p.	Boraginaceae	Latin America	Freijo / Laurel blanco*
<i>Cordia platythyrsa</i> Baker	Boraginaceae	Africa	African Cordia* / Cordia d'Afrique
<i>Cordia trichotoma</i> Arrab.	Boraginaceae	Latin America	Freijo / Laurel blanco*
<i>Cotylelobium burckii</i> Heim	Dipterocarpaceae	Asia, Oceania	Resak
<i>Cotylelobium lanceolatum</i> Craib	Dipterocarpaceae	Asia, Oceania	Resak
<i>Cotylelobium melanoxyton</i> Pierre	Dipterocarpaceae	Asia, Oceania	Resak
<i>Cotylelobium</i> p.p.	Dipterocarpaceae	Asia, Oceania	Resak
<i>Coula edulis</i> Baill.	Olcaceae	Africa	Coula

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<i>Coumarouna odorata</i> Aubl. (cf. <i>Dipteryx odorata</i>)	Leguminosae (Fabaceae)	Latin America	Cumaru / Tonka*
<i>Couratari fagifolia</i> Eyma (cf. <i>C. multiflora</i>)	Lecythidaceae	Latin America	Tauari
<i>Couratari guianensis</i> Aubl.	Lecythidaceae	Latin America	Tauari
<i>Couratari macrosperma</i> A.C. Sm.	Lecythidaceae	Latin America	Tauari
<i>Couratari multiflora</i> Eyma	Lecythidaceae	Latin America	Tauari
<i>Couratari oblongifolia</i> Ducke	Lecythidaceae	Latin America	Tauari
<i>Couratari</i> p.p.	Lecythidaceae	Latin America	Tauari
<i>Couroupita guianensis</i> Aubl.	Lecythidaceae	Latin America	Couroupita
<i>Couroupita</i> p.p.	Lecythidaceae	Latin America	Couroupita
<i>Couroupita subsessilis</i> Pilg.	Lecythidaceae	Latin America	Couroupita
<i>Cratoxylum arborescens</i> Blume	Hypericaceae	Asia, Oceania	Geronggang
<i>Cratoxylum glaucum</i> Korth.	Hypericaceae	Asia, Oceania	Geronggang
<i>Cratoxylum</i> p.p.	Hypericaceae	Asia, Oceania	Geronggang
<i>Cryptomeria japonica</i> D. Don	Taxodiaceae	Asia-Oceania, Réunion Island	Cryptomeria* / Sugi
<i>Cylicodiscus gabunensis</i> Harms	Leguminosae (Mimosaceae)	Africa	Okan
<i>Cynometra ananta</i> Hutch. & Dalziel	Leguminosae (Caesalpiniaceae)	Africa	Nganga
<i>Cynometra hankei</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Nganga
<i>Cynometra</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Nganga
<i>Dacryodes buettneri</i> H.J. Lam	Burseraceae	Africa	Ozigo
<i>Dacryodes costata</i> H.J. Lam	Burseraceae	Asia, Oceania	Kedondong
<i>Dacryodes excelsa</i> Vahl	Burseraceae	Latin America	Gommier
<i>Dacryodes heterotricha</i> H.J. Lam	Burseraceae	Africa	Safukala
<i>Dacryodes hexandra</i> Griseb. (cf. <i>D. excelsa</i>)	Burseraceae	Latin America	Gommier
<i>Dacryodes igaganga</i> Aubrév. & Pellegr.	Burseraceae	Africa	Igaganga
<i>Dacryodes normandii</i> Aubrév. & Pellegr.	Burseraceae	Africa	Ossabel
<i>Dacryodes occidentalis</i> Cuatrec.	Burseraceae	Latin America	Gommier
<i>Dacryodes olivifera</i> Cuatrec.	Burseraceae	Latin America	Gommier
<i>Dacryodes</i> p.p.	Burseraceae	Latin America	Gommier
<i>Dacryodes peruviana</i> H.J. Lam	Burseraceae	Latin America	Gommier
<i>Dacryodes pubescens</i> H.J. Lam	Burseraceae	Africa	Safukala
<i>Dalbergia latifolia</i> Roxb.	Leguminosae (Fabaceae)	Asia, Oceania	Rosewood, Sonokeling
<i>Dalbergia melanoxydon</i> Guill. & Perr.	Leguminosae (Fabaceae)	Africa	Grenadillo
<i>Dalbergia oliveri</i> Gamb.	Leguminosae (Fabaceae)	Asia, Oceania	Rosewood, Tamalan
<i>Dalbergia spruceana</i> Benth.	Leguminosae (Fabaceae)	Asia, Oceania	Rosewood, Para
<i>Daniellia klainei</i> Pierre	Leguminosae (Caesalpiniaceae)	Africa	Faro / Ogea*
<i>Daniellia ogea</i> Rolfe	Leguminosae (Caesalpiniaceae)	Africa	Faro / Ogea*
<i>Daniellia</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Faro / Ogea*
<i>Daniellia soyauxii</i> Rolfe	Leguminosae (Caesalpiniaceae)	Africa	Faro / Ogea*
<i>Daniellia thurifera</i> Benn.	Leguminosae (Caesalpiniaceae)	Africa	Faro / Ogea*
<i>Desbordesia glaucescens</i> V. T. (cf. <i>D. insignis</i>)	Irvingiaceae	Africa	Alep
<i>Desbordesia insignis</i> Pierre	Irvingiaceae	Africa	Alep
<i>Desbordesia pierreana</i> V.T. (cf. <i>D. insignis</i>)	Irvingiaceae	Africa	Alep
<i>Detarium macrocarpum</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Mambodé
<i>Detarium senegalense</i> J.F. Gmel.	Leguminosae (Caesalpiniaceae)	Africa	Mambodé

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<i>Dialium aubrevillei</i> Pellegr.	Leguminosae (Caesalpiniaceae)	Africa	Éyoum
<i>Dialium bipindense</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Éyoum
<i>Dialium cochinchinensis</i> Pierre	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Keranji
<i>Dialium dinklagei</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Éyoum
<i>Dialium indum</i> L.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Keranji
<i>Dialium</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Éyoum
<i>Dialium</i> p.p.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Keranji
<i>Dialium pachyphyllum</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Éyoum
<i>Dialium platysepalum</i> Baker	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Keranji
<i>Dialyanthera</i> p.p. (cf. <i>Otoba</i> p.p.)	Myristicaceae	Latin America	Virola / Dalli*
<i>Dicorynia guianensis</i> Amsh.	Leguminosae (Caesalpiniaceae)	Latin America	Basralocus
<i>Dicorynia paraensis</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Basralocus
<i>Didelotia africana</i> Baill.	Leguminosae (Caesalpiniaceae)	Africa	Gombé
<i>Didelotia brevipaniculata</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Gombé
<i>Didelotia idae</i> Oldeman & Al.	Leguminosae (Caesalpiniaceae)	Africa	Gombé
<i>Didelotia letouzeyi</i> Pellegr.	Leguminosae (Caesalpiniaceae)	Africa	Gombé
<i>Didelotia</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Gombé
<i>Didymopanax morototoni</i> Decne. & Planch. (cf. <i>Schefflera morototoni</i>)	Araliaceae	Latin America	Morototo
<i>Dillenia aurea</i> Sm.	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia excelsa</i> Gilg	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia eximia</i> Miq.	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia grandifolia</i> Wall.	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia indica</i> L.	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia ovata</i> Wall.	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia</i> p.p.	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dillenia papuana</i> Martelli	Dilleniaceae	Asia, Oceania	Simpoh
<i>Dimorphandra hohenkerkii</i> Sprague & Sandw. (cf. <i>D. polyandra</i>)	Leguminosae (Caesalpiniaceae)	Latin America	Aiéouéko / Dakama*
<i>Dimorphandra</i> p.p.	Leguminosae (Caesalpiniaceae)	Latin America	Aiéouéko / Dakama*
<i>Dimorphandra polyandra</i> Benoist	Leguminosae (Caesalpiniaceae)	Latin America	Aiéouéko / Dakama*
<i>Dinizia excelsa</i> Ducke	Leguminosae (Mimosaceae)	Latin America	Angelim vermelho
<i>Diospyros celebica</i> Bakh.	Ebenaceae	Asia, Oceania	Asian Grained Ebony* / Ébène veinée d'Asie
<i>Diospyros crassiflora</i> Hiern	Ebenaceae	Africa	African Ebony* / Ébène d'Afrique
<i>Diospyros ebenum</i> Koen.	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros ferrea</i> Willd. (cf. <i>D. vera</i>)	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros marmorata</i> Roxb.	Ebenaceae	Asia, Oceania	Asian Grained Ebony* / Ébène veinée d'Asie
<i>Diospyros melanoxydon</i> Roxb.	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros mespiliformis</i> Hochst.	Ebenaceae	Africa	African Ebony* / Ébène d'Afrique
<i>Diospyros mollis</i> Griff.	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros mun</i> H. Lec.	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros</i> p.p.	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros</i> p.p.	Ebenaceae	Asia, Oceania	Asian Grained Ebony* / Ébène veinée d'Asie

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<i>Diospyros</i> p.p.	Ebenaceae	Africa	African Ebony* / Ébène d'Afrique
<i>Diospyros rumphii</i> Bakh.	Ebenaceae	Asia, Oceania	Asian Grained Ebony* / Ébène veinée d'Asie
<i>Diospyros vera</i> A. Chev.	Ebenaceae	Asia, Oceania	Asian Black Ebony* / Ébène noire d'Asie
<i>Diospyros viridicans</i> Hiern	Ebenaceae	Africa	African Ebony* / Ébène d'Afrique
<i>Diploptropis guianensis</i> Benth. (cf. <i>D. purpurea</i>)	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Diploptropis martiusii</i> Benth.	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Diploptropis</i> p.p.	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Diploptropis purpurea</i> Amsh.	Leguminosae (Fabaceae)	Latin America	Sucupira preta
<i>Dipterocarpus acutangulus</i> Vesque	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus alatus</i> Roxb.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus appendiculatus</i> Scheff.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus baudii</i> Korth.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus borneensis</i> Slooten	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus caudatus</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus costulatus</i> Slooten	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus gracilis</i> Blume	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus grandiflorus</i> Blco.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus kerrii</i> King	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus</i> p.p.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus pilosus</i> Roxb. (cf. <i>D. gracilis</i>)	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipterocarpus verrucosus</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Keruing
<i>Dipteryx alata</i> Vogel	Leguminosae (Fabaceae)	Latin America	Cumaru / Tonka*
<i>Dipteryx micrantha</i> Harms	Leguminosae (Fabaceae)	Latin America	Cumaru / Tonka*
<i>Dipteryx odorata</i> Willd.	Leguminosae (Fabaceae)	Latin America	Cumaru / Tonka*
<i>Dipteryx</i> p.p.	Leguminosae (Fabaceae)	Latin America	Cumaru / Tonka*
<i>Dipteryx polyphylla</i> Huber	Leguminosae (Fabaceae)	Latin America	Cumaru / Tonka*
<i>Distemonanthus benthamianus</i> Baill.	Leguminosae (Caesalpiniaceae)	Africa	Movingui / Ayan*
<i>Dryobalanops aromatica</i> Gaertn. (cf. <i>D. sumatrensis</i>)	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops beccarii</i> Dyer	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops fusca</i> Slooten	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops lanceolata</i> Burck	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops oblongifolia</i> Dyer	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops oocarpa</i> Slooten (cf. <i>D. beccarii</i>)	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops</i> p.p.	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops rappa</i> Becc.	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Dryobalanops sumatrensis</i> Kosterm.	Dipterocarpaceae	Asia, Oceania	Kapur
<i>Duabanga grandiflora</i> Walp.	Lythraceae (Sonneratiaceae)	Asia, Oceania	Duabanga
<i>Duabanga moluccana</i> Blume	Lythraceae (Sonneratiaceae)	Asia, Oceania	Duabanga
<i>Durio</i> p.p.	Malvaceae (Bombacaceae)	Asia, Oceania	Durian
<i>Durio zibethinus</i> L.	Malvaceae (Bombacaceae)	Asia, Oceania	Durian
<i>Dyera costulata</i> Hook. f.	Apocynaceae	Asia, Oceania	Jelutong
<i>Dyera</i> p.p.	Apocynaceae	Asia, Oceania	Jelutong
<i>Dyera polyphylla</i> Steenis	Apocynaceae	Asia, Oceania	Jelutong
<i>Endospermum diadenum</i> Airy Shaw	Euphorbiaceae	Asia, Oceania	Sesendok
<i>Endospermum medullosum</i> L.S. Sm.	Euphorbiaceae	Asia, Oceania	Sesendok

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<i>Endospermum peltatum</i> Merr.	Euphorbiaceae	Asia, Oceania	Sesendok
<i>Entandrophragma angolense</i> C. DC.	Meliaceae	Africa	Tiama / Gedu Nohor*
<i>Entandrophragma candollei</i> Harms	Meliaceae	Africa	Kosipo
<i>Entandrophragma congoense</i> A. Chev.	Meliaceae	Africa	Tiama / Gedu Nohor*
<i>Entandrophragma cylindricum</i> Sprague	Meliaceae	Africa	Sapelli / Sapele*
<i>Entandrophragma excelsum</i> (Dawe & Sprague) Sprague	Meliaceae	Africa	Tiama / Gedu Nohor*
<i>Entandrophragma utile</i> Sprague	Meliaceae	Africa	Sipo / Utile*
<i>Enterolobium contortisiliquum</i> Morong	Leguminosae (Mimosaceae)	Latin America	Tamboril
<i>Enterolobium cyclocarpum</i> Griseb.	Leguminosae (Mimosaceae)	Latin America	Tamboril
<i>Enterolobium maximum</i> Ducke	Leguminosae (Mimosaceae)	Latin America	Tamboril
<i>Enterolobium schomburgkii</i> Benth.	Leguminosae (Mimosaceae)	Latin America	Batibatra
<i>Eperua falcata</i> Aubl.	Leguminosae (Caesalpinaceae)	Latin America	Wallaba
<i>Eperua jenmanii</i> Oliv.	Leguminosae (Caesalpinaceae)	Latin America	Wallaba
<i>Eperua</i> p.p.	Leguminosae (Caesalpinaceae)	Latin America	Wallaba
<i>Eperua rubiginosa</i> Miq.	Leguminosae (Caesalpinaceae)	Latin America	Wallaba
<i>Eribrroma oblongum</i> Pierre	Malvaceae (Sterculiaceae)	Africa	Éyong / White Sterculia*
<i>Erisma nitidum</i> DC.	Vochysiaceae	Latin America	Cambara
<i>Erisma</i> p.p.	Vochysiaceae	Latin America	Cambara
<i>Erisma uncinatum</i> Warm.	Vochysiaceae	Latin America	Cambara
<i>Erismadelphus exsul</i> Mildbr.	Vochysiaceae	Africa	Angoa
<i>Erythrophleum guineense</i> G. Don	Leguminosae (Caesalpinaceae)	Africa	Tali / Missanda*
<i>Erythrophleum ivorense</i> A. Chev.	Leguminosae (Caesalpinaceae)	Africa	Tali / Missanda*
<i>Erythrophleum</i> p.p.	Leguminosae (Caesalpinaceae)	Africa	Tali / Missanda*
<i>Erythrophleum suaveolens</i> Brenan	Leguminosae (Caesalpinaceae)	Africa	Tali / Missanda*
<i>Erythroxylum manni</i> Oliv.	Erythroxylaceae	Africa	Landa
<i>Eucalyptus delegatensis</i> F. Muell.	Myrtaceae	Asia, Oceania	Tasmanian Oak
<i>Eucalyptus diversicolor</i> F. Muell.	Myrtaceae	Asia, Oceania	Karri
<i>Eucalyptus gigantea</i> Dehnh. (cf. <i>E. delegatensis</i>)	Myrtaceae	Asia, Oceania	Tasmanian Oak
<i>Eucalyptus grandis</i> W. Hill	Myrtaceae	Asia, Oceania	Eucalyptus grandis
<i>Eucalyptus marginata</i> Donn	Myrtaceae	Asia, Oceania	Jarrah
<i>Eucalyptus obliqua</i> L'Hér.	Myrtaceae	Asia, Oceania	Tasmanian Oak
<i>Eucalyptus</i> p.p.	Myrtaceae	Asia, Oceania	Tasmanian Oak
<i>Eucalyptus regnans</i> F. Muell.	Myrtaceae	Asia, Oceania	Tasmanian Oak
<i>Eusideroxylon zwageri</i> Teijsm. & Binn.	Lauraceae	Asia, Oceania	Billian
<i>Euxylophora paraensis</i> Huber	Rutaceae	Latin America	Pau amarelo
<i>Fagara heitzii</i> Pellegr. (cf. <i>Zanthoxylum heitzii</i>)	Rutaceae	Africa	Olon
<i>Fagus sylvatica</i> L.	Fagaceae	Europe	Beech
<i>Fillaeopsis discophora</i> Harms	Leguminosae (Mimosaceae)	Africa	Nieuk
<i>Fleroya ledermannii</i> Y.F. Abura	Rubiaceae	Africa	Abura
<i>Fleroya rubrostipulata</i> Y.F. Abura	Rubiaceae	Africa	Abura
<i>Fleroya stipulosa</i> Y.F. Abura	Rubiaceae	Africa	Abura
<i>Fraxinus excelsior</i> L.	Oleaceae	Europe	Ash
<i>Gambeya africana</i> Pierre (cf. <i>Chrysophyllum africana</i>)	Sapotaceae	Africa	Longhi

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<i>Gambeya lacourtiana</i> Aubrév. & Pellegr. (cf. <i>Chrysophyllum lacourtiana</i>)	Sapotaceae	Africa	Longhi
<i>Gambeya</i> p.p. (cf. <i>Chrysophyllum</i>)	Sapotaceae	Africa	Longhi
<i>Gambeya subnuda</i> Pierre (cf. <i>Chrysophyllum subnuda</i>)	Sapotaceae	Africa	Longhi
<i>Gambeyobotrys gigantea</i> Aubrév. (cf. <i>Chrysophyllum giganteum</i>)	Sapotaceae	Africa	Aniégré / Anigeria*
<i>Garuga</i> p.p.	Burseraceae	Asia, Oceania	Kedondong
<i>Gilbertiodendron dewevrei</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Limbali
<i>Gilbertiodendron</i> p.p.	Leguminosae (Caesalpiniaceae)	Africa	Limbali
<i>Gilbertiodendron preussii</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Limbali
<i>Gilbertiodendron splendidum</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Limbali
<i>Gluta beccarii</i> Ding Hou	Anacardiaceae	Asia, Oceania	Rengas
<i>Gluta malayana</i> Ding Hou	Anacardiaceae	Asia, Oceania	Rengas
<i>Gluta</i> p.p.	Anacardiaceae	Asia, Oceania	Rengas
<i>Gluta renghas</i> L.	Anacardiaceae	Asia, Oceania	Rengas
<i>Gmelina arborea</i> Roxb.	Lamiaceae (Verbenaceae)	Asia, Oceania	Yemane
<i>Gonystylus bancanus</i> Kurz	Thymeleaceae	Asia, Oceania	Ramin
<i>Gonystylus macrophyllus</i> Airy Shaw	Thymeleaceae	Asia, Oceania	Ramin
<i>Gonystylus maingayi</i> Hook. f.	Thymeleaceae	Asia, Oceania	Ramin
<i>Gonystylus</i> p.p.	Thymeleaceae	Asia, Oceania	Ramin
<i>Gosseweierodendron balsamiferum</i> Harms (cf. <i>Prioria balsamifera</i>)	Leguminosae (Caesalpiniaceae)	Africa	Tola / Agba*
<i>Goupia glabra</i> Aubl.	Goupiaceae	Latin America	Cupiuba / Kabukalli*
<i>Guarea cedrata</i> Pellegr.	Meliaceae	Africa	Guarea, Scented* / Bossé clair
<i>Guarea laurentii</i> De Wild.	Meliaceae	Africa	Guarea, Scented* / Bossé clair
<i>Guarea</i> p.p.	Meliaceae	Africa	Guarea, Scented* / Bossé clair
<i>Guarea thompsonii</i> Sprague	Meliaceae	Africa	Guarea, Black* / Bossé foncé
<i>Guibourtia arnoldiana</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Mutényé
<i>Guibourtia demeusei</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Bubinga
<i>Guibourtia ehie</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Ovèngkol
<i>Guibourtia pellegriniana</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Bubinga
<i>Guibourtia tessmannii</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Bubinga
<i>Haldina cordifolia</i> Ridsdale	Rubiaceae	Asia, Oceania	Haldu
<i>Hallea ledermannii</i> J.-F. Leroy (cf. <i>Fleroya ledermannii</i>)	Rubiaceae	Africa	Abura
<i>Hallea rubrostipulata</i> J.-F. Leroy (cf. <i>Fleroya rubrostipulata</i>)	Rubiaceae	Africa	Abura
<i>Hallea stipulosa</i> J.-F. Leroy (cf. <i>Fleroya stipulosa</i>)	Rubiaceae	Africa	Abura
<i>Handroanthus heptaphylla</i> A. Mattos	Bignoniaceae	Latin America	Ipê
<i>Handroanthus impetiginosa</i> A. Mattos	Bignoniaceae	Latin America	Ipê
<i>Handroanthus</i> p.p.	Bignoniaceae	Latin America	Ipê
<i>Handroanthus serratifolia</i> S.O. Ipê	Bignoniaceae	Latin America	Ipê
<i>Haplormosia monophylla</i> Harms	Leguminosae (Fabaceae)	Africa	Idéwa
<i>Heritiera densiflora</i> Kosterm.	Malvaceae (Sterculiaceae)	Africa	Niangon
<i>Heritiera javanica</i> Kosterm.	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang

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<i>Heritiera</i> p.p.	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Heritiera</i> p.p.	Malvaceae (Sterculiaceae)	Africa	Niangon
<i>Heritiera simplicifolia</i> Kosterm.	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Heritiera sumatrana</i> Kosterm.	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Heritiera utilis</i> Kosterm.	Malvaceae (Sterculiaceae)	Africa	Niangon
<i>Hevea brasiliensis</i> Muell. Arg.	Euphorbiaceae	Africa, Latin America, Asia, Oceania	Hevea / Rubberwood*
<i>Hexalobus crispiflorus</i> A. Rich.	Annonaceae	Africa	Owui
<i>Holoptelea grandis</i> Mildbr.	Ulmaceae	Africa	Kékélé
<i>Hopea apiculata</i> Symington	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea dryobalanoides</i> Miq.	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea ferrea</i> Laness.	Dipterocarpaceae	Asia, Oceania	Giam
<i>Hopea forbesii</i> Slooten	Dipterocarpaceae	Asia, Oceania	Giam
<i>Hopea griffithii</i> Kurz	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea helferi</i> Brandis	Dipterocarpaceae	Asia, Oceania	Giam
<i>Hopea lowii</i> Dyer	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea mengarawan</i> Miq.	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea nervosa</i> King	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea nutans</i> Ridl.	Dipterocarpaceae	Asia, Oceania	Giam
<i>Hopea odorata</i> Roxb.	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Giam
<i>Hopea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea papuana</i> Diels	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea pierrei</i> Hance	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea sangal</i> Korth.	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hopea sulcata</i> Symington	Dipterocarpaceae	Asia, Oceania	Merawan
<i>Hura crepitans</i> L.	Euphorbiaceae	Latin America	Açacu / Sandbox*
<i>Hymenaea courbaril</i> L.	Leguminosae (Caesalpiniaceae)	Latin America	Jatobá / Algarrobo*
<i>Hymenaea davisii</i> Sandw. (cf. <i>H. oblongifolia</i>)	Leguminosae (Caesalpiniaceae)	Latin America	Jatobá / Algarrobo*
<i>Hymenaea intermedia</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Jatobá / Algarrobo*
<i>Hymenaea oblongifolia</i> Huber	Leguminosae (Caesalpiniaceae)	Latin America	Jatobá / Algarrobo*
<i>Hymenaea</i> p.p.	Leguminosae (Caesalpiniaceae)	Latin America	Jatobá / Algarrobo*
<i>Hymenolobium elatum</i> Ducke	Leguminosae (Fabaceae)	Latin America	Angelim
<i>Hymenolobium excelsum</i> Ducke	Leguminosae (Fabaceae)	Latin America	Angelim
<i>Hymenolobium</i> p.p.	Leguminosae (Fabaceae)	Latin America	Angelim
<i>Hymenolobium petraeum</i> Ducke	Leguminosae (Fabaceae)	Latin America	Angelim
<i>Inga alba</i> Willd.	Leguminosae (Mimosaceae)	Latin America	Inga
<i>Inga</i> p.p.	Leguminosae (Mimosaceae)	Latin America	Inga
<i>Inga pezizifera</i> Benth.	Leguminosae (Mimosaceae)	Latin America	Inga
<i>Intsia amboinensis</i> Thouars (cf. <i>I. bijuga</i>)	Leguminosae (Caesalpiniaceae)	Asia, Océania (+ Madagascar)	Merbau
<i>Intsia backeri</i> Prain (cf. <i>I. palembanica</i>)	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Merbau
<i>Intsia bijuga</i> Kuntze	Leguminosae (Caesalpiniaceae)	Asia, Océania (+ Madagascar)	Merbau
<i>Intsia cuanzensis</i> Oliv. (cf. <i>Afzelia quanzensis</i>)	Leguminosae (Caesalpiniaceae)	Africa	Doussié / Afzelia*
<i>Intsia</i> p.p.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Merbau
<i>Intsia palembanica</i> Miq.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Merbau
<i>Intsia retusa</i> Kuntze (cf. <i>I. bijuga</i>)	Leguminosae (Caesalpiniaceae)	Asia, Océania (+ Madagascar)	Merbau

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<i>Irvingia gabonensis</i> (Aubry-Lecomte ex O'Rorke) Baill.	Irvingiaceae	Africa	Andok
<i>Irvingia grandifolia</i> (Engl.) Engl.	Irvingiaceae	Africa	Olène
<i>Jacaranda copaia</i> D. Don	Bignoniaceae	Latin America	Parapará
<i>Juglans australis</i> Griseb.	Juglandaceae	Latin America	Nogal
<i>Juglans boliviana</i> Dode	Juglandaceae	Latin America	Nogal
<i>Juglans neotropica</i> Diels	Juglandaceae	Latin America	Nogal
<i>Juglans p.p.</i>	Juglandaceae	Latin America	Nogal
<i>Juglans regia</i> L.	Juglandaceae	Europe	Walnut
<i>Julbernardia pellegriniana</i> Troupin	Leguminosae (Caesalpiniaceae)	Africa	Awoura
<i>Julbernardia seretii</i> Troupin	Leguminosae (Caesalpiniaceae)	Africa	Alumbi
<i>Khaya anthotheca</i> C. DC.	Meliaceae	Africa	African Mahogany* / Acajou d'Afrique
<i>Khaya grandifoliola</i> C. DC.	Meliaceae	Africa	African Mahogany* / Acajou d'Afrique
<i>Khaya ivorensis</i> A. Chev.	Meliaceae	Africa	African Mahogany* / Acajou d'Afrique
<i>Khaya klainei</i> Pierre (cf. <i>K. ivorensis</i>)	Meliaceae	Africa	African Mahogany* / Acajou d'Afrique
<i>Khaya senegalensis</i> A. Juss.	Meliaceae	Africa	Acajou Cailcédrat
<i>Klainedoxa gabonensis</i> Pierre	Irvingiaceae	Africa	Éveuss
<i>Klainedoxa trillesii</i> Pierre	Irvingiaceae	Africa	Éveuss
<i>Koompassia malaccensis</i> Maing.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Kempas
<i>Lagerstroemia p.p.</i>	Lythraceae	Asia, Oceania	Bungur
<i>Lannea welwitschii</i> Engl.	Anacardiaceae	Africa	Kumbi
<i>Larix decidua</i> Mill.	Pinaceae	Europe	European Larch
<i>Larix europaea</i> Lam. & A.DC. (cf. <i>Larix decidua</i>)	Pinaceae	Europe	European Larch
<i>Lecythis p.p.</i>	Lecythidaceae	Latin America	Sapucaia
<i>Letestua durissima</i> Lecomte	Sapotaceae	Africa	Congotali
<i>Lophira alata</i> Banks	Ochnaceae	Africa	Azobé / Ekki*
<i>Lophira procera</i> A. Chev. (cf. <i>L. alata</i>)	Ochnaceae	Africa	Azobé / Ekki*
<i>Lophopetalum javanum</i> Turcz.	Celastraceae	Asia, Oceania	Perupok
<i>Lophopetalum multinervium</i> Ridl.	Celastraceae	Asia, Oceania	Perupok
<i>Lophopetalum p.p.</i>	Celastraceae	Asia, Oceania	Perupok
<i>Lophopetalum wightianum</i> Arn.	Celastraceae	Asia, Oceania	Perupok
<i>Lovoa klaineana</i> Pierre (cf. <i>Lovoa trichilioides</i>)	Meliaceae	Africa	Dibétou
<i>Lovoa swynnertonii</i> Baker	Meliaceae	Africa	Dibétou
<i>Lovoa trichilioides</i> Harms	Meliaceae	Africa	Dibétou
<i>Maclura tinctoria</i> D. Don	Moraceae	Latin America	Moral
<i>Macrolobium dewevrei</i> De Wild. (cf. <i>Gilbertiodendron dewevrei</i>)	Leguminosae (Caesalpiniaceae)	Africa	Limbali
<i>Madhuca betis</i> J.F. Macbr.	Sapotaceae	Asia, Oceania	Bitis
<i>Madhuca burckiana</i> H.J. Lam	Sapotaceae	Asia, Oceania	Nyatoh
<i>Madhuca malaccensis</i> H.J. Lam	Sapotaceae	Asia, Oceania	Nyatoh
<i>Madhuca motleyana</i> J.F. Macbr.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Madhuca p.p.</i>	Sapotaceae	Asia, Oceania	Bitis
<i>Madhuca p.p.</i>	Sapotaceae	Asia, Oceania	Nyatoh
<i>Madhuca utilis</i> H.J. Lam	Sapotaceae	Asia, Oceania	Bitis
<i>Maesopsis eminii</i> Engl.	Rhamnaceae	Africa	Musizi
<i>Malacantha superba</i> Vermeesen (cf. <i>Pouteria superba</i>)	Sapotaceae	Africa	Aniégré / Aningeria*

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<i>Mammea africana</i> Sabine	Calophyllaceae (Clusiaceae)	Africa	Oboto
<i>Mangifera foetida</i> Lour.	Anacardiaceae	Asia, Oceania	Mango / Machang*
<i>Mangifera indica</i> L.	Anacardiaceae	Asia, Oceania	Mango / Machang*
<i>Mangifera laurina</i> Blume	Anacardiaceae	Asia, Oceania	Mango / Machang*
<i>Mangifera</i> p.p.	Anacardiaceae	Asia, Oceania	Mango / Machang*
<i>Manilkara bidentata</i> A. Chev.	Sapotaceae	Latin America	Maçaranduba / Bulletwood*
<i>Manilkara huberi</i> Ducke	Sapotaceae	Latin America	Maçaranduba / Bulletwood*
<i>Manilkara mabokeensis</i> Aubrév.	Sapotaceae	Africa	Monghinza
<i>Manilkara obovata</i> J.H. Hemsl.	Sapotaceae	Africa	Monghinza
<i>Manilkara</i> p.p.	Sapotaceae	Latin America	Maçaranduba / Bulletwood*
<i>Manilkara</i> p.p.	Sapotaceae	Africa	Monghinza
<i>Mansonia altissima</i> A. Chev.	Malvaceae (Sterculiaceae)	Africa	Bété / Mansonia*
<i>Maquira sclerophylla</i> C.C. Muiratinga	Moraceae	Latin America	Muiratinga
<i>Marmaroxylon racemosum</i> Record (cf. <i>Zygia racemosa</i>)	Leguminosae (Mimosaceae)	Latin America	Angelim rajado / Snakewood*
<i>Melanorrhoea</i> p.p. (cf. <i>Gluta</i>)	Anacardiaceae	Asia, Oceania	Rengas
<i>Mezilaurus itauba</i> Taub.	Lauraceae	Latin America	Itaúba
<i>Mezilaurus lindaviana</i> Schwacke & Mez	Lauraceae	Latin America	Itaúba
<i>Mezilaurus navalium</i> Taub.	Lauraceae	Latin America	Itaúba
<i>Mezilaurus</i> p.p.	Lauraceae	Latin America	Itaúba
<i>Microberlinia bisulcata</i> A. Chev.	Leguminosae (Caesalpiniaceae)	Africa	Zingana / Zebrano*
<i>Microberlinia brazzavillensis</i> A. Chev.	Leguminosae (Caesalpiniaceae)	Africa	Zingana / Zebrano*
<i>Micropholis gardnerianum</i> Pierre	Sapotaceae	Latin America	Curupixa
<i>Micropholis melinoniana</i> Pierre	Sapotaceae	Latin America	Curupixa
<i>Micropholis</i> p.p.	Sapotaceae	Latin America	Curupixa
<i>Micropholis venulosa</i> Pierre	Sapotaceae	Latin America	Curupixa
<i>Milicia excelsa</i> C.C. Muiratinga	Moraceae	Africa	Iroko
<i>Milicia regia</i> C.C. Muiratinga	Moraceae	Africa	Iroko
<i>Millettia laurentii</i> De Wild.	Leguminosae (Fabaceae)	Africa	Wengé
<i>Millettia stuhlmannii</i> Taub.	Leguminosae (Fabaceae)	Africa	Wengé
<i>Mimusops congolensis</i> De Wild. (cf. <i>Austranella congolensis</i>)	Sapotaceae	Africa	Mukulungu
<i>Mimusops djave</i> Engl. (cf. <i>Baillonella toxisperma</i>)	Sapotaceae	Africa	Moabi
<i>Mimusops elengi</i> L.	Sapotaceae	Asia, Oceania	Bitis
<i>Monopetalanthus coriacea</i> Aubrév. (cf. <i>Bikinia coriacea</i>)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Monopetalanthus durandii</i> F. Halle & Normand (cf. <i>Bikinia durandii</i>)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Monopetalanthus hedinii</i> Pellegr. (cf. <i>Aphanocalyx hedinii</i>)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Monopetalanthus heitzii</i> Pellegr. (cf. <i>Aphanocalyx heitzii</i>)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Monopetalanthus le-testui</i> Pellegr. (cf. <i>Bikinia le-testui</i>)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Monopetalanthus</i> p.p. (cf. <i>Bikinia</i> p.p.)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Monopetalanthus pellegrini</i> Pellegr. (cf. <i>Bikinia pellegrini</i>)	Leguminosae (Caesalpiniaceae)	Africa	Andoung
<i>Mora excelsa</i> Benth.	Leguminosae (Caesalpiniaceae)	Africa	Mora

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<i>Mora</i> p.p.	Leguminosae (Caesalpiniaceae)	África	Mora
<i>Mora paraensis</i> Ducke	Leguminosae (Caesalpiniaceae)	África	Mora
<i>Moronobea coccinea</i> Aubl.	Clusiaceae	Latin America	Manniballi
<i>Morus lactea</i> Mildbr. (cf. <i>M. mesozygia</i>)	Moraceae	África	Difou
<i>Morus mesozygia</i> Stapf	Moraceae	África	Difou
<i>Myroxylon balsamum</i> Harms	Leguminosae (Fabaceae)	Latin America	Balsamo
<i>Myroxylon peruiferum</i> L.	Leguminosae (Fabaceae)	Latin America	Balsamo
<i>Myroxylon toluiferum</i> H.B.K. (cf. <i>M. balsamum</i>)	Leguminosae (Fabaceae)	Latin America	Balsamo
<i>Nauclea diderrichii</i> Merr.	Rubiaceae	África	Bilinga / Opepe*
<i>Nauclea gillettii</i> Merr.	Rubiaceae	África	Bilinga / Opepe*
<i>Nauclea trillesii</i> Merr. (cf. <i>N. diderrichii</i>)	Rubiaceae	África	Bilinga / Opepe*
<i>Nauclea xanthoxylon</i> Aubrév.	Rubiaceae	África	Bilinga / Opepe*
<i>Nectandra elaiophora</i> Barb. Rodr. (cf. <i>Ocotea cymbarum</i>)	Lauraceae	Latin America	Louro branco
<i>Neesia</i> p.p.	Malvaceae (Bombacaceae)	Asia, Oceania	Durian
<i>Neobalanocarpus heimii</i> P.S. Ashton	Dipterocarpaceae	Asia, Oceania	Chengal
<i>Nesogordonia fouassieri</i> Capuron	Malvaceae (Sterculiaceae)	África	Kotibé / Danta*
<i>Nesogordonia kabingaensis</i> Capuron	Malvaceae (Sterculiaceae)	África	Kotibé / Danta*
<i>Nesogordonia leplaei</i> Capuron	Malvaceae (Sterculiaceae)	África	Kotibé / Danta*
<i>Nesogordonia papaverifera</i> Capuron	Malvaceae (Sterculiaceae)	África	Kotibé / Danta*
<i>Newtonia leucocarpa</i> Gilbert & Boutique	Leguminosae (Mimosaceae)	África	Ossimiale
<i>Newtonia suaveolens</i> Brenan (cf. <i>Pseudopiptadenia suaveolens</i>)	Leguminosae (Mimosaceae)	Latin America	Timborana
<i>Ochroma lagopus</i> Sw. (cf. <i>O. pyramidale</i>)	Malvaceae (Bombacaceae)	Latin America	Balsa
<i>Ochroma pyramidale</i> Urb.	Malvaceae (Bombacaceae)	Latin America	Balsa
<i>Ocotea cymbarum</i> Kunth	Lauraceae	Latin America	Louro branco
<i>Ocotea guianensis</i> Aubl.	Lauraceae	Latin America	Louro branco
<i>Ocotea oblonga</i> Mez	Lauraceae	Latin America	Louro branco
<i>Ocotea</i> p.p.	Lauraceae	Latin America	Louro branco
<i>Ocotea porosa</i> Barroso	Lauraceae	Latin America	Imbuia
<i>Ocotea rodiei</i> Mez (cf. <i>Chlorocardium rodiei</i>)	Lauraceae	Latin America	Greenheart
<i>Ocotea rubra</i> Mez (cf. <i>Sextonia rubra</i>)	Lauraceae	Latin America	Louro vermelho / Determa*
<i>Ocotea wachenheimii</i> Benoist	Lauraceae	Latin America	Louro branco
<i>Oldfieldia africana</i> Benth. & Hook.	Phyllanthaceae (Euphorbiaceae)	África	Vésámbata
<i>Olmedioperebea sclerophylla</i> Ducke (cf. <i>Maquira sclerophylla</i>)	Moraceae	Latin America	Muiratinga
<i>Ongokea gore</i> Engl.	Olacaceae	África	Angueuk
<i>Ormosia coccinea</i> Jack	Leguminosae (Fabaceae)	Latin America	Tento
<i>Ormosia coutinhoi</i> Ducke	Leguminosae (Fabaceae)	Latin America	Tento
<i>Ormosia excelsa</i> Benth.	Leguminosae (Fabaceae)	Latin America	Tento
<i>Ormosia</i> p.p.	Leguminosae (Fabaceae)	Latin America	Tento
<i>Ormosia paraensis</i> Ducke	Leguminosae (Fabaceae)	Latin America	Tento
<i>Otoba</i> p.p.	Myristicaceae	Latin America	Virola / Dalli*
<i>Oxystigma oxyphyllum</i> J. Léonard	Leguminosae (Caesalpiniaceae)	África	Tchitola

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<i>Pachylobus buettneri</i> Engl. (cf. <i>Dacryodes buettneri</i>)	Burseraceae	Latin America	Ozigo
<i>Pachylobus pubescens</i> Engl. (cf. <i>Dacryodes pubescens</i>)	Burseraceae	Africa	Safukala
<i>Palaquium acuminatum</i> Burck (cf. <i>P. gutta</i>)	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium burkii</i> H.J. Lam	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium gutta</i> Burck	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium hexandrum</i> Baill.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium maingayi</i> Engl.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium obovatum</i> Engl.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium</i> p.p.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium rostratum</i> Burck	Sapotaceae	Asia, Oceania	Nyatoh
<i>Palaquium xanthochymum</i> Pierre	Sapotaceae	Asia, Oceania	Nyatoh
<i>Paraberlinia bifoliolata</i> Pellegr. (cf. <i>Julbernardia pellegriniana</i>)	Leguminosae (Caesalpiniaceae)	Africa	Awoura
<i>Parahancornia fasciculata</i> Benoist	Apocynaceae	Latin America	Dukali / Amapa*
<i>Parashorea densiflora</i> Slooten & Symington	Dipterocarpaceae	Asia, Oceania	Gerutu
<i>Parashorea lucida</i> Kurz	Dipterocarpaceae	Asia, Oceania	Gerutu
<i>Parashorea malaanonan</i> Merr.	Dipterocarpaceae	Asia, Oceania	Seraya, White
<i>Parashorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Gerutu
<i>Parashorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Seraya, White
<i>Parashorea smythiesii</i> Wyatt-Smith	Dipterocarpaceae	Asia, Oceania	Gerutu
<i>Parashorea tomentella</i> Meijer	Dipterocarpaceae	Asia, Oceania	Seraya, White
<i>Parinari excelsa</i> Sabine	Chrysobalanaceae	Africa	Sougué
<i>Parinari holstii</i> Engl. (cf. <i>P. excelsa</i>)	Chrysobalanaceae	Africa	Sougué
<i>Parinari</i> p.p.	Chrysobalanaceae	Africa	Sougué
<i>Parinari tenuifolia</i> A. Chev. (cf. <i>P. excelsa</i>)	Chrysobalanaceae	Africa	Sougué
<i>Parkia multijuga</i> Benth.	Leguminosae (Mimosaceae)	Latin America	Faveira
<i>Parkia nitida</i> Miq.	Leguminosae (Mimosaceae)	Latin America	Faveira
<i>Parkia</i> p.p.	Leguminosae (Mimosaceae)	Latin America	Faveira
<i>Payena acuminata</i> Pierre	Sapotaceae	Asia, Oceania	Nyatoh
<i>Payena lanceolata</i> Ridl.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Payena leerii</i> Kurz	Sapotaceae	Asia, Oceania	Bitis
<i>Payena maingayi</i> C.B. Clarke	Sapotaceae	Asia, Oceania	Nyatoh
<i>Payena obscura</i> Burck	Sapotaceae	Asia, Oceania	Bitis
<i>Payena</i> p.p.	Sapotaceae	Asia, Oceania	Bitis
<i>Payena</i> p.p.	Sapotaceae	Asia, Oceania	Nyatoh
<i>Peltogyne catingae</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne confertiflora</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne lecointei</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne maranhensis</i> Huber	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne</i> p.p.	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne paniculata</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne porphyrocardia</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*

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<i>Peltogyne pubescens</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Peltogyne venosa</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Pau roxo / Purpleheart*
<i>Pentace burmanica</i> Kurz	Malvaceae (Tiliaceae)	Asia, Oceania	Melunak
<i>Pentace</i> p.p.	Malvaceae (Tiliaceae)	Asia, Oceania	Melunak
<i>Pentace triptera</i> Mast.	Malvaceae (Tiliaceae)	Asia, Oceania	Melunak
<i>Pentaclethra macrophylla</i> Benth.	Leguminosae (Mimosaceae)	Africa	Mubala
<i>Pentacme contorta</i> Merr. & Rolfe (cf. <i>Shorea contorta</i>)	Dipterocarpaceae	Asia, Oceania	Seraya, White
<i>Pericopsis elata</i> Meeuwen	Leguminosae (Fabaceae)	Africa	Afrormosia
<i>Pertusadina eurhyncha</i> Ridsdale	Rubiaceae	Asia, Oceania	Haldu
<i>Petersia africana</i> Welw. (cf. <i>Petersianthus macrocarpus</i>)	Lecythidaceae	Africa	Essia
<i>Petersianthus macrocarpus</i> Liben	Lecythidaceae	Africa	Essia
<i>Phoebe porosa</i> Mez (cf. <i>Ocotea porosa</i>)	Lauraceae	Latin America	Imbuia
<i>Picea abies</i> (L.) H. Karst.	Pinaceae	Europe	Épicéa
<i>Picea excelsa</i> (Lamb.) Link (cf. <i>P. abies</i>)	Pinaceae	Europe	Spruce
<i>Pinus caribaea</i> Morelet	Pinaceae	Africa, Latin America, Asia, Oceania	Caribbean Pine
<i>Pinus kesiya</i> Royle	Pinaceae	Africa, Latin America, Asia, Oceania	Pinus kesiya* / Kesiya Pine
<i>Pinus maritima</i> Mill. (cf. <i>Pinus pinaster</i>)	Pinaceae	Europe	Maritime Pine
<i>Pinus merkusii</i> Jungh. & de Vriese	Pinaceae	Asia, Oceania	Pinus merkusii* / Merkusii Pine
<i>Pinus patula</i> Schiede	Pinaceae	Africa, Latin America, Asia, Oceania	Pinus patula* / Patula Pine
<i>Pinus pinaster</i> Aiton	Pinaceae	Europe	Maritime Pine
<i>Pinus sylvestris</i> L.	Pinaceae	Europe	Scots Pine
<i>Piptadenia africana</i> Hook. f. (cf. <i>Piptadeniastrum africanum</i>)	Leguminosae (Mimosaceae)	Africa	Dabéma / Dahoma*
<i>Piptadenia leucocarpa</i> Harms (cf. <i>Newtonia leucocarpa</i>)	Leguminosae (Mimosaceae)	Africa	Ossimiale
<i>Piptadeniastrum africanum</i> Brenan	Leguminosae (Mimosaceae)	Africa	Dabéma / Dahoma*
<i>Platonia insignis</i> Mart.	Clusiaceae	Latin America	Bacuri
<i>Platymiscium pinnatum</i> Dugand	Leguminosae (Fabaceae)	Latin America	Macacaúba
<i>Platymiscium trinitatis</i> Benth.	Leguminosae (Fabaceae)	Latin America	Macacaúba
<i>Platymiscium ulei</i> Harms	Leguminosae (Fabaceae)	Latin America	Macacaúba
<i>Poga oleosa</i> Pierre	Anisophylleaceae	Africa	Ovoga
<i>Pometia pinnata</i> J.R. Forst. & G. Forst.	Sapindaceae	Asia, Oceania	Kasai
<i>Pometia tomentosa</i> Teijsm. & Binn. (cf. <i>P. pinnata</i>)	Sapindaceae	Asia, Oceania	Kasai
<i>Populus</i> p.p.	Salicaceae	Europe	Poplar
<i>Pouteria altissima</i> Baehni	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Pouteria</i> p.p.	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Pouteria piperi</i> Baehni	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Pouteria superba</i> L. Gaut.	Sapotaceae	Africa	Aniégré / Aningeria*
<i>Prioria balsamifera</i> Breteler	Leguminosae (Caesalpiniaceae)	Africa	Tola / Agba*

Botanical name(s)	Family	Continent	Pilot name / Commercial name*
<i>Protium</i> p.p.	Burseraceae	Asia, Oceania	Kedondong
<i>Protium</i> p.p.	Burseraceae	Latin America	Kurokaï / Breu*
<i>Prunus avium</i> L. (cf. <i>Cerasus avium</i>)	Rosaceae	Europe	Cherry Wood
<i>Pseudopiptadenia suaveolens</i> J.W. Grimes	Leguminosae (Mimosaceae)	Latin America	Timborana
<i>Pseudosindora palustris</i> Symington	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Pseudotsuga menziesii</i> (Mirb.) Franco	Pinaceae	Europe	Douglas Fir
<i>Pteleopsis hylodendron</i> Mildbr.	Combretaceae	Africa	Osanga
<i>Pteleopsis myrtifolia</i> Engl.	Combretaceae	Africa	Osanga
<i>Pterocarpus dalbergioides</i> DC.	Leguminosae (Fabaceae)	Asia, Oceania	Padauk Amboina
<i>Pterocarpus erinaceus</i> Poir.	Leguminosae (Fabaceae)	Africa	Vêne
<i>Pterocarpus indicus</i> Willd.	Leguminosae (Fabaceae)	Asia, Oceania	Padauk Amboina
<i>Pterocarpus osun</i> Craib	Leguminosae (Fabaceae)	Africa	African Padauk / Padouk d'Afrique
<i>Pterocarpus soyauxii</i> Taub.	Leguminosae (Fabaceae)	Africa	African Padauk / Padouk d'Afrique
<i>Pterocarpus tinctorius</i> Welw.	Leguminosae (Fabaceae)	Africa	African Padauk / Padouk d'Afrique
<i>Pterocarpus vidalianus</i> Rolfe (cf. <i>P. indicus</i>)	Leguminosae (Fabaceae)	Asia, Oceania	Padauk Amboina
<i>Pterygopodium oxyphyllum</i> Harms (cf. <i>Oxystigma oxyphyllum</i>)	Leguminosae (Caesalpiniaceae)	Africa	Tchitola
<i>Pterygota bequaertii</i> De Wild.	Malvaceae (Sterculiaceae)	Africa	Koto
<i>Pterygota macrocarpa</i> K. Schum.	Malvaceae (Sterculiaceae)	Africa	Koto
<i>Pycnanthus angolensis</i> Warb.	Myristicaceae	Africa	Ilomba
<i>Pycnanthus kombo</i> Warb. (cf. <i>P. angolensis</i>)	Myristicaceae	Africa	Ilomba
<i>Qualea albiflora</i> Warm. (cf. <i>Ruizterania albiflora</i>)	Vochysiaceae	Latin America	Mandioqueira
<i>Qualea coerulea</i> Aubl.	Vochysiaceae	Latin America	Mandioqueira
<i>Qualea dinizii</i> Ducke	Vochysiaceae	Latin America	Mandioqueira
<i>Qualea</i> p.p.	Vochysiaceae	Latin America	Mandioqueira
<i>Qualea paraensis</i> Ducke	Vochysiaceae	Latin America	Mandioqueira
<i>Qualea rosea</i> Aubl.	Vochysiaceae	Latin America	Mandioqueira
<i>Quercus petraea</i> (Matt.) Liebl.	Fagaceae	Europe	Oak
<i>Quercus robur</i> L.	Fagaceae	Europe	Oak
<i>Rhodognaphalon brevicuspe</i> Roberty	Malvaceae (Bombacaceae)	Africa	Kondroti / East African Bombax*
<i>Rhodognaphalon schumannianum</i> Robyns	Malvaceae (Bombacaceae)	Africa	Kondroti / East African Bombax*
<i>Ricinodendron africanum</i> Muell. Arg. (cf. <i>R. heudelotii</i>)	Euphorbiaceae	Africa	Essessang / Erimado*
<i>Ricinodendron heudelotii</i> Pierre	Euphorbiaceae	Africa	Essessang / Erimado*
<i>Ricinodendron rautanenii</i> Schinz (cf. <i>Schinziophyton rautanenii</i>)	Euphorbiaceae	Africa	Essessang / Erimado*
<i>Robinia pseudoacacia</i> L.	Leguminosae (Fabaceae)	Europe	Black Locust
<i>Roupala brasiliensis</i> Klotzsch	Proteaceae	Latin America	Catuaém / Louro faia*
<i>Ruizterania albiflora</i> Marc.-Berti	Vochysiaceae	Latin America	Mandioqueira
<i>Ruizterania</i> p.p.	Vochysiaceae	Latin America	Mandioqueira
<i>Ruizterania retusa</i> Marc.-Berti	Vochysiaceae	Latin America	Mandioqueira
<i>Sacoglottis gabonensis</i> Urb.	Humiriaceae	Africa	Ozouga
<i>Sacoglottis</i> p.p.	Humiriaceae	Latin America	Uchy

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<i>Santiria</i> p.p.	Burseraceae	Asia, Oceania	Kedondong
<i>Sarcocephalus diderrichii</i> De Wild. (cf. <i>Nauclea diderrichii</i>)	Rubiaceae	Africa	Bilinga / Opepe*
<i>Sarcocephalus xanthoxylon</i> A. Chev. (cf. <i>Nauclea xanthoxylon</i>)	Rubiaceae	Africa	Bilinga / Opepe*
<i>Scaphium linearicarpum</i> Pierre	Malvaceae (Sterculiaceae)	Asia, Oceania	Kembang Semangkok
<i>Scaphium macropodum</i> Beumee	Malvaceae (Sterculiaceae)	Asia, Oceania	Kembang Semangkok
<i>Scaphium</i> p.p.	Malvaceae (Sterculiaceae)	Asia, Oceania	Kembang Semangkok
<i>Scaphium scaphigerum</i> G. Planch.	Malvaceae (Sterculiaceae)	Asia, Oceania	Kembang Semangkok
<i>Schefflera angustissima</i> Frodin	Araliaceae	Latin America	Morototo
<i>Schefflera decaphylla</i> Harms	Araliaceae	Latin America	Morototo
<i>Schefflera morototoni</i> Maguire, Steyerm. & Frodin	Araliaceae	Latin America	Morototo
<i>Schefflera paraensis</i> Huber (cf. <i>S. decaphylla</i>)	Araliaceae	Latin America	Morototo
<i>Schinziophyton rautanenii</i> Sm.	Euphorbiaceae	Africa	Essessang / Erimado*
<i>Schizolobium amazonicum</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Pashaco / Paricá*
<i>Schizolobium excelsum</i> Vogel (cf. <i>S. parahyba</i>)	Leguminosae (Caesalpiniaceae)	Latin America	Pashaco / Paricá*
<i>Schizolobium parahyba</i> Blake	Leguminosae (Caesalpiniaceae)	Latin America	Pashaco / Paricá*
<i>Sclerolobium</i> p.p. (cf. <i>Tachigali</i>)	Leguminosae (Caesalpiniaceae)	Latin America	Tachi / Djedoe*
<i>Scleronema micranthum</i> Ducke	Malvaceae (Bombacaceae)	Latin America	Cardeiro
<i>Scottellia coriacea</i> A. Chev. (cf. <i>S. klaineana</i>)	Achariaceae (Flacourtiaceae)	Africa	Akossika / Odoko*
<i>Scottellia klaineana</i> Pierre	Achariaceae (Flacourtiaceae)	Africa	Akossika / Odoko*
<i>Scyphocephalum mannii</i> Warb. (cf. <i>S. ochocoa</i>)	Myristicaceae	Africa	Ossoko
<i>Scyphocephalum ochocoa</i> Warb.	Myristicaceae	Africa	Ossoko
<i>Sextonia rubra</i> van der Werff	Lauraceae	Latin America	Louro vermelho / Determa*
<i>Shorea acuminata</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea acuminatissima</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea agami</i> Ashton	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea agsaboensis</i> W.L. Stern	Dipterocarpaceae	Asia, Oceania	Lauan, Red
<i>Shorea albidia</i> Symington	Dipterocarpaceae	Asia, Oceania	Alan / Alan-Batu*
<i>Shorea almon</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Almon
<i>Shorea argentifolia</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea assamica</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea balangeran</i> Burck	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea blumutensis</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea bracteolata</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea collina</i> Ridl.	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea contorta</i> S. Vidal	Dipterocarpaceae	Asia, Oceania	Seraya, White
<i>Shorea curtisii</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea dasyphylla</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea dealbata</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea dolichocarpa</i> Slooten	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea faguëtiana</i> Heim	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea faguëtoides</i> Ashton	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea farinosa</i> C.E.C. Fischer	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea floribunda</i> Kurz (cf. <i>S. roxburghii</i>)	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea gibbosa</i> Brandis	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow

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<i>Shorea glauca</i> King	Dipterocarpaceae	Asia, Oceania	Balau, Yellow / Bangkirai*
<i>Shorea gratissima</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea guiso</i> Blume	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea gysbertsiana</i> Burck	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea hemsleyana</i> King	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea hentonyensis</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea hopeifolia</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea hypochra</i> Hance	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea inaequilateralis</i> Symington	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea javanica</i> Koord. & Valetton	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea johorensis</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea kalunt</i> Merr.	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea kunstleri</i> King	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea laevis</i> Ridl.	Dipterocarpaceae	Asia, Oceania	Balau, Yellow / Bangkirai*
<i>Shorea lamellata</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea lepidota</i> Blume	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea leprosula</i> Miq.	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea leptocladus</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea longisperma</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea macrantha</i> Brandis	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea macrophylla</i> P.S. Ashton	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea macroptera</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea maxima</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea maxwelliana</i> King	Dipterocarpaceae	Asia, Oceania	Balau, Yellow / Bangkirai*
<i>Shorea multiflora</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea negrosensis</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Lauan, Red
<i>Shorea ochracea</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea ochrophloia</i> Symington	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea ovalis</i> Blume	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea ovata</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea pachyphylla</i> Ridl.	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea palembanica</i> Miq.	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea palosapis</i> Merr.	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea parvifolia</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea pauciflora</i> King	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea peltata</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea plagata</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea platycarpa</i> Heim.	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea platyclados</i> Slooten	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea polita</i> S. Vidal	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea polysperma</i> Merr.	Dipterocarpaceae	Asia, Oceania	Lauan, Red
<i>Shorea quadrinervis</i> Slooten	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea resina-nigra</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea resinosa</i> Foxw.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea revoluta</i> Ashton	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea roxburghii</i> G. Don	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea sandakanensis</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea sericeifolia</i> Fischer & Hutch.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea singkawang</i> Burck	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red

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<i>Shorea smithiana</i> Symington	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea squamata</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea</i> subgen. <i>Anthoshorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea</i> subgen. <i>Eushorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Balau, Yellow / Bangkirai*
<i>Shorea</i> subgen. <i>Pentacme</i> p.p.	Dipterocarpaceae	Asia, Oceania	Seraya, White
<i>Shorea</i> subgen. <i>Richetia</i> p.p.	Dipterocarpaceae	Asia, Oceania	Meranti, Yellow
<i>Shorea</i> subgen. <i>Rubroshorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Balau, Red
<i>Shorea</i> subgen. <i>Rubroshorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Lauan, Red
<i>Shorea</i> subgen. <i>Rubroshorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Meranti, Dark Red
<i>Shorea</i> subgen. <i>Rubroshorea</i> p.p.	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Shorea superba</i> Symington	Dipterocarpaceae	Asia, Oceania	Balau, Yellow / Bangkirai*
<i>Shorea talura</i> Roxb.	Dipterocarpaceae	Asia, Oceania	Meranti, White
<i>Shorea teysmanniana</i> Dyer	Dipterocarpaceae	Asia, Oceania	Meranti, Light Red
<i>Simarouba amara</i> Aubl.	Simaroubaceae	Latin America	Marupa
<i>Simarouba glauca</i> DC.	Simaroubaceae	Latin America	Marupa
<i>Sindora leiocarpa</i> Baker	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Sindora</i> p.p.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Sindora siamensis</i> Teijsm.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Sindora sumatrana</i> Miq.	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Sindora velutina</i> Baker	Leguminosae (Caesalpiniaceae)	Asia, Oceania	Sepetir
<i>Sindoropsis letestui</i> J. Léonard	Leguminosae (Caesalpiniaceae)	Africa	Ghéombi
<i>Staudtia gabonensis</i> Warb. (cf. <i>S. kamerunensis</i>)	Myristicaceae	Africa	Niové
<i>Staudtia kamerunensis</i> Warb.	Myristicaceae	Africa	Niové
<i>Staudtia stipitata</i> Warb. (cf. <i>S. kamerunensis</i>)	Myristicaceae	Africa	Niové
<i>Sterculia oblonga</i> Mast. (cf. <i>Eribroma oblongum</i>)	Malvaceae (Sterculiaceae)	Africa	Éyong / White Sterculia*
<i>Sterculia</i> p.p.	Malvaceae (Sterculiaceae)	Latin America	Chicha
<i>Sterculia pruriens</i> K. Schum.	Malvaceae (Sterculiaceae)	Latin America	Chicha
<i>Sterculia rhinopetala</i> K. Schum.	Malvaceae (Sterculiaceae)	Africa	Lotofa / Brown Sterculia*
<i>Sterculia rugosa</i> R. Br.	Malvaceae (Sterculiaceae)	Latin America	Chicha
<i>Sterculia speciosa</i> K. Schum.	Malvaceae (Sterculiaceae)	Latin America	Chicha
<i>Swartzia fistuloides</i> Harms (cf. <i>Bobgunnia fistuloides</i>)	Leguminosae (Caesalpiniaceae)	Africa	Pao rosa / Dina*
<i>Swartzia leiocalycina</i> Benth.	Leguminosae (Caesalpiniaceae)	Latin America	Coração de negro* / Panacoco
<i>Swartzia</i> p.p.	Leguminosae (Caesalpiniaceae)	Latin America	Coração de negro* / Panacoco
<i>Swartzia panacoco</i> Cowan	Leguminosae (Caesalpiniaceae)	Latin America	Coração de negro* / Panacoco
<i>Swartzia prouacensis</i> Amsh. (cf. <i>Bocoa prouacensis</i>)	Leguminosae (Caesalpiniaceae)	Latin America	Wamara
<i>Swartzia tomentosa</i> DC.	Leguminosae (Caesalpiniaceae)	Latin America	Coração de negro* / Panacoco
<i>Swietenia candollei</i> Pitt. (<i>S. macrophylla</i>)	Meliaceae	Latin America	Mahogany
<i>Swietenia humilis</i> Zucc.	Meliaceae	Latin America	Mahogany
<i>Swietenia krukovii</i> Gleason	Meliaceae	Latin America	Mahogany
<i>Swietenia macrophylla</i> King	Meliaceae	Latin America	Mahogany

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<i>Swietenia mahagoni</i> Jacq.	Meliaceae	Latin America	Mahogany
<i>Swietenia tessmannii</i> Harms (cf. <i>S. macrophylla</i>)	Meliaceae	Latin America	Mahogany
<i>Swintonia floribunda</i> Griff.	Anacardiaceae	Asia, Oceania	Merpauh
<i>Swintonia</i> p.p.	Anacardiaceae	Asia, Oceania	Merpauh
<i>Swintonia penangiana</i> King	Anacardiaceae	Asia, Oceania	Merpauh
<i>Swintonia pierrei</i> Hance	Anacardiaceae	Asia, Oceania	Merpauh
<i>Swintonia schwenkii</i> Teijsm. & Binn.	Anacardiaceae	Asia, Oceania	Merpauh
<i>Swintonia spicifera</i> Hook. f.	Anacardiaceae	Asia, Oceania	Merpauh
<i>Symphonia globulifera</i> L.	Clusiaceae	Latin America	Manil / Manni
<i>Syzygium</i> p.p.	Myrtaceae	Asia, Oceania	Kelat
<i>Tabebuia heptaphylla</i> Toledo (cf. <i>Handroanthus heptaphylla</i>)	Bignoniaceae	Latin America	Ipê
<i>Tabebuia impetiginosa</i> Standl. (cf. <i>Handroanthus impetiginosa</i>)	Bignoniaceae	Latin America	Ipê
<i>Tabebuia</i> p.p. (cf. <i>Handroanthus</i>)	Bignoniaceae	Latin America	Ipê
<i>Tabebuia serratifolia</i> Nicholson (cf. <i>Handroanthus serratifolia</i>)	Bignoniaceae	Latin America	Ipê
<i>Tachigali albiflora</i> Zarucchi & Herend.	Leguminosae (Caesalpiniaceae)	Latin America	Tachi /Djedoe*
<i>Tachigali chrysophylla</i> Zarucchi & Herend.	Leguminosae (Caesalpiniaceae)	Latin America	Tachi /Djedoe*
<i>Tachigali myrmecophylla</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Tachi /Djedoe*
<i>Tachigali</i> p.p.	Leguminosae (Caesalpiniaceae)	Latin America	Tachi /Djedoe*
<i>Tachigali paniculata</i> Aubl.	Leguminosae (Caesalpiniaceae)	Latin America	Tachi /Djedoe*
<i>Tarrietia densiflora</i> Aubrév. & Normand (cf. <i>Heritiera densiflora</i>)	Malvaceae (Sterculiaceae)	Africa	Niangon
<i>Tarrietia javanica</i> Blume (cf. <i>Heritiera javanica</i>)	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Tarrietia</i> p.p. (cf. <i>Heritiera</i>)	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Tarrietia</i> p.p. (cf. <i>Heritiera</i>)	Malvaceae (Sterculiaceae)	Africa	Niangon
<i>Tarrietia simplicifolia</i> Mast. (cf. <i>Heritiera simplicifolia</i>)	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Tarrietia sumatrana</i> Miq. (cf. <i>Heritiera sumatrana</i>)	Malvaceae (Sterculiaceae)	Asia, Oceania	Mengkulang
<i>Tarrietia utilis</i> Sprague (cf. <i>Heritiera utilis</i>)	Malvaceae (Sterculiaceae)	Africa	Niangon
<i>Tectona grandis</i> L. f.	Lamiaceae (Verbenaceae)	Africa, Latin America, Asia, Oceania	Teak
<i>Terminalia amazonia</i> Exell	Combretaceae	Latin America	Tanimbuca / Yellow Sanders*
<i>Terminalia guyanensis</i> Eichl.	Combretaceae	Latin America	Tanimbuca / Yellow Sanders*
<i>Terminalia ivorensis</i> A. Chev.	Combretaceae	Africa	Framiré / Idigbo*
<i>Terminalia oblonga</i> Steud.	Combretaceae	Latin America	Tanimbuca / Yellow Sanders*
<i>Terminalia</i> p.p.	Combretaceae	Latin America	Tanimbuca / Yellow Sanders*
<i>Terminalia superba</i> Engl. & Diels	Combretaceae	Africa	Limba /Afara*
<i>Tessmannia africana</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Wamba
<i>Tessmannia anomala</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Wamba
<i>Tessmannia lescrauwaetii</i> Harms	Leguminosae (Caesalpiniaceae)	Africa	Wamba
<i>Testulea gabonensis</i> Pellegr.	Ochnaceae	Africa	Izombé

Botanical name(s)	Family	Continent	Pilot name / Commercial name*
<i>Tetraberlinia bifoliolata</i> Hauman	Leguminosae (Caesalpiniaceae)	África	Ékaba / Ekop*
<i>Tetraberlinia longiracemosa</i> Wieringa	Leguminosae (Caesalpiniaceae)	África	Ékaba / Ekop*
<i>Tetraberlinia</i> p.p.	Leguminosae (Caesalpiniaceae)	África	Ékaba / Ekop*
<i>Tetraberlinia tubmaniana</i> J. Léonard	Leguminosae (Caesalpiniaceae)	África	Ékaba / Ekop*
<i>Tetragastris altissima</i> Swart	Burseraceae	Latin America	Amescião
<i>Tetragastris</i> p.p.	Burseraceae	Latin America	Amescião
<i>Tetragastris panamensis</i> Kuntze	Burseraceae	Latin America	Amescião
<i>Tetramerista glabra</i> Miq.	Tetrameristaceae	Asia, Oceania	Punah
<i>Thuja plicata</i> Donn ex D. Don	Cupressaceae	Europe	Red Cedar
<i>Tieghemella africana</i> Pierre	Sapotaceae	África	Douka
<i>Tieghemella heckelii</i> Pierre	Sapotaceae	África	Makoré
<i>Toona calantas</i> Merr. & Rolfe	Meliaceae	Asia, Oceania	Suren
<i>Toona ciliata</i> M. Roem.	Meliaceae	Asia, Oceania	Suren
<i>Toona febrifuga</i> M. Roem. (cf. <i>T. sureni</i>)	Meliaceae	Asia, Oceania	Suren
<i>Toona sureni</i> Merr.	Meliaceae	Asia, Oceania	Suren
<i>Triplochiton scleroxylon</i> K. Schum.	Malvaceae (Sterculiaceae)	África	Ayous / Obeche*
<i>Turraeanthus africana</i> Pellegr.	Meliaceae	África	Avodiré
<i>Vatairea guianensis</i> Aubl.	Leguminosae (Fabaceae)	Latin America	Fava amargosa
<i>Vatairea</i> p.p.	Leguminosae (Fabaceae)	Latin America	Fava amargosa
<i>Vatairea paraensis</i> Ducke	Leguminosae (Fabaceae)	Latin America	Fava amargosa
<i>Vataireopsis speciosa</i> Ducke	Leguminosae (Fabaceae)	Latin America	Fava amargosa
<i>Vataireopsis surinamensis</i> Lima	Leguminosae (Fabaceae)	Latin America	Fava amargosa
<i>Vatica maingayi</i> Dyer	Dipterocarpaceae	Asia, Oceania	Resak
<i>Vatica mangachapoi</i> Blco.	Dipterocarpaceae	Asia, Oceania	Resak
<i>Vatica</i> p.p.	Dipterocarpaceae	Asia, Oceania	Resak
<i>Vatica rassak</i> Blume	Dipterocarpaceae	Asia, Oceania	Resak
<i>Viola michelii</i> Heckel	Myristicaceae	Latin America	Virola / Dallí*
<i>Viola multicostata</i> Ducke	Myristicaceae	Latin America	Virola / Dallí*
<i>Viola</i> p.p.	Myristicaceae	Latin America	Virola / Dallí*
<i>Viola surinamensis</i> Warb.	Myristicaceae	Latin America	Virola / Dallí*
<i>Vochysia bracediniae</i> Standl.	Vochysiaceae	Latin America	Quaruba
<i>Vochysia guatemalensis</i> Donn. Sm.	Vochysiaceae	Latin America	Quaruba
<i>Vochysia guianensis</i> Aubl.	Vochysiaceae	Latin America	Quaruba
<i>Vochysia hondurensis</i> Sprague (cf. <i>V. guatemalensis</i>)	Vochysiaceae	Latin America	Quaruba
<i>Vochysia maxima</i> Ducke	Vochysiaceae	Latin America	Quaruba
<i>Vochysia</i> p.p.	Vochysiaceae	Latin America	Quaruba
<i>Vochysia tetraphylla</i> DC.	Vochysiaceae	Latin America	Quaruba
<i>Vochysia tomentosa</i> DC.	Vochysiaceae	Latin America	Quaruba
<i>Vouacapoua americana</i> Aubl.	Leguminosae (Caesalpiniaceae)	Latin America	Wacapou
<i>Vouacapoua macropetala</i> Sandw.	Leguminosae (Caesalpiniaceae)	Latin America	Wacapou
<i>Vouacapoua pallidior</i> Ducke	Leguminosae (Caesalpiniaceae)	Latin America	Wacapou
<i>Xylia dolabriformis</i> Benth. (cf. <i>X. xylocarpa</i>)	Leguminosae (Mimosaceae)	Asia, Oceania	Pyinkado
<i>Xylia kerrii</i> Craib & Hutch. (cf. <i>X. xylocarpa</i>)	Leguminosae (Mimosaceae)	Asia, Oceania	Pyinkado
<i>Xylia xylocarpa</i> Taub.	Leguminosae (Mimosaceae)	Asia, Oceania	Pyinkado
<i>Zanthoxylum heitzii</i> P.G. Waterman	Rutaceae	África	Olon
<i>Zygia racemosa</i> Barneby & J.W. Grimes	Leguminosae (Mimosaceae)	Latin America	Ángelimo rajado / Snakewood*

Common names / Pilot names

Common names	Pilot name (/commercial name)
Abachi	Ayous
Abacu	Makoré
Abale	Émien
Abale	Essia
Abalé	Essia
Abam	Longhi
Abang	Iroko
Abarco	Abarco
Abe	Aiélé / African Canarium*
Abeba	Tiama / Gedu Nohor*
Abebay	Sipo / Utile*
Abel	Aiélé / African Canarium*
Abem	Ébiara / Berlinia*
Abete	Fir
Abete comun	Fir
Abete rosso	Spruce
Abeubègne	Tiama / Gedu Nohor*
Abeubêgne	Tiama / Gedu Nohor*
Abeul	Aiélé / African Canarium*
Abeum	Limbali
Abgo	Acajou Cailcédrat
Abin	Essia
Abing	Essia
Abiu casca	Goiabao
Abiurana	Curupixa
Abiurana	Goiabao
Abiurana amarela	Goiabao
Abiurana goiaba	Goiabao
Abokpo	African Ebony* / Ébène d'Afrique
Aboonkini	Inga
Aboranzork	Mambodé
Aborbora	Kotibé / Danta*
Abotzok	Oboto
Aboudikro	Sapelli / Sapele*
Abura	Abura
Deng	Pyinkado
Acacia	Black Locust
Acacia franc	Batibatra
Acacia mangium	Acacia mangium
Açacu	Açacu / Sandbox*
Acajou Bassam	African Mahogany* / Acajou d'Afrique
Acajou bissilom	Acajou Cailcédrat
Acajou blanc	African Mahogany* / Acajou d'Afrique

Common names	Pilot name (/commercial name)
Acajou cailcédrat	Acajou Cailcédrat
Acajou d'Amérique	Mahogany
Acapro	Ipê
Acapu	Wacapou
Acapurana	Andira
Aceite	Copaiba
Aceite cachicamo	Jacaréuba
Aceite mario	Jacaréuba
Aceró blanco	Great Maple
Achapo	Tornillo
Achicha	Chicha
Acuminata	Tiama / Gedu Nohor*
Acurubu	Pashaco / Paricá*
Adadua	Okan
Aderno-preto	Muiracatiara
Adina	Haldu
Adjap	Moabi
Adjolohutin	Fuma / Fromager*
Adoum	Okan
Adza	Moabi
Adzacon-aboga	Monghinza
Aek	Balau, Yellow / Bangkirai*
Afambéou	Éyoum
Afara	Limba /Afara*
Afatin	Émien / Alstonia*
Afo	Ovoga
Afoé bilobi	Angoa
African cordia	African Cordia* / Cordia d'Afrique
African ebony	African Ebony* / Ébène d'Afrique
African greenheart	Okan
Acajou d'Afrique	African Mahogany* / Acajou d'Afrique
African Mahogany	African Mahogany* / Acajou d'Afrique
African padauk	African Padauk* / Padouk d'Afrique
African Pearwood	Moabi
African pearwood	Monghinza
African pterygota	Koto / Pterygota*
African walnut	Dibétou
Afrikanisches ebenholz	African Ebony* / Ébène d'Afrique
Afrormosia	Afrormosia
Afzelia	Doussié / Afzelia*
Agathis	Kauri

Common names	Pilot name (/commercial name)
Agba	Tola / Agba*
Agbantín	Abura
Agboin	Dabéma / Dahoma*
Agelam	Balau, Yellow / Bangkirai*
Agla nyinfun	Iatandza
Aguacatillo	Louro branco
Aguano	Mahogany
Agui	Coração de negro* / Panacoco
Agui	Tento
Agupanga	Kasai
Ahafo	African Mahogany* / Acajou d'Afrique
Ahmin	Ramin
Ahun	Émien / Alstonia*
Aiélé	Aiélé / African Canarium*
Aiéouéko	Aiéouéko / Dakama*
Ailai	Mango / Machang*
Aini	Keledang
Ainunura	Ramin
Aji	Guariúba
Ajillo	Piquia
Ak	Balau, Yellow / Bangkirai*
Akasa	Longhi
Akatio	Longhi
Aké	Izombé
Aké	Koto / Pterygota*
Akédé	Ako / Antiaris*
Akenia	Ramin
Akéwé	Izombé
Akhuekhue	Olène
Ako	Ako / Antiaris*
Akoga	Azobé / Ekki*
Akola	Mukulungu
Akom	Limba / Afara*
Akomu	Ilomba
Akondoc	Bilinga / Opepe*
Akossika	Akossika / Odoko*
Akoti	Idéwa
Akoua	Onzabili
Akouapo	Ozouga
Akpaflo	Étimé
Akuk	African Mahogany* / Acajou d'Afrique
Akuka	Émien / Alstonia*
Akume	Bubinga
Akurna	Ossoko
Akwakwa	Tchitola
Alamo	Poplar

Common names	Pilot name (/commercial name)
Alan-batu	Alan / Alan-Batu*
Alan-bunga	Alan / Alan-Batu*
Alan-meraka	Alan / Alan-Batu*
Alan-paya	Alan / Alan-Batu*
Alasoabo	Tanimbuca / Yellow Sanders*
Alcarreto	Araracanga
Alcornoque	Mora
Alcornoque	Sucupira preta
Alep	Alep
Alerce	European Larch
Álvaro	Jacaréuba
Algarrobo	Jatobá / Algarrobo*
Algodon	Balsa
Aligna	Doussié / Afzelia*
Alimiao	Timborana
Allen élé	Zingana
Almaciga	Kauri
Almecega	Kurokaï / Breu*
Almendra	Piquiarana
Almendra con espinas	Piquiarana
Almendrillo	Cumaru / Tonka*
Almendrillo	Garapa
Almendro	Piquia
Almendro	Piquiarana
Almendro de rio	Andira
Almendron	Piquiarana
Almon	Almon
Aloma	Bilinga / Opepe*
Alone	Kondroti / East African Bombax*
Alpin ash	Tasmanian Oak
Alstonia	Émien / Alstonia*
Alui	Tali / Missanda*
Alumbi	Alumbi
Amapa	Dukali / Amapa*
Amapa	Sandé
Amapa amargoso	Dukali / Amapa*
Amapa doce	Sandé
Amapa rana	Muirapiranga
Amapazinho	Dukali / Amapa*
Amarante	Pau roxo / Purpleheart*
Amaranth	Pau roxo / Purpleheart*
Amarelao	Garapa
Amarelao	Pau amarelo
Amarelao	Tatajuba
Amarello	Moral
Amarelo cetim	Pau amarelo

Common names	Pilot name (/commercial name)
Amargo	Fava amargosa
Amarillo	Garapa
Amarillo	Louro branco
Amarillo	Moral
Amarillo	Tanimbuca / Yellow Sanders*
Amat	Punah
Amazakoué	Ovèngkol
Ambay-guazu	Morototo
Amboina	Padauk Amboina
Amburana	Cerejeira
Amesclào	Amesclào
Amouk	Mambodé
Amouk	Zingana
Ana	Garapa
Anacaguita	Chicha
Anamenila	Dibétou
Anandio	Longhi
Anangossi	Tanimbuca / Yellow Sanders*
Anangossiti	Tanimbuca / Yellow Sanders*
Anani	Manil / Manni*
Anani da terra firme	Manniballi
Anatolia	Koto / Pterygota*
Andaman padauk	Padauk Amboina
Andem	Anzem / Nténé*
Andem-éviné	Étimoé
Andira	Andira
Andira uchi	Andira
Andiroba	Andiroba
Andiroba branca	Andiroba
Andiroba vermelha	Andiroba
Andirobeira	Andiroba
Andjarotoeng	Jelutong
Andjung	Andoung
Andok	Andok
Andok ngoe	Olène
Andongwé	Olène
Andoum	Ako / Antiaris*
Andoung	Andoung
Angalé	Ovoga
Angelica	Basralocus
Angelica do para	Basralocus
Angelim	Andira
Angelim	Angelim
Angelim amarelo	Angelim
Angelim amargoso	Fava amargosa
Angelim da mata	Angelim

Common names	Pilot name (/commercial name)
Angelim falso	Angelim vermelho
Angelim ferro	Angelim vermelho
Angelim pedra	Angelim
Angelim pedra	Angelim vermelho
Angelim rajado	Angelim rajado / Snakewood*
Angelim rosa	Angelim
Angelim vermelho	Angelim vermelho
Angelin	Andira
Angélique	Basralocus
Angico	Timborana
Angico vermelho	Timborana
Angoa	Angoa
Angocon	Nieuk
Angok	Gombé
Angonga	Onzabili
Angouchy	Tanimbuca / Yellow Sanders*
Angouma	Okoumé / Gaboon*
Angsana	Padauk Amboina
Anguekong	Onzabili
Angueuk	Angueuk
Aniégré	Aniégré / Aningeria*
Anime	Gommier
Anime	Kurokaï / Breu*
Anime blanco	Kurokaï / Breu*
Aningeria	Aniégré / Aningeria*
Aningre	Aniégré / Aningeria*
Aninguéri	Longhi
Aninguéri blanca	Aniégré / Aningeria*
Aninguéri rouge	Longhi
Anjama	Aiéouéko / Dakama*
Anjili	Keledang
Anokye	Ovèngkol
Anokyé	Ovèngkol
Anonilla	Morototo
Antiaris	Ako / Antiaris*
Antipolo	Keledang
Anubing	Keledang
Anzèm	Anzem / Nténé*
Anzèm noir	Étimoé
Anzèm rouge	Anzem / Nténé*
Apa	Doussié / Afzelia*
Apa	Wallaba
Apa apa	Durian
Apa igbo	Doussié / Afzelia*
Apapaya	Avodiré
Aparaçu	Tachi / Djedoe*

Common names	Pilot name (/commercial name)
Apaya	Avodiré
Apazeiro	Wallaba
Apepere	Olène
Apitong	Keruing
Apopo	Dibétou
Aprokuma	Onzabili
Aprono	Bété / Mansonia*
Araba	Fuma / Fromager*
Arabisco	Parapará
Aracui	Fava amargosa
Aracuy	Fava amargosa
Araguaney	Ipê
Araputanga	Mahogany
Araracanga	Araracanga
Ararauba	Araracanga
Araucaria	Pinho Paraná
Arbol carne	Catucaém / Louro faia*
Arbol de caucho	Hevea / Rubberwood*
Arbol del bálsamo	Balsamo
Arbol vaca	Sandé
Arce blanco	Great Maple
Arenillo	Mandioqueira
Arenillo	Sucupira preta
Arere	Ayous / Obeche*
Ariella	Bomanga / Ariella*
Arisauro	Fava amargosa
Arisoeroe	Fava amargosa
Arr	Acacia mangium
Aruru	Kurokaï / Breu*
Asai	Mango / Machang*
Asam	Mango / Machang*
Asama	Avodiré
Asan	Ohia
Asanfena	Aniégré / Aningeria*
Ash	Ash
Asian Black Ebony	Asian Black Ebony* / Ébène noire d'Asie
Asian Grained Ebony	Asian Grained Ebony* / Ébène veinée d'Asie
Ébène veinée d'Asie	Asian Grained Ebony* / Ébène veinée d'Asie
Assacu	Açacu / Sandbox*
Assaméla	Afromosia
Assas	Igaganga
Assas	Ozigo
Asseng-assié	Sipo / Utile*
Assi	Sipo / Utile*
Assia	Ozigo
Assié	Sapelli / Sapele*

Common names	Pilot name (/commercial name)
Assié-sapelli	Sapelli / Sapele*
Assila	Sougué
Atala	Ozouga
Atiokouo	Kanda rose
Atlantische zeder	Cedar
Atlas cedar	Cedar
Atom-assié	Kosipo
Attia	Coula
Atui	Dabéma / Dahoma*
Atui	Ossimiale
Aviemfo-samina	Iatandza
Avodiré	Avodiré
Awari	Koto / Pterygota*
Awhi	African Cordia* / Cordia d'Afrique
Awong	Wengé
Awori	Kondroti / East African Bombax*
Awoung	Wengé
Awoura	Awoura
Awun	Émien / Alstonia*
Ayan	Movingui / Ayan*
Ayanran	Movingui / Ayan*
Ayap	Moabi
Aye	Difou
Aye	Lotofa / Brown Sterculia*
Ayini	Keledang
Ayinre-ogo	Iatandza
Ayous	Ayous / Obeche*
Ayus	Ayous / Obeche*
Azem	Anzem / Nténé*
Azini	Limba / Afara*
Azobé	Azobé / Ekki*
Azodau	Doussié / Afzélia*
Azucar-huayo	Jatobá / Algarrobo*
Azucarito	Kurokaï / Breu*
Azufre	Manil / Manni*
Ba	Ohia
Baaka	Louro vermelho / Determa*
Baaka boubá	Curupixa
Baaka kiabici	Sucupira preta
Baboen	Virola / Dallii*
Bacouman	Curupixa
Bacu	Abarco
Bacu mixa	Curupixa
Bacuri	Bacuri
Bacuri açu	Bacuri
Bacuri de anta	Manniballi

Common names	Pilot name (/commercial name)
Bacuriuba	Bacuri
Bacury	Bacuri
Badi	Bilinga / Opepe*
Bado	Ayous / Obeche*
Bagaceira	Tatajuba
Bagasse	Tatajuba
Bagbé	Ébiara / Berlinia*
Bagtikan	Seraya, White
Bahia	Abura
Bajji	Framiré / Idigbo*
Bakanga	Kosipo
Bakota	Sesendok
Baku	Makoré
Balam	Nyatoh
Balangeran	Balau, Red
Balata	Maçaranduba / Bulletwood*
Balata blanc	Curupixa
Balata blanc	Tauari
Balata franc	Maçaranduba / Bulletwood*
Balata gomme	Maçaranduba / Bulletwood*
Balata indien	Curupixa
Balata rouge	Maçaranduba / Bulletwood*
Balau	Balau, Yellow / Bangkirai*
Balau kumus	Balau, Yellow / Bangkirai*
Balau laut merah	Balau, Red
Balau membuatu	Balau, Red
Balau merah	Balau, Red
Balau red	Balau, Red
Balau simantok	Balau, Yellow / Bangkirai*
Balsa	Balsa
Balsa maria	Jacareúba
Balsam	Balsamo
Balsam	Copaiba
Balsamo	Balsamo
Bálsamo	Balsamo
Bálsamo de Perú	Balsamo
Bálsamo de tolu	Balsamo
Balso	Balsa
Balzé	Diania
Bamisa	Igaganga
Banaba	Bungur
Banak	Virola / Dalli*
Banati	Perupok
Banda	Fuma / Fromager*
Bang kalis	Punah

Common names	Pilot name (/commercial name)
Bang lang	Bungur
Bangkirai	Balau, Yellow / Bangkirai*
Bangor	Bungur
Bangui	Iroko
Bansanghal	Bintangor
Banya	Coração de negro* / Panacoco
Baracatiara	Muiracatiara
Barajuba	Garapa
Baraka	Nganga
Barakaro	Tento
Barakaroballi	Basralocus
Barilla de agua	Curupixa
Barossa	Moral
Barré	Movingui / Ayan*
Baru-baran	Melunak
Barwood	African Padauk* / Padouk d'Afrique
Basralocus	Basralocus
Basralokus	Basralocus
Basswood	Sesendok
Bastado	Macacaúba
Bastard mahogany	Andiroba
Bastard purpleheart	Fava amargosa
Bat seed	Andira
Bataan	Meranti, Dark Red
Batibatra	Batibatra
Bauwaua	Fava amargosa
Bawe	Diania
Baywood	Mahogany
Beati	Macacaúba
Bediwunua	Aiélé / African Canarium*
Bedwa	Ozouga
Beeberoe	Greenheart
Beech	Beech
Beefwood	Maçaranduba / Bulletwood*
Belangeran	Balau, Red
Béli	Awoura
Belian	Billian
Bella maria	Jacareúba
Bella maria	Quaruba
Bella rosa	Mersawa
Bellota	Chicha
Belutu	Seraya, White
Bendang	Kauri
Benga	Alep
Bengang	Durian
Bengi	Anzèm / Nténé*

Common names	Pilot name (/commercial name)
Benin mahogany	African Mahogany* / Acajou d'Afrique
Benteak	Bungur
Benuas	Balau, Yellow / Bangkirai*
Benya	Okan
Benzi	Mutényé
Berg gronfoeloe	Mandioqueira
Bergahorn	Great Maple
Berlinia	Ébiara / Berlinia*
Bété	Bété / Mansonia*
Betis	Bitis
Beuhago	Igaganga
Bi	Éyong / White Sterculia*
Bibiru	Greenheart
Bibolo	Dibétou
Bidikala	Aiélé / African Canarium*
Bidou	Ozouga
Bijlhout	Wallaba
Bilinga	Bilinga / Opepe*
Billi	Aiélé / African Canarium*
Billian	Billian
Bilogh-bi-nkélé	Akossika / Odoko*
Bilombi	Étimé
Bimini	Landa
Binatoh	Meranti, Dark Red
Bindang	Kauri
Bingo	African Ebony* / Ébène d'Afrique
Bintangor	Bintangor
Bintangur	Bintangor
Bioudou	Wallaba
Biqui	Piquiarana
Bissilom	Acajou Cailcédrat
Bitehi	Kanda rose
Bitis	Bitis
Bitterwood	Marupa
Black afara	Framiré / Idigbo*
Black Ebony	Asian Black Ebony* / Ébène noire d'Asie
Black guarea	Guarea, Black* / Bossé foncé
Black gum	Idéwa
Black kelat	Kelat
Black locust	Black Locust
Black Locust	Black Locust
Black manariballi	Faveira
Black wattle	Acacia mangium
Blima-pu	Avodiré
Bloodwood	Muirapiranga

Common names	Pilot name (/commercial name)
Blue leaf	Tasmanian Oak
Boarwood	Manil / Manni*
Bobenkusu	Bodioa
Boborou	Andok
Boco	Wamara
Bodioa	Bodioa
Bodo	Mambodé
Bodoua	Ozouga
Bodwe	Angueuk
Boes'amandra	Tanimbuca / Yellow Sanders*
Bofélélé	Étimé
Bofroe-oedoe	Uchy
Bogdei	Naga / Okwen*
Bohala	Afrormosia
Bohélé	Afrormosia
Boiré	Mambodé
Bois abeille	Maçaranduba / Bulletwood*
Bois caca	Cupiuba / Kabukalli*
Bois cochon	Amesclão
Bois d'orange	Moral
Bois de mora	Macacaúba
Bois du diable	Açacu / Sandbox*
Bois flot	Balsa
Bois jaune	Tatajuba
Bois pagode	Inga
Bois perdrix	Coração de negro* / Panacoco
Bois perdrix	Wacapou
Bois pian	Parapará
Bois serpent	Angelim rajado / Snakewood*
Bois violet	Pau roxo / Purpleheart*
Bokanga	Lati
Bokapi	Niové
Bokoi	Sipo / Utile*
Bokoka	Okan
Bokokwanjube	Angoa
Bokoko	Alumbi
Bokoli	Oboto
Bokungu	Dabéma / Dahoma*
Boléko	Angueuk
Bolele	Oboto
Bolélé	Oboto
Bolengu	Doussié / Afzelia*
Bolengu	Faro / Ogea*
Boliki	Oboto

Common names	Pilot name (/commercial name)
Bolletrie	Maçaranduba / Bulletwood*
Bolon	Guarea, Black* / Bossé foncé
Bolundé	Ohia
Bom pegya	Oboto
Bomanga	Bomanga / Ariella*
Bombax	Kondroti / East African Bombax*
Bombulu	Dibétou
Bon	African Cordia* / Cordia d'Afrique
Bondé	Difou
Bondu	Gombé
Bonga	Sumauma
Bongélé	Éyong / White Sterculia*
Bongo	Éyong / White Sterculia*
Bongo	Olon
Bongola	Éyom
Bongossi	Azobé / Ekki*
Bonkingu	Bilinga / Opepe*
Bonkole	Azobé / Ekki*
Bonkolé	Azobé / Ekki*
Bonkongo	Ako / Antiaris*
Bonkonko	Ako / Antiaris*
Bonsamdua	Movingui / Ayan*
Bonzale	Kanda brun
Bonzale	Kanda rose
Bopambu	Longhi
Borneo camphorwood	Kapur
Borracho	Morototo
Bosamandel	Tanimbuca / Yellow Sanders*
Bosasa	Guarea, Scented* / Bossé clair
Boshcalabas	Couroupita
Boso	Igaganga
Bosse	Guarea, Black* / Bossé foncé
Bosse	Guarea, Scented* / Bossé clair
Bossé clair	Guarea, Scented* / Bossé clair
Bosso	Dibétou
Bossoho	Essia
Bostamarinde	Angelim rajado / Snakewood*
Boto	Pao rosa / Dina*
Bouanga	Mukulungu
Bouchi apa	Curupixa
Bouemon	Okan

Common names	Pilot name (/commercial name)
Bouémon	Okan
Bougou bati batra	Batibatra
Bougouni	Inga
Boulet de canon	Couroupita
Bouma	Fuma / Fromager*
Bounaati	Wacapou
Boyo kondi	Dibétou
Brazil nut	Castanheiro
Brazilian walnut	Imbuia
Brea amarilla	Manil / Manni*
Brea-caspi	Manil / Manni*
Breu	Kurokaï / Breu*
Breu grande	Amesclão
Breu manga	Amesclão
Breu preto	Amesclão
Breu vermelho	Amesclão
Breu-sucuruba	Amesclão
Broutou	Gombé
Brown salwood	Acacia mangium
Brown sterculia	Lotofa / Brown Sterculia*
Bruinhart	Wacapou
Bsang	Keledang
Bubinga	Bubinga
Buche	Beech
Buiucu	Tento
Bukungu	Dabéma / Dahoma*
Bullet wood	Maçaranduba / Bulletwood*
Bulletwood	Maçaranduba / Bulletwood*
Bundui	Bilinga / Opepe*
Bungor	Bungur
Bungur	Bungur
Bunzquillo	Inga
Buruta	Satin, Ceylon
Bwelabako	Angueuk
Bwiba bambale	Andok
Bwibanjoe	Olène
Cabimo	Copaiba
Cabino blanco	Copaiba
Cabreuva	Balsamo
Cabreuva vermelha	Balsamo
Cacao de mote	Chicha
Cachaceiro	Cupiuba / Kabukalli*
Cachicamo	Jacareúba
Caconnier rouge	Tento
Cafetero	Morototo
Cajuea	Virola / Dalli*

Common names	Pilot name (/commercial name)
Calabo	Ilomba
Calantas	Suren
Calophyllum	Bintangor
Camajura	Chicha
Camaticaro	Virola / Dalli*
Camba-camby	Tamboril
Cambara	Cambara
Cambara	Quaruba
Camiba	Copaiba
Camoruco	Chicha
Camwood	African Padauk* / Padouk d’Afrique
Cam-xe	Pyinkado
Canadi	Manil / Manni*
Canaguate	Ipê
Canari macaque	Sapucaia
Canarium	Aiélé / African Canarium*
Canela	Imbuia
Canela do maranhão	Preciosa
Canela imbuia	Imbuia
Canelo amarillo	Louro branco
Canime	Copaiba
Caniva	Copaiba
Canon ball	Couroupita
Caoba	Macacaúba
Caoba	Mahogany
Caoba del galon	African Mahogany* / Acajou d’Afrique
Caovi	Timborana
Capa de tabaco	Tauari
Capinuri	Guariúba
Capinuri	Muiratinga
Capirona	Pau mulato
Capomo	Muiratinga
Capricornia	Cupiuba / Kabukalli*
Carano	Kurokaï / Breu*
Carapa	Andiroba
Carara	Tanimbuca / Yellow Sanders*
Cardeiro	Cardeiro
Caribbean Pine	Caribbean Pine
Carito	Tamboril
Caroba	Parapará
Caroba do mato	Parapará
Caroba manaca	Parapará
Caro-caro	Tamboril
Carrapatinho	Coração de negro* / Panacoco
Carvalho	Catuaém / Louro faia*

Common names	Pilot name (/commercial name)
Carvalho do brazil	Catuaém / Louro faia*
Casca do maranhão	Preciosa
Casca preciosa	Preciosa
Cascarón	Faveira
Castagno	Chestnut
Castaña	Castanheiro
Castana del maranon	Castanheiro
Castana do maranhao	Castanheiro
Castanha de macaco	Couroupita
Castanha de paca	Cardeiro
Castanha do brasil	Castanheiro
Castanha do para	Castanheiro
Castanha sapucaia	Sapucaia
Castanheiro	Castanheiro
Castaño	Cardeiro
Castaño	Chestnut
Catahua	Açacu / Sandbox*
Catillo	Balsa
Catuaém	Catuaém / Louro faia*
Ceder	Cedro
Cedrat	Cedro
Cèdre	Cedar
Cèdre apici	Louro branco
Cèdre de l’Atlas	Cedar
Cèdre gris	Louro branco
Cèdre noir	Louro branco
Cèdre remi	Tachi / Djedoe*
Cèdre rouge d’amérique	Red Cedar
Cedrinho	Cambara
Cedrinho	Cardeiro
Cedro	Cedro
Cedro amargo	Marupa
Cedro bateo	Andiroba
Cedro blanco	Marupa
Cedro bravo	Cardeiro
Cedro canadense	Red Cedar
Cedro del Atlas	Cedar
Cedro dell’atlante	Cedar
Cedro do pantano	Jacareúba
Cedro macho	Andiroba
Cedro tornillo	Tornillo
Cedrorana	Tornillo
Ceiba	Fuma / Fromager*
Ceiba	Sumauma
Ceiba habillo	Açacu / Sandbox*
Ceiba lechosa	Açacu / Sandbox*
Ceiba uchuputu	Sumauma
Ceiba yucca	Sumauma

Common names	Pilot name (/commercial name)
Celtis	Diania
Cengal	Merawan
Cerejeira	Cerejeira
Cerezo silvestre	Cherry Wood
Ceylon Ebony	Asian Black Ebony* / Ébène noire d'Asie
Chacalte	Mahogany
Chai	Meranti, White
Chaliviande	Virola / Dalli*
Cham	Kedondong
Chamisa	Tanimbuca / Yellow Sanders*
Champanha	Cumaru / Tonka*
Chan	Balau, Yellow / Bangkirai*
Chan hoi	Meranti, Light Red
Chan khah	Balau, Red
Chanfuta	Doussié / Afzelia*
Chankhau	Balau, Red
Chaparro	Catucáem / Louro faia*
Chapel	Aracanga
Chaperna	Aracanga
Chaquiro	Cupiuba / Kabukalli*
Charapilla	Cumaru / Tonka*
Châtaignier	Chestnut
Chatian	Pulai
Chatiyán	Pulai
Chawari	Piquiarana
Chay	Nyatho
Chenchen	Ako / Antiaris*
Chêne	Oak
Chêne blanc européen	Oak
Chengal	Chengal
Chestnut	Chestnut
Chiapas	Chicha
Chicha	Chicha
Chicharra caspi	Parapará
Chicharrón	Tanimbuca / Yellow Sanders*
Chichica	Aracanga
Chilean pine	Pinho Paraná
Chimbulla	Quaruba
Ching chan	Rosewood, Tamalan
Chingale	Parapará
Chinsale	Grenadillo
Chiriwana	Marupa
Chloeuteal	Keruing
Cho-chi	Gerutu
Chocho	Tento
Choco	Tento

Common names	Pilot name (/commercial name)
Chomcha	Suren
Chomphu	Kelat
Chontaquiro	Sucupira preta
Chramas	Resak
Chumprak	Mengkulang
Chuncho	Tornillo
Chungé	Owui
Ciania	Éyoum
Cigarbox	Cedro
Ciliego selvatico	Cherry Wood
Cimbirre	Mecrussé
Citronnier ceylan	Satin, Ceylon
Civit	Merpauh
Civit taung thayet	Merpauh
Cobi	Timborana
Cobre	Garapa
Coco cristal	Sapucaia
Coco de mono	Sapucaia
Coco mono	Sapucaia
Coconut	Coconut Wood
Cocotero	Coconut Wood
Cocotier	Coconut Wood
Cocowood	Coconut Wood
Cœur dehors	Sucupira preta
Coffee mortar	Tanimbuca / Yellow Sanders*
Cokerwood	Tanimbuca / Yellow Sanders*
Common kelat	Kelat
Common spruce	Spruce
Conduru	Muirapiranga
Cong	Bintangor
Congo	Andira
Congotali	Congotali
Congowood	Dibétou
Congrio	Sucupira preta
Congrio	Tachi / Djedoe*
Congrio blanco	Cupiuba / Kabukalli*
Copachi	Aracanga
Copahyba	Copaiba
Copaia	Parapará
Copaiba	Copaiba
Copaibarana	Copaiba
Copaibarana	Wallaba
Copaibo	Copaiba
Copal	Amesclão
Copal	Gommier
Copal caspi	Kurokai / Breu*

Common names	Pilot name (/commercial name)
Copalier	Jatobá / Algarrobo*
Copaya	Parapará
Copi	Cupiuba / Kabukalli*
Copiuva	Cupiuba / Kabukalli*
Coqueiro	Coconut Wood
Coração de negro	Coração de negro* / Panacoco
Corail	African Padauk* / Padouk d'Afrique
Cordeiro	Cardeiro
Cordia d'afrique	African Cordia* / Cordia d'Afrique
Cordia wood	Freijo / Laurel blanco*
Coronobo	Manniballi
Corusicaa	Pau mulato
Cottonwood	Poplar
Couatari	Tauari
Coula	Coula
Courbaril	Jatobá / Algarrobo*
Couroupita	Couroupita
Cow tree	Sandé
Cow-wood	Tatajuba
Crabwood	Andiroba
Crappo	Andiroba
Criptomeria japonesa	Cryptomeria* / Sugi
Crittomeria giapponese	Cryptomeria* / Sugi
Cryptomeria	Cryptomeria* / Sugi
Cuajo	Virola / Dalli*
Cubaga	African Ebony* / Ébène d'Afrique
Cubixa	Curupixa
Cuiarana	Tanimbuca / Yellow Sanders*
Cumala	Virola / Dalli*
Cumaru	Cumaru / Tonka*
Cumaru de cheiro	Cerejeira
Cumaru ferro	Cumaru / Tonka*
Cumarurana	Cumaru / Tonka*
Cuna	Marupa
Cupay	Copaiba
Cupiuba	Cupiuba / Kabukalli*
Curiy	Pinho Paraná
Currucay	Kurokaï / Breu*
Curupixa	Curupixa
Cutiuba	Sucupira preta
Dabé	Landa
Dabéma	Dabéma / Dahoma*
Daeng-samaet	Melunak
Dahoma	Dabéma / Dahoma*

Common names	Pilot name (/commercial name)
Dakama	Aiéouéko / Dakama*
Dalli	Virola / Dalli*
Damar bindang	Kauri
Damar kapas	Kauri
Damar laut	Balau, Yellow / Bangkirai*
Damar laut kumus	Balau, Yellow / Bangkirai*
Damar laut merah	Balau, Red
Damar miniak	Kauri
Damar minyak	Kauri
Damar pilau	Kauri
Damar puthi	Meranti, White
Damar putih	Meranti, White
Damar sigi	Kauri
Damar siput	Meranti, Light Red
Daniellia	Faro / Ogea*
Danta	Kotibé / Danta*
Danto carne	Catucacém / Louro faia*
Dantoué	Vésámbata
Dark red meranti	Meranti, Dark Red
Dark red seraya	Meranti, Dark Red
Dastan	Pau roxo / Purpleheart*
Dà-tà	Pyinkado
Dau	Keruing
Déké	African Mahogany* / Acajou d'Afrique
Demerara	Greenheart
Denya	Okan
Determa	Louro vermelho / Determa*
Dhup	Kedondong
Dhuwhite	Kedondong
Diaguidia	Tachi / Djedoe*
Diala	Acajou Caillédrat
Dialambame	Grenadillo
Diambi	Guarea, Black* / Bossé foncé
Diambi	Guarea, Scented* / Bossé clair
Diamuni	Kosipo
Diania	Diania
Dibétou	Dibétou
Difou	Difou
Dillenia	Simpoh
Dimpampi	Moabi
Dina	Pao rosa / Dina*
Dinankrohia	Idéwa
Dinde	Moral
Diolosso	Ako / Antiaris*
Distemonanthus	Movingui / Ayan*
Dita	Pulai

Common names	Pilot name (/commercial name)
Ditshipi	Limbali
Djarkidja	Tachi / Djedoe*
Djedoe	Tachi / Djedoe*
Djelutong	Jelutong
Djimbo	Oboto
Dodomissinga	Faveira
Doekaliballi	Macacaúba
Doekaliballi	Muirapiranga
Dokali	Sandé
Domba-gass	Bintangor
Don cede	Tornillo
Don chêm	Mengkulang
Dongomanguila	Tiama / Gedu Nohor*
Dormilon	Quaruba
Douglas	Douglas fir
Douglas fir	Douglas fir
Douglasie	Douglas fir
Douka	Douka
Doum	Fuma / Fromager*
Doussié	Doussié / Afzelia*
Driedoring	Grenadillo
Du yin	Durian
Dua	Coconut Wood
Duabanga	Duabanga
Dubini-biri	Dibétou
Dukalaballi	Macacaúba
Dukali	Dukali / Amapa*
Dukuria	Uchy
Dulit	Kedondong
Dunki	Diania
Durian	Durian
Durian isa	Durian
East African Bombax	Kondroti / East African Bombax*
Eba	Azobé / Ekki*
Ébais	African Cordia* / Cordia d'Afrique
Ébana	Bubinga
Ebangbemwa	Guarea, Scented* / Bossé clair
Ebano	African Ebony* / Ébène d'Afrique
Ebano verde	Ipê
Ebbehout	Grenadillo
Ébé	African Cordia* / Cordia d'Afrique
Ébène	African Ebony* / Ébène d'Afrique
Ébène	Grenadillo

Common names	Pilot name (/commercial name)
Ébène d'Afrique	African Ebony* / Ébène d'Afrique
Ébène de Macassar	Asian Grained Ebony* / Ébène veinée d'Asie
Ébène du Mozambique	Grenadillo
Ébène noire d'Asie	Asian Black Ebony* / Ébène noire d'Asie
Ébène verte	Ipê
Ebi	Andok
Ébiara	Ébiara / Berlinia*
Ebo	Cumaru / Tonka*
Ebony	Asian Black Ebony* / Ébène noire d'Asie
Ebony	Asian Grained Ebony* / Ébène veinée d'Asie
Ebony persimmon	Asian Black Ebony* / Ébène noire d'Asie
Ébornzork	Oboto
Éboukzok	Ossoko
Edelkastanie	Chestnut
Edinam	Tiama / Gedu Nohor*
Edjin	Lati
Edou	Diania
Édoué	Ozouga
Édoum	Okan
Édoumeuleu	Doussié / Afzelia*
Edzil	Lati
Edzui	Lati
Egbenrin	Ékoune
Éguess	Ayous / Obeche*
Eho	Essessang / Erimado*
Éhoumé	Coula
Eiche	Oak
Ékaba	Ékaba / Ekop*
Ekaban	Ékaba / Ekop*
Ekembe bakaswa	Diania
Ekhi	African Cordia* / Cordia d'Afrique
Ekhimi	Dabéma / Dahoma*
Éki	Azobé / Ekki*
Ekiawa	Bodioa
Ekika	Kumbi
Ekki	Azobé / Ekki*
Éko-andoung	Ékaba / Ekop*
Ékobem	Limbali
Ekop	Andoung
Ekop	Ékaba / Ekop*
Ékop-béli	Awoura
Ékop-évène	Bomanga / Ariella*
Ékop-gombé	Gombé

Common names	Pilot name (/commercial name)
Ékop-léké	Bomanga / Ariella*
Ékop-mayo	Andoung
Ékop-naga	Naga / Okwen*
Ékop-nganga	Nganga
Ékop-rîbi	Ékaba / Ekop*
Ékor	Sesendok
Ékouk	Émien / Alstonia*
Ékoune	Ékoune
Ékpagoi eze	Limbali
Ékpiro	Longhi
Ékpogoi	Ébiara / Berlinia*
Ékuk	Émien / Alstonia*
Ékun	Ékoune
Ekuso	Angueuk
Élang	Mukulungu
Élanzok	Mukulungu
Elede	Angueuk
Elelom	Abura
Élélom-n' zam	Abura
Elelon	Abura
Elemi	Aiélé / African Canarium*
Élolom	Abura
Elondo	Tali / Missanda*
Élone	Tali / Missanda*
Elongwamba	Iatandza
Éloué	Ozouga
Éloun	Tali / Missanda*
Embero	Dibétou
Embuia	Imbuia
Emeri	Framiré / Idigbo*
Émien	Émien / Alstonia*
Émola	Tchitola
Émolo	Tola / Agba*
Empenit-meraka	Balau, Red
Encens blanc	Kurokaï / Breu*
Encens blanc/gris/rouge	Kurokaï / Breu*
Encens rouge	Amesclào
Endospermum-sasa	Sesendok
Engbang chenak	Meranti, Dark Red
Engkabang	Meranti, Light Red
Éngo	Diania
Engolo	Bilinga / Opepe*
Énia	Fuma / Fromager*
Eniok	Andok
Énoi	Ovoga
Énouk	Mambodé
Énoumnomé	Nieuk
Entedua	Étimoé

Common names	Pilot name (/commercial name)
Entuyut	Punah
Eñuk	Mambodé
Épal	Limbali
Épal	Limbali
Épi de blé	Wacapou
Épicéa	Spruce
Épindé-pindé	African Ebony* / Ébène d'Afrique
Érable blanc	Great Maple
Érable sycomore	Great Maple
Eri kire	African Mahogany* / Acajou d'Afrique
Erimado	Essessang / Erimado*
Erun	Tali / Missanda*
Esa	Ohia
Esa-biri	Diania
Esa-kokoo	Diania
Esa-kosua	Diania
Esche	Ash
Eseng	Ossimiale
Ésésang	Essessang / Erimado*
Eshago	Sougué
Esia	Essia
Esodoum	Kapokier
Espadeira	Wallaba
Essabem	Ébiara / Berlinia*
Essak	Étimoé
Essang-afane	Angoa
Essessang	Essessang / Erimado*
Essia	Essia
Essingang	Bubinga
Essiri	Mubala
Essoua	Ozouga
Estopeiro	Jequitiba
Estoraque	Balsamo
Éténg	Ilomba
Étimoé	Étimoé
Étom	Kosipo
Eucalyptus grandis	Eucalyptus grandis
European walnut	Walnut
Évam	Bodioa
Évès	Éveuss
Éveuss	Éveuss
Évila	African Ebony* / Ébène d'Afrique
Évota	Owui
Évoudous	Iatandza
Ewome	Coula
Éwomè	Coula

Common names	Pilot name (/commercial name)
Éyan	Dibétou
Éyegh	Nieuk
Éyek	Nieuk
Eyen	Movingui / Ayan*
Éyen	Movingui / Ayan*
Eyere	Aiélé / African Canarium*
Éyong	Éyong / White Sterculia*
Éyoum	Éyoum
Ézézang	Essessang / Erimado*
Faggio	Beech
Falsche akazie	Black Locust
False acacia	Black Locust
Falso pao brasil	Muirapiranga
Farakalay	Grenadillo
Faro	Faro / Ogea*
Fava amarela	Fava amargosa
Fava amargosa	Fava amargosa
Fava arara tucupi	Faveira
Fava bolocha	Melancieira
Fava bolota	Faveira
Fava de folha miuda	Timborana
Fava de rosca	Batibatra
Fava folha fina	Timborana
Fava orelha de macaco	Batibatra
Fava orelha de negro	Batibatra
Faveira	Faveira
Faveira amarela	Fava amargosa
Faveira amargosa	Fava amargosa
Faveira bolacha	Fava amargosa
Faveira grande	Angelim vermelho
Faveira preta	Angelim vermelho
Fayard	Beech
Felli kouali	Cambara
Ferolia	Muirapiranga
Ferreol	Coração de negro* / Panacoco
Ferro	Garapa
Fichte	Spruce
Figueroa	Andiroba
Fir	Fir
Firma	Angelim rajado / Snakewood*
Flooded gum	Eucalyptus grandis
Floreccillo	Mandioqueira
Foeti	Parapará
Fohre	Scots Pine
Fotui	Parapará
Fraké	Limba / Afara*

Common names	Pilot name (/commercial name)
Framiré	Framiré / Idigbo*
Frassino	Ash
Freijo	Freijo / Laurel blanco*
Frei-jorge	Freijo / Laurel blanco*
Frêne	Ash
Fresno	Ash
Fromager	Fuma / Fromager*
Fromager	Sumauma
Fukadi	Tanimbuca / Yellow Sanders*
Fuma	Fuma / Fromager*
Fungunigalo	Ramin
Fustic	Tatajuba
Futi	Parapará
Futui	Parapará
Gaboon	Okoumé / Gaboon*
Gagil	Merawan
Gaiac de cayenne	Cumarú / Tonka*
Gamar	Yemane
Gamari	Yemane
Gambhar	Yemane
Gamela	Louro vermelho / Determa*
Gandoe	Coração de negro* / Panacoco
Gao-vang	Haldu
Garapa	Garapa
Garu buaja	Ramin
Gateado	Garapa
Gateado	Muiracatiara
Gatillo	Balsa
Gavetillo	Araracanga
Gavilan	Pashaco / Paricá*
Gayabochi	Pau mulato
Gbelle-flu	Éyoum
Gbéri	Aiélé / African Canarium*
Gbessi	Faro / Ogea*
Gedu Nohor	Tiama / Gedu Nohor*
Gélé	Ilomba
Gele kabbes	Fava amargosa
Geli-kabissi	Fava amargosa
Gema-de-ovo	Garapa
Géndo	Olène
Genizero	Batibatra
Geronggang	Geronggang
Gerunggang	Geronggang
Gerutu	Gerutu
Gerutu pasir	Gerutu
Ghe	Fuma / Fromager*

Common names	Pilot name (/commercial name)
Ghéombi	Ghéombi
Gia kaba	Éyoum
Giam	Giam
Giati	Teak
Gila	Fuma / Fromager*
Gisok	Balau, Red
Gisok	Balau, Yellow / Bangkirai*
Glenren	Dabéma / Dahoma*
Gluta	Rengas
Gmelina	Yemane
Gobaja	Parapará
Goebaja	Parapará
Goelhart	Bacuri
Gogbei	Tali / Missanda*
Goiabao	Goiabao
Golondrino	Timborana
Goma amarilla	Quaruba
Goma pashaco	Faveira
Gomari	Yemane
Gombé	Gombé
Gombeira	Coração de negro* / Panacoco
Gomboul	Kékélé
Gommier	Gommier
Gommier blanc	Gommier
Gommier de montagne	Gommier
Gomo	Quaruba
Gonçaleiro	Muiracatiara
Gonçalo-alvez	Muiracatiara
Gonfolo	Mandioqueira
Gonfolo kouali	Mandioqueira
Gonggang	Geronggang
Gongu	Onzabili
Goni	Vêne
Gonuoc	Merbau
Goupi	Cupiuba / Kabukalli*
Goyabao	Goiabao
Grand moni	Amesclão
Grandis	Eucalyptus grandis
Grapia	Garapa
Great Maple	Great Maple
Great Maple	Great Maple
Greenheart	Greenheart
Grenadille d’Afrique	Grenadillo
Grenadille du Mozambique	Grenadillo
Grenadillo	Grenadillo
Grignon franc	Louro vermelho / Determa*

Common names	Pilot name (/commercial name)
Groenhart	Greenheart
Groenhart	Ipê
Gronfoeloe	Mandioqueira
Gronfolo	Mandioqueira
Grubixa	Curupixa
Grumixava	Curupixa
Guabillo	Sapucaia
Guabillo	Tachi / Djedoe*
Guaimaro	Sandé
Guajará	Curupixa
Gualanday	Parapará
Guambush	Sumauma
Guamillo	Tachi / Djedoe*
Guamo	Inga
Guanandi	Jacaréuba
Guano	Balsa
Guapinol	Jatobá / Algarrobo*
Guapuruvù	Pashaco / Paricá*
Guarabu	Pau roxo / Purpleheart*
Guarajuba	Tanibuca / Yellow Sanders*
Guarea	Guarea, Black* / Bossé foncé
Guaribu-preto	Muiracatiara
Guarita	Muiracatiara
Guariúba	Guariúba
Guarumo macho	Morototo
Guasango	Muiracatiara
Guatambù	Guatambù
Guatambù blanco	Guatambù
Guayabillo	Tanibuca / Yellow Sanders*
Guayabo	Tanibuca / Yellow Sanders*
Guayabon	Tanibuca / Yellow Sanders*
Guayacán	Ipê
Gubas	Sesendok
Guenin	Vêne
Guerra	Fava amargosa
Guibourtia	Ovèngkol
Guijo	Balau, Red
Güino	Andiroba
Guissépa	Bété / Mansonia*
Guitarrero	Morototo
Guitarro	Marupa
Gulí	Dabéma / Dahoma*
Gumari	Yemane
Gumbar	Yemane

Common names	Pilot name (/commercial name)
Gumhar	Yemane
Gumhu	Yemane
Gurjun	Keruing
Gurupa	Angelim vermelho
Gusanero	Muiracatiara
Guxotin	Ako / Antiaris*
Guyabi amarillo	Tanimbuca / Yellow Sanders*
Habillo	Açacu / Sandbox*
Had	Keledang
Haiariballi	Melancieira
Haiawa	Kurokai / Breu*
Haiawaballi	Amescião
Hakia	Ipê
Halabalagi	Kedondong
Haldu	Haldu
Harewood	Great Maple
Hatti	Hevea / Rubberwood*
Haya	Beech
Heavy african mahogany	African Mahogany* / Acajou d'Afrique
Heavy sapele	Kosipo
Heavy white seraya	Gerutu
Hendui	Azobé / Ekki*
Hêtre	Beech
Hévéa	Hevea / Rubberwood*
Hevea	Hevea / Rubberwood*
Hevea wood	Hevea / Rubberwood*
Hintsy	Merbau
Hnaw	Haldu
Hoepelhout	Copaiba
Hoh	Ékaba / Ekop*
Hongopo	Sesendok
Honne	Padauk Amboina
Hora	Keruing
Huarango	Faveira
Huarmi-caspi	Chicha
Huaryoro	Tento
Huasai-caspi	Sucupira preta
Huayra caspi	Tornillo
Huevo de burro	Piquiarana
Huimba	Sumauma
Huriki	Uchy
Hutin	Fuma / Fromager*
Huynh	Mengkulang
Hyedua	Ovèngkol
Hyeduanini	Ovèngkol
latandza	latandza

Common names	Pilot name (/commercial name)
Ibagho	Igaganga
Ibirá camby	Curupixa
Ibira pere	Garapa
Ibira-moroti	Pau mulato
Idéwa	Idéwa
Idigbo	Framiré / Idigbo*
Igaganga	Igaganga
Ijzerhart	Coração de negro* / Panacoco
Ikame	Koto / Pterygota*
Ikélé	Éveuss
Ikomkpa	Olène
Illupai	Nyatoh
Ilomba	Ilomba
Imbirema	Tuari
Imbuia	Imbuia
Imburana	Cerejeira
Impas	Kempas
Impompo	Kosipo
Incienso	Balsamo
Indian rosewood	Rosewood, Sonokeling
Inga	Inga
Inga-chi-chi	Inga
Inga-chi-chica	Inga
Ingarana	Angelim rajado / Snakewood*
Ingarana da terra firma	Angelim rajado / Snakewood*
Ingazeira	Inga
Ingipipa	Tuari
Inguipipa	Tuari
Inkassa	Fava amargosa
Intanin	Bungur
Inyi	Sougué
Ipanai	Faveira
Ipé	Ipê
Ipê	Ipê
Ipê	Muirapiranga
Ipe roxo	Pau roxo / Purpleheart*
Ipê roxo	Ipê
Ipil	Merbau
Ipil laut	Merbau
Iroko	Iroko
Ironwood	Coração de negro* / Panacoco
Ironwood	Ipê
Irul	Pyinkado
Ishpingo	Cerejeira
Ishtapi	Paraparâ

Common names	Pilot name (/commercial name)
Ita	Diania
Itaúba	Itaúba
Itauba branca	Greenheart
Iteballi	Quaruba
Itti	Rosewood, Sonokeling
Ituri wallaba	Wallaba
Ivianlegbe	Coula
Izombé	Izombé
Jabillo	Açacu / Sandbox*
Jaboty	Cambara
Jacamin	Araracanga
Jacarana	Parapará
Jacaranda	Parapará
Jacaranda	Rosewood, Para
Jacarandá do Pará	Rosewood, Para
Jacaranda preto	Rosewood, Para
Jacareuba	Jacareúba
Jacareúba	Jacareúba
Jackwood	Keledang
Jahoballi	Chicha
Jaja	Ilomba
Jalang	Rengas
Jaman	Kelat
Jambiré	Wengé
Jambu	Kelat
Jamun	Kelat
Japanese cedar	Cryptomeria* / Sugi
Japanische zeder	Cryptomeria* / Sugi
Jarrah	Jarrah
Jarul	Bungur
Jatai	Jatobá / Algarrobo*
Jatai-amarello	Tanimbuca / Yellow Sanders*
Jatai-amarelo	Garapa
Jati	Teak
Jatin	Faro / Ogea*
Jatoba	Jatobá / Algarrobo*
Jatobá	Jatobá / Algarrobo*
Jatobazinho	Pau roxo / Purpleheart*
Java teak	Teak
Jawahedan	Tatajuba
Jelecote pine	Pinus patula* / Patula Pine
Jelocote	Pinus patula* / Patula Pine
Jelutong	Jelutong
Jelutong bukit	Jelutong
Jelutong paya	Jelutong
Jenny wood	Freijo / Laurel blanco*
Jequitiba	Jequitiba

Common names	Pilot name (/commercial name)
Jequitiba branco	Jequitiba
Jequitiba rosa	Jequitiba
Jequitiba vermelho	Jequitiba
Jeve	Hevea / Rubberwood*
Jigua amarillo	Louro branco
Joeliballi-tataroe	Amesclão
Jubia	Castanheiro
Jutai	Jatobá / Algarrobo*
Jutai açu	Jatobá / Algarrobo*
Jutai roxo	Jatobá / Algarrobo*
Kabak khao	Meranti, White
Kabek	Bungur
Kabukalli	Cupiuba / Kabukalli*
Kaditiri	Tachi / Djedoe*
Kafundula	Grenadillo
Kaiwi	Émien / Alstonia*
Kajol martem	Asian Grained Ebony* / Ébène veinée d'Asie
Kaju	African Mahogany* / Acajou d'Afrique
Kaju hitam	Asian Black Ebony* / Ébène noire d'Asie
Kaju hitam	Asian Grained Ebony* / Ébène veinée d'Asie
Kakantrie	Fuma / Fromager*
Kakawalli	Tauari
Kakendé	Koto / Pterygota*
Kaki-khao	Keranjii
Kaku	Azobé / Ekki*
Kalabau	Merbau
Kalam	Duabanga
Kalebashout	Tanimbuca / Yellow Sanders*
Kali	Aniégré / Anigeria*
Kalo	Meranti, Yellow
Kaluk afuon	Ovèngkol
Kalulot	Keledang
Kalungi	Sipo / Utile*
Kamarere	Eucalyptus grandis
Kamashi	Niové
Kamasumu	Olon
Kambala	Iroko
Kanawang	Meranti, White
Kanda	Kanda brun
Kanda	Kanda rose
Kanda brun	Kanda brun
Kanda rose	Kanda rose
Kaneelhout	Itaúba
Kanga	Tiama / Gedu Nohor*

Common names	Pilot name (/commercial name)
Kankantrie	Sumauma
Kankaté	Difou
Kanran	African Ebony* / Ébène d'Afrique
Kanyin	Keruing
Kanzo	Mengkulang
Ka-ok	Keledang
Kaori	Kauri
Kapiag	Keledang
Kapokier	Kapokier
Kapur	Kapur
Kapur empedu	Kapur
Kapur kayatan	Kapur
Kapur kejatan	Kapur
Kapur singkel	Kapur
Kapur sintuk	Kapur
Kapur tanduk	Kapur
Kapuyai	Mambodé
Kararo	Aniégré / Aningeria*
Karivembu	Kedondong
Karohoro	Morototo
Karrevembu	Kedondong
Karri	Karri
Karuvembu	Kedondong
Kasai	Kasai
Kasalusalu	Grenadillo
Kasavehout	Morototo
Kashit	Melunak
Kassa	Tali / Missanda*
Kassagnan	Piquiarana
Kastanienbaum	Chestnut
Kasudu	Éyoum
Kathing	Bintangor
Katillupai	Nyatoh
Kaunghmu	Mersawa
Kauri	Kauri
Kauri pine	Kauri
Kauvula	Sesendok
Kaw oudou	Tatajuba
Kawang	Meranti, Light Red
Kaw-oedoe	Tatajuba
Kayombo	Ohia
Kayu safoda	Acacia mangium
Kebon tang	Meranti, White
Kedawang	Balau, Yellow / Bangkirai*
Kedondong	Kedondong
Kefe	Koto / Pterygota*
Kékélé	Kékélé

Common names	Pilot name (/commercial name)
Keladan	Kapur
Kelapa	Coconut Wood
Kelat	Kelat
Keledang	Keledang
Keledang babi	Keledang
Kélebicho	Akossika / Odoko*
Kembang	Mengkulang
Kembang Semangkok	Kembang Semangkok
Kempas	Kempas
Kenari	Kedondong
KerANJI	KerANJI
Kerbau	Rengas
Kereti	Louro branco
Kereti-silverballi	Louro branco
Keroeing	Keruing
Keruing	Keruing
Keruing bajak	Keruing
Keruing beras	Keruing
Keruing gaga	Keruing
Kesica	Pinus kesiya* / Kesiya Pine
Kesiya Pine	Pinus kesiya* / Kesiya Pine
Kessé	Difou
Kévazingo	Bubinga
Khabhari	Yemane
Khai khieo	Gerutu
Kha-nunnok	Nyatoh
Khanun-pa	Keledang
Khasi-pine	Pinus kesiya* / Kesiya Pine
Khasya-pine	Pinus kesiya* / Kesiya Pine
Khaya mahogani	African Mahogany* / Acajou d'Afrique
Khèn hin	Giam
Khleng	KerANJI
Khlong	Keruing
Kia	Pinus merkusii* / Merkusii Pine
Kiantioutiou	Araracanga
Kiefer	Scots Pine
Kiharpan	Kedondong
Kikubi-lomba	Ékoune
Kikwaju	Grenadillo
Kiliakamba	Diania
Kilingi	Bilinga / Opepe*
Kilu	Bilinga / Opepe*
Kilula	Tiama / Gedu Nohor*
Kirundu	Ako / Antiaris*
Kisasamba	Pao rosa / Dina*
Kisésé	African Padauk* / Padouk d'Afrique

Common names	Pilot name (/commercial name)
Kissinhungo	Kotibé / Danta*
Kitola	Tchitola
Kobé	Chicha
Kobehe	Chicha
Kocolorelli	Pau roxo / Purpleheart*
Koemaka	Sumauma
Koemaroe	Cumaru / Tonka*
Koenatepi	Macacaúba
Koepajoewa	Copaiba
Koepi	Cupiuba / Kabukalli*
Kofina	Éyoum
Koframiré	Osanga
Kofyo	Azobé / Ekki*
Kohu	Merbau
Koila	Bintangor
Kojagei	Limba /Afara*
Koki	Merawan
Koki phnom	Meranti, White
Koki thmor	Giam
Kokoti	Bodioa
Kokriki	Tento
Kokrudua	Afromosia
Koloméko	Ékoune
Kolon	Haldu
Koma	Ossabel
Kondofindo	Kotibé / Danta*
Kondroti	Kondroti / East African Bombax*
Kong-afane	Congotali
Kopie	Cupiuba / Kabukalli*
Koraro	Andira
Koraroballi	Angelim
Korina	Limba /Afara*
Koroko	Akossika / Odoko*
Korokon	Akossika / Odoko*
Kosipo	Kosipo
Kosipo-mahogany	Kosipo
Kosramba	Kedondong
Kotibé	Kotibé / Danta*
Koto	Koto / Pterygota*
Kouali	Quaruba
Kouatakaman	Faveira
Kouatapatoe	Sapucaia
Kouatapitou	Sapucaia
Kouéro	Angueuk
Koul	Bété / Mansonia*
Koumanti oudou	Araracanga
Kouria	Kapokier

Common names	Pilot name (/commercial name)
Kowo	Alep
Kpakpatin	Doussié / Afzelia*
Kpaoli	Vésámbata
Kpar	Sougué
Kpatin dehun	Kondroti / East African Bombax*
Kpendei	Doussié / Afzelia*
Kpomusi	Bodioa
Kpowuli	Ozouga
Kpoyei	Ilomba
Kra thin tepa	Acacia mangium
Krabak	Mersawa
Krakas	Sepetir
Krala	African Mahogany* / Acajou d'Afrique
Kralanh	KerANJI
Krappa	Andiroba
Krathon	Sepetir
Kroma	Éveuss
Kromanti kopi	Araracanga
Kruku	Akossika / Odoko*
Kruma	Éveuss
Kua	Alumbi
Kudi biushi	Curupixa
Kuil	Éyong / White Sterculia*
Kuishop	Parapará
Kumaka	Sumauma
Kuma-kuma	Éveuss
Kumaru	Cumaru / Tonka*
Kumbi	Kumbi
Kumenini	Kumbi
Kumunu	Coula
Kumus	Balau, Yellow / Bangkirai*
Kungulu	Mukulungu
Kunyt	Meranti, Yellow
Kurahara	Jacaréuba
Kuran	KerANJI
Kurang	Inga
Kurokaï	Kurokaï / Breu*
Kurokay	Kurokaï / Breu*
Kusia	Bilinga / Opepe*
Kwabohoro	Guarea, Scented* / Bossé clair
Kwao	Haldu
Kwari	Inga
Kwariye	Quaruba
Kwariye	Inga
Kwarye	Inga
Kwatakama	Faveira

Common names	Pilot name (/commercial name)
Kwila	Merbau
Kwilau	Merbau
Kyenkyen	Ako / Antiaris*
Kyere	Koto / Pterygota*
Kyun	Teak
Lagarto-caspi	Jacareúba
Laguno	Quaruba
Lakuch	Keledang
Lampati ramdala	Duabanga
Landa	Landa
Landojan	Aniégré / Aningeria*
Lanilla	Balsa
Lanu	Balsa
Lanutan bagio	Ramin
Lapacho	Ipê
Lapacho negro	Ipê
Lapawe	Owui
Lapland pine	Scots Pine
Larch	European Larch
Larche	European Larch
Larice	European Larch
Larme	Idéwa
Lasi	Haldu
Latareko	Ramin
Lati	Lati
Lauan malaanonan	Seraya, White
Lauan red	Lauan, Red
Lauan, white	Almon
Lauan, white	Meranti, White
Laurel	Louro branco
Laurel blanco	Freijo / Laurel blanco*
Laurier	Louro branco
Lebi oueko	Inga
Lebombo ironwood	Mecrussé
Lechero	Sandé
Legno satino	Muirapiranga
Leiteira	Sandé
Lejonclo	Ilomba
Leoué	Owui
Letoeng	Jelutong
Letok	Pulai
Lianu	Bubinga
Liar	Olène
Liboyo	Sipo / Utile*
Libu	Oboto
Lidia	Framiré / Idigbo*
Lifaki	Sapelli / Sapele*
Lifaki	Tiama / Gedu Nohor*

Common names	Pilot name (/commercial name)
Lifaki muindu	Dibétou
Lifondo	Ilomba
Lifuco	Kosipo
Light hopea	Merawan
Light red lauan	Almon
Light red meranti	Meranti, Light Red
Light red seraya	Meranti, Light Red
Ligudu	Limbali
Likundu	Dabéma / Dahoma*
Limba	Limba /Afara*
Limbali	Limbali
Limbo	Limba /Afara*
Limpagna	Suren
Linggua	Padauk Amboina
Lingué	Doussié / Afzelia*
Liniumbu	Ohia
Linkwai	Duabanga
Linog	Pulai
Linzi	Bilinga / Opepe*
Liusan	Cryptomeria* / Sugi
Livuite	Tiama / Gedu Nohor*
Locust	Jatobá / Algarrobo*
Lohonfé	Diania
Loirinho	Tanimbuca / Yellow Sanders*
Lokonfi	Diania
Lokotin	Iroko
Loktob	Duabanga
Lolagbola	Tchitola
Lolako	Ilomba
Loloti	Kumbi
Lomba-kumbi	Ékoune
Longhi	Longhi
Lonlaviol	Faro / Ogea*
Lotofa	Lotofa / Brown Sterculia*
Louro	Louro branco
Louro branco	Louro branco
Louro faia	Catucáem / Louro faia*
Louro gamela	Louro vermelho / Determa*
Louro inhamui	Louro branco
Louro itaúba	Itaúba
Louro precioso	Preciosa
Louro tamaquare	Aiéouéko / Dakama*
Louro vermelho	Louro vermelho / Determa*
Lukienzo	Landa
Lumbandjii	Ghéombi
Lumbayau	Mengkulang
Lum-paw	Merbau

Common names	Pilot name (/commercial name)
Lun gajah	Meranti, Yellow
Lun kuning	Meranti, Yellow
Lun merat	Meranti, Yellow
Lun siput	Meranti, Yellow
Lusamba	Avodiré
Lusanga	Iroko
M'babou	Tchitola
M'bado	Ayous / Obeche*
M'bagna	Ovèngkol
M'banga	Doussié / Afzelia*
M'banza	Olon
M'bébane	Longhi
M'bero	Dibétou
M'bidikala	Aiélé / African Canarium*
M'bidinkala	Safukala
M'bili	Aiélé / African Canarium*
M'bonda	Niové
M'bossi	Oboto
M'boul	Aniégré / Aningeria*
M'boun	Niové
M'boyo	Sapelli / Sapele*
M'boza	Oboto
M'fan	Éyoum
M'foi	Moabi
M'fubé	Avodiré
M'penze	Mutényé
M'possa	Ébiara / Berlinia*
Ma klua	Asian Black Ebony* / Ébène noire d'Asie
Maaka	Curupixa
Macacarecuia	Couroupita
Macacaúba	Macacaúba
Macacaúba preta	Macacaúba
Macacaúba vermelha	Macacaúba
Macaniaba	Sucupira preta
Maçaranduba	Maçaranduba / Bulletwood*
Macassar ebony	Asian Grained Ebony* / Ébène veinée d'Asie
Macawood	Macacaúba
Machang	Mango / Machang*
Machare	Manil / Manni*
Machin mango	Sapucaia
Macucu da catinga	Macucu de paca
Macucu de paca	Macucu de paca
Macucu do baixo	Macucu de paca
Magas	Duabanga
Magasawith	Duabanga
Maho	Chicha

Common names	Pilot name (/commercial name)
Maho cigare	Tauri
Maho jaune	Sapucaia
Mahoe	Chicha
Mahogany	Mahogany
Mahonia	Mahogany
Mahot coton	Sumauma
Mahua	Bitis
Mai bak	Mersawa
Mai hao	Gerutu
Mai hao	Mengkulang
Mai nhang	Keruing
Mai po hao	Mengkulang
Mai puay	Bungur
Mai sat	Keruing
Mai saw	Yemane
Mai so	Yemane
Mai tin pet	Pulai
Makai	Meranti, White
Makasim	Kelat
Makata	Balau, Red
Maka-tea	Sepetir
Ma-kerm	Kedondong
Makkakabes	Angelim
Makobokobo	African Cordia* / Cordia d'Afrique
Makoré	Makoré
Malako	Pau roxo / Purpleheart*
Malakubi	Keledang
Malarveppu	Suren
Malaykal	Balau, Yellow / Bangkirai*
Maloba	Bitis
Malugai	Kasai
Mamantin	Curupixa
Mambodé	Mambodé
Mammea apple	Bacuri
Mampalagai	Mango / Machang*
Mampata	Sougué
Ma-muang-pa	Mango / Machang*
Manari balli	Timborana
Mancone	Tali / Missanda*
Mandiocai	Morototo
Mandioqueira	Mandioqueira
Mandioqueira aspera	Mandioqueira
Mandioqueira escamosa	Mandioqueira
Mandioqueira lisa	Mandioqueira
Mandji	Iroko
Mandurike	Suren
Mangga	Mango / Machang*

Common names	Pilot name (/commercial name)
Manggachapoi	Merawan
Manggachapui	Merawan
Mangge hutan	Acacia mangium
Mango	Mango / Machang*
Mangona	African Mahogany* / Acajou d'Afrique
Mangowood	Mango / Machang*
Mangue	Manil / Manni*
Manguier	Mango / Machang*
Mani	Chicha
Mani	Manil / Manni*
Manil	Manil / Manni*
Manil marécage	Manil / Manni*
Manil montagne	Manniballi
Manil peou	Manniballi
Manila-padouk	Padauk Amboina
Manni	Manil / Manni*
Manniballi	Manniballi
Manonti kouali	Cambara
Mansonia	Bété / Mansonia*
Mapa	Dukali / Amapa*
Mapajo	Sumauma
Mapalapa	Hevea / Rubberwood*
Maparajuba	Maçaranduba / Bulletwood*
Mapat	Geronggang
Maporokon	Inga
Mapurite	Garapa
Maqui	Fava amargosa
Maquilla	Andira
Mara	Mahogany
Maram	Copaiba
Marblewood	Asian Grained Ebony* / Ébène veinée d'Asie
Maria	Jacaréuba
Mari-mari	Fava amargosa
Marina	Sandé
Mario	Jacaréuba
Maritime pine	Maritime Pine
Marupa	Marupa
Marupa del bajo	Fava amargosa
Marupa falso	Parapará
Marupauba	Marupa
Marupauba falso	Morototo
Masa	Amesclão
Masabalo	Andiroba
Masenkuanim	Timborana
Massarandu	Maçaranduba / Bulletwood*

Common names	Pilot name (/commercial name)
Mata palo	Guariúba
Mataki	Manil / Manni*
Matakkie	Manniballi
Matapalo	Tachi / Djedoe*
Matatauba	Morototo
Matazama	Bacuri
Matoa	Kasai
Mave	Mango / Machang*
Mavini	African Ebony* / Ébène d'Afrique
Mavota	Ramin
Mavu	Mango / Machang*
May pek	Pinus merkusii* / Merkusii Pine
May sak	Teak
Mayagua	Chicha
Mayang	Nyatoh
Mayapis	Meranti, Light Red
Mazabalo	Andiroba
Mbagna	Ovèngkol
Mbanga	Coconut Wood
Mbangandourgou	Alumbi
Mbel	African Padauk* / Padouk d'Afrique
Mbele	Dabéma / Dahoma*
Mbele-guli	Dabéma / Dahoma*
Mbeli	Dabéma / Dahoma*
Mbembakofi	Doussié / Afzelia*
Mbengé	Mutényé
Mboi	Abura
Mbosso	Kékélé
Méblo	Naga / Okwen*
Mecobze	Difou
Mecodze	Difou
Mecrussé	Mecrussé
Medang keram	Ramin
Meguza	Kondroti / East African Bombax*
Meketil	Sepetir
Melabuwai	Jelutong
Melancieira	Melancieira
Melapi	Meranti, White
Melawis	Ramin
Melegba	Ébiara / Berlinia*
Mélèze	European Larch
Mélèze d'Europe	European Larch
Melunak	Melunak
Membacang	Mango / Machang*
Membatu	Balau, Red

Common names	Pilot name (/commercial name)
Mendou	Naga / Okwen*
Menga-menga	Niové
Menggeris	Kempas
Menghilan	Kauri
Mengkulang	Mengkulang
Mengris	Kempas
Meraga	Haldu
Merah-tua	Meranti, Dark Red
Meraka	Alan / Alan-Batu*
Meralu	Kelat
Merana	Mecrussé
Meranti bukit	Meranti, Dark Red
Meranti bunga	Meranti, Dark Red
Meranti bunga	Meranti, Light Red
Meranti bunga sengawan	Meranti, Dark Red
Meranti damar hitam	Meranti, Yellow
Meranti dark red	Meranti, Dark Red
Meranti daun basar	Meranti, Dark Red
Meranti gerutu	Gerutu
Meranti hantu	Meranti, Light Red
Meranti jerit	Meranti, White
Meranti kelim	Meranti, Yellow
Meranti kepong	Meranti, Light Red
Meranti ketung	Meranti, Dark Red
Meranti kuning	Meranti, Yellow
Meranti langgang	Meranti, Light Red
Meranti lapis	Meranti, White
Meranti light red	Meranti, Light Red
Meranti melanthi	Meranti, Light Red
Meranti merah muda	Meranti, Light Red
Meranti paya	Meranti, Light Red
Meranti putih	Meranti, White
Meranti rambai	Meranti, Light Red
Meranti sangkawang	Meranti, Light Red
Meranti telepok	Meranti, Yellow
Meranti temak	Meranti, White
Meranti tembaga	Meranti, Light Red
Meranti tengkawang	Meranti, Light Red
Meranti white	Meranti, White
Meranti yellow	Meranti, Yellow
Merawan	Merawan
Merawayana	Pau roxo / Purpleheart*
Merbau	Merbau
Merisier	Cherry Wood
Merkusii Pine	Pinus merkusii* / Merkusii Pine
Merkus-pine	Pinus merkusii* / Merkusii Pine

Common names	Pilot name (/commercial name)
Merpau	Merpauh
Merpauh	Merpauh
Mersawa	Mersawa
Meruyun	Gerutu
Messmate	Tasmanian Oak
Mévini	African Ebony* / Ébène d'Afrique
Mezimbite	Mecrussé
Mfang	Éyoum
Mfimbo	Kanda brun
Mfimbo	Kanda rose
Mfua	Mukulungu
Mfume	Kondroti / East African Bombax*
Mfumu	Okoumé / Gaboon*
Mfwankomo	Grenadillo
Milk wood	Pulai
Mindoro-pine	Pinus merkusii* / Merkusii Pine
Minzu	Essia
Mirabow	Merbau
Mirarena	Angelim
Mirindiba	Tanibuca / Yellow Sanders*
Mirueira	Muiracatiara
Missanda	Tali / Missanda*
Mit-nai	Keledang
Mivuko	Abura
Mivuku	Abura
Mkalambaki	Muhuhu
Mkarambati	Muhuhu
Mkelete	Grenadillo
Mkora	Doussié / Afzelia*
Mkumudwe	Grenadillo
Mkuzu	Ako / Antiaris*
Mlulu	Ako / Antiaris*
Moabi	Moabi
Mobengé	Angueuk
Moboma	Bodioa
Mocacahiba	Coração de negro* / Panacoco
Mocha colorado	Andira
Mo-cua	Pulai
Moena amarilla	Louro branco
Moena blanca	Louro branco
Mogano	Mahogany
Mogno	Mahogany
Mogouga	Émien / Alstonia*
Moholé	Afrormosia

Common names	Pilot name (/commercial name)
Mokelete	Grenadillo
Mokessé	Bilinga / Opepe*
Mokoba	Igaganga
Mokongo	Iroko
Mokoungou	Dabéma / Dahoma*
Molanga	Niové
Molapa	Limbali
Moloundou	Iroko
Monghinza	Monghinza
Monginja	Monghinza
Mongola	African Padauk* / Padouk d'Afrique
Mongongo	Onzabili
Monkey pot	Sapucaia
Mopini	African Ebony* / Ébène d'Afrique
Mora	Mora
Mora amarillo	Tatajuba
Moraballi	Curupixa
Moraboekea	Mora
Morabukea	Mora
Morado	Pau roxo / Purpleheart*
Moral	Moral
Moral	Tatajuba
Moral bobo	Guariúba
Morcegueira	Amescião
Moreira	Iroko
Morombo-rai	Manniballi
Moronobo	Manniballi
Morototo	Morototo
Mossome	Owui
Motangu	Grenadillo
Moton	Andira
Mouali	Nieuk
Mouganga	Safukala
Mouguengueri	Safukala
Moulala	Nieuk
Moulomba	Virola / Dalli*
Mountain ash	Tasmanian Oak
Mouquenquéri	Safukala
Moutendé	Quaruba
Movingui	Movingui / Ayan*
Mozambique	Ovèngkol
Mpande	Wengé
Mpengwa	Dibétou
Mpewere	Dabéma / Dahoma*
Mpingo	Grenadillo
Mringaringa	African Cordia* / Cordia d'Afrique

Common names	Pilot name (/commercial name)
Msalu	Grenadillo
Muamba jaune	Moabi
Muave	Tali / Missanda*
Muawa	Essessang / Erimado*
Mubala	Mubala
Mubangu	Alumbi
Mubura	Sougué
Mucututu	Morototo
Mufula	Iroko
Mufumbi	Sipo / Utile*
Mugavu	Iatandza
Mugongo	Onzabili
Muhugwe	Muhuhu
Muhuhu	Muhuhu
Mühühü	Muhuhu
Muiracatiara	Muiracatiara
Muirajuba	Garapa
Muirapiranga	Muirapiranga
Muirataua	Garapa
Muirataua	Pau amarelo
Muiratinga	Muiratinga
Muizi	Lati
Mujwa	Émien / Alstonia*
Mukali	Aniégré / Aningeria*
Mukangu	Aniégré / Aningeria*
Mukebu	African Cordia* / Cordia d'Afrique
Mukelete	Grenadillo
Mukessu	Olène
Mukokukoma	Ohia
Mukongoro	Dibétou
Mukula	African Padauk* / Padouk d'Afrique
Mukulungu	Mukulungu
Mukumari	African Cordia* / Cordia d'Afrique
Mukusu	Dibétou
Mukusu	Tiama / Gedu Nohor*
Mula	Sougué
Mulateiro	Pau mulato
Mulu	Geronggang
Mumaka	Ako / Antiaris*
Mumululi	Kékélé
Mun	Asian Black Ebony* / Ébène noire d'Asie
Muna	Aniégré / Aningeria*
Mungusa	Kondroti / East African Bombax*

Common names	Pilot name (/commercial name)
Munyama	African Mahogany* / Acajou d'Afrique
Munyii	Pao rosa / Dina*
Muom	Merpauh
Mureillo	Cambara
Murere	Guariúba
Murtenga	Kedondong
Murure	Guariúba
Murwiti	Grenadillo
Musira	Musizi
Musizi	Musizi
Musonkomo	Grenadillo
Mussacossa	Doussié / Afzelia*
Mutényé	Mutényé
Mutigbanaye	Guarea, Black* / Bossé foncé
Mutsonga	Pao rosa / Dina*
Mu-u	Bintangor
Muyovu	Sapelli / Sapele*
Mvuku	Abura
Mvumo	Muhuhu
Mwafu	Aiélé / African Canarium*
Mwavi	Tali / Missanda*
My lady	Araracanga
Myauklok	Keledang
Myaukngo	Duabanga
Myroxylon	Balsamo
N'aoumbou	Guarea, Black* / Bossé foncé
N'chong	Éyong / White Sterculia*
N'démo	Kondroti / East African Bombax*
N'dola	African Mahogany* / Acajou d'Afrique
N'dombou	Ako / Antiaris*
N'douma	Andoung
N'duka	Douka
N'duma	Okan
N'ganga	Limba /Afara*
N'gollon	African Mahogany* / Acajou d'Afrique
N'gongo	Onzabili
N'goumi	Okoumé / Gaboon*
N'guessa	Pao rosa / Dina*
N'gula	African Padauk* / Padouk d'Afrique
N'gulu-maza	Bilinga / Opepe*
N'gwaki	Izombé
N'kagha	Wamba
N'kali	Aniégré / Aningeria*

Common names	Pilot name (/commercial name)
N'kanang	Lotofa / Brown Sterculia*
N'kanguelé	Musizi
N'kara	Wamba
N'kassa	Tali / Missanda*
N'kokongo	Doussié / Afzelia*
N'komi	Izombé
N'kumi	Okoumé / Gaboon*
N'safu-nkala	Safukala
N'singa	Dabéma / Dahoma*
N'su	Faro / Ogea*
N'suku	Ossoko
N'téné	Anzèm / Nténé*
N'tola	Tola / Agba*
N'vero	Dibétou
N'zombou	Guarea, Scented* / Bossé clair
N'zong	Éyong / White Sterculia*
Naga	Naga / Okwen*
Naharu	Tanimbuca / Yellow Sanders*
Namanuka	Ohia
Nambar	Macacaúba
Nandi	Bungur
Nandiroba	Andiroba
Naouya	Kotibé / Danta*
Naranja podrida	Dukali / Amapa*
Naranja	Tanimbuca / Yellow Sanders*
Nargusta	Tanimbuca / Yellow Sanders*
Narig	Resak
Narra	Padauk Amboina
Nato	Mora
Nato	Nyatoh
Nato rojo	Mora
Nazanero	Pau roxo / Purpleheart*
Nazareno	Pau roxo / Purpleheart*
Ndou	African Ebony* / Ébène d'Afrique
Ndungu	Musizi
Neang nuon	Rosewood, Tamalan
Nekoe-oedoe	Melancieira
Neko-oudou	Tento
Nemba-mbobolo	Kékélé
Nemesu	Meranti, Dark Red
New guinea basswood	Sesendok
Nfum	Alumbi
Nganga	Nganga
Nghien	Melunak

Common names	Pilot name (/commercial name)
Ngobisololo	Akossika / Odoko*
Ngom	Ghéombi
Ngon	Éveuss
Ngoubou	African Ebony* / Ébène d'Afrique
Ngouma	Coula
Ngwe	Fuma / Fromager*
Niangon	Niangon
Nielillo negro	Araracanga
Nieuk	Nieuk
Niog	Coconut Wood
Nioubou	Ako / Antiaris*
Niové	Niové
Nir-naval	Kelat
Nispero	Maçaranduba / Bulletwood*
Niuka	Ozouga
Nkanza	Landa
Nkoba	Dibétou
Nkokom	Nganga
Nkonengu	Kanda brun
Nkonengu	Kanda rose
Noce commune	Walnut
Nogal	Nogal
Nogal	Walnut
Nom abam	Aniégré / Anigeria*
Nom atui	Ossimiale
Nom éteng	Ékoune
Nom nsas	Pao rosa / Dina*
Nom sinedon	Tchitola
Nongo	Iatandza
Northern pine	Scots Pine
Nossoba	Essia
Noudougou	Bodioa
Noyer	Walnut
Noyer d'Afrique	Dibétou
Noyer du Gabon	Dibétou
Noyer du Mayombe	Limba /Afara*
Nsakala	Pao rosa / Dina*
Nsezang	Essessang / Erimado*
Nsou	Faro / Ogea*
Ntesi	Olène
Ntwa	Andok
Nuanamo	Virola / Dalli*
Nuez del brazil	Castanheiro
Nussbaum	Walnut
Nyankom	Niangon
Nyareti	African Ebony* / Ébène d'Afrique

Common names	Pilot name (/commercial name)
Nyatoh	Nyatoh
Nzang	Bomanga / Ariella*
Nzingu	Abura
Oabé	Moabi
Oak	Oak
Oba	Kapokier
Oba suluk	Meranti, Dark Red
Obang	Afromosia
Obar	Kelat
Obeche	Ayous / Obeche*
Obobo nekwi	Guarea, Black* / Bossé foncé
Obobo nofua	Guarea, Scented* / Bossé clair
Oboro	Éveuss
Oboto	Oboto
Ochoho	Açacu / Sandbox*
Ocote	Caribbean Pine
Ocote	Pinus patula* / Patula Pine
Ocote liso	Pinus patula* / Patula Pine
Odoko	Akossika / Odoko*
Odou	Ohia
Odou vrai	Diania
Odoum	Iroko
Odouma	Fuma / Fromager*
Odoun	Tatajuba
Odudu	Éveuss
Oduma	Okan
Ofete	Koto / Pterygota*
Ofram	Limba /Afara*
Ofun	Bété / Mansonia*
Ogea	Faro / Ogea*
Ogiovu	Ako / Antiaris*
Ogoué	Niangon
Ogumalanga	Kondroti / East African Bombax*
Ogwango	African Mahogany* / Acajou d'Afrique
Ogwe	Andok
Ohaa	Éyong / White Sterculia*
Ohélé	Ovoga
Ohia	Ohia
Oiticica amarela	Guariúba
Oiticica da mata	Guariúba
Okan	Okan
Oken	Pao rosa / Dina*
Okha	Fuma / Fromager*
Okoku	Moabi
Okoka	Azobé / Ekki*

Common names	Pilot name (/commercial name)
Okoko	Éyong / White Sterculia*
Okola	Douka
Okoumé	Okoumé / Gaboon*
Okro-oedoe	Chicha
Okume	Okoumé / Gaboon*
Okuro	Iatandza
Okuru	Iatandza
Okwen	Naga / Okwen*
Olazo	Kékélé
Ole	Afromosia
Olé	Afromosia
Olène	Olène
Oleo pardo	Afromosia
Oleo vermelho	Balsamo
Olive walnut	Mutényé
Olla de mono	Sapucaia
Ologbomidu	Oboto
Ologbomodu	Oboto
Olon	Olon
Olong	Olon
Omang	Alep
Ombafo	Mecrussé
Omo	African Cordia* / Cordia d'Afrique
Omu	Kosipo
Omvong	Éyoum
Onakwa	Kékélé
Onglen	Billian
Onumu	Igaganga
Onyina	Fuma / Fromager*
Onzabili	Onzabili
Opépé	Bilinga / Opepe*
Opepe	Bilinga / Opepe*
Oreja de negro	Tamboril
Orejero	Tamboril
Orelha de macaco	Batibatra
Oro	Abura
Oro	Ako / Antiaris*
Oro	Andok
Oropa	Niové
Orumu	Igaganga
Orura	Mahogany
Osan	Aniégré / Aningeria*
Osan	Longhi
Osanga	Osanga
Osibin	African Ebony* / Ébène d'Afrique
Ossabel	Ossabel

Common names	Pilot name (/commercial name)
Ossel	Difou
Ossimiale	Ossimiale
Ossoko	Ossoko
Ossoung	Guarea, Black* / Bossé foncé
Ossoung	Guarea, Scented* / Bossé clair
Osun	African Padauk* / Padouk d'Afrique
Otie	Ilomba
Otivo	Virola / Dalli*
Otutu	Kotibé / Danta*
Otutu	Bodioa
Oueko	Inga
Ovala	Mubala
Ovangkol	Ovèngkol
Ovbialeke	Étimoé
Ovèng	Bubinga
Ovèngkol	Ovèngkol
Ovili	Aiélé / African Canarium*
Ovoé	Kotibé / Danta*
Ovoga	Ovoga
Ovong	Kondroti / East African Bombax*
Ovoui	Kotibé / Danta*
Owé	Owui
Owewe	Essia
Ozigo	Ozigo
Oziya	Faro / Ogea*
Ozouga	Ozouga
Pa nong	Meranti, White
Paali	Nyatoh
Pacuare	Tachi / Djedoe*
Padang	Nyatoh
Padauk	African Padauk* / Padouk d'Afrique
Padauk Amboina	Padauk Amboina
Padoek	African Padauk* / Padouk d'Afrique
Padouk	African Padauk* / Padouk d'Afrique
Padouk d'Afrique	African Padauk* / Padouk d'Afrique
Paduk	African Padauk* / Padouk d'Afrique
Pagoda tree	Pulai
Pahunan	Mango / Machang*
Paigie	Kapur
Pakoeli	Bacuri
Pakpajide	Doussié / Afzelia*

Common names	Pilot name (/commercial name)
Pakuri	Bacuri
Pala	Nyatoth
Palapi	Mengkulang
Pale	Nyatoth
Pali	Nyatoth
Palissandre des indes	Rosewood, Sonokeling
Palissandro	Ovèngkol
Palo amarillo	Moral
Palo amarillo	Tanimbuca / Yellow Sanders*
Palo banco	Pau mulato
Palo cochino	Amesclào
Palo de aceite	Amesclào
Palo de balsa	Balsa
Palo de culebra	Muiracatiara
Palo de matos	Tento
Palo de mora	Moral
Palo de oro	Muirapiranga
Palo de rosa	Pau roxo / Purpleheart*
Palo de vaca	Sandé
Palo machete	Wallaba
Palo maria	Jacaréuba
Palo morado	Pau roxo / Purpleheart*
Palo rojo	African Padauk* / Padouk d'Afrique
Palo trébol	Cerejeira
Palosapis	Mersawa
Pamashto	Maçaranduba / Bulletwood*
Pamiel	Bodioa
Pamutan	Mango / Machang*
Panacoco	Coração de negro* / Panacoco
Panchimouti	Copaiba
Panchonta	Nyatoth
Paneira	Sumauma
Panga-panga	Wengé
Panguana	Sandé
Pan-thya	Resak
Pantoeng	Jelutong
Pao amarello	Pau amarelo
Pao rosa	Pao rosa / Dina*
Papao	Doussié / Afzelia*
Pappel	Poplar
Para	Tamboril
Para rubber tree	Hevea / Rubberwood*
Parahyba	Marupa
Paraiba	Marupa

Common names	Pilot name (/commercial name)
Paraju	Maçaranduba / Bulletwood*
Parakwa	Angelim vermelho
Paraman	Manil / Manni*
Paraná pine	Pinho Paraná
Para-para	Parapará
Parapará	Parapará
Parcouri	Bacuri
Parcouri-manil	Manniballi
Parica	Faveira
Parica	Timborana
Paricá	Pashaco / Paricá*
Parica branco	Timborana
Partridgewood	Wacapou
Pashaco	Pashaco / Paricá*
Pashu-padauk	Padauk Amboina
Pata de dando amarillo	Tanimbuca / Yellow Sanders*
Pata de galina	Morototo
Pattern wood	Émien / Alstonia*
Pattern wood	Pulai
Pátula	Pinus patula* / Patula Pine
Patula Pine	Pinus patula* / Patula Pine
Pau amarelo	Pau amarelo
Pau cetim	Pau amarelo
Pau cham	Resak
Pau conta	Doussié / Afzelia*
Pau d'arco	Ipê
Pau de balsa	Balsa
Pau de remo	Curupixa
Pau ferro	Pao rosa / Dina*
Pau marfim	Guatambù
Pau mulato	Pau mulato
Pau mulato branco	Tanimbuca / Yellow Sanders*
Pau precioso	Preciosa
Pau preto	Grenadillo
Pau rainha	Muirapiranga
Pau roxo	Pau roxo / Purpleheart*
Pau sangue	Vêne
Pau veludo	Éyoum
Pau violeta	Pau roxo / Purpleheart*
Pau-d'oleo	Copaiba
Pau-jacare	Timborana
Pauli	Vésámbata
Pavito	Parapará
Pavo	Morototo
Paya	Punah
Pa-yom dong	Balau, Yellow / Bangkirai*

Common names	Pilot name (/commercial name)
Peda	Punah
Pekia	Piquia
Pékié	Andok
Pelmax	Araracanga
Penaga	Bintangor
Penak-bunga	Chengal
Penak-sabut	Chengal
Penak-tembaga	Chengal
Pencil cedar	Nyatoh
Pendan	Meranti, White
Pendan	Seraya, White
Pengiran	Mersawa
Penkwa	Sapelli / Sapele*
Penkwa-akowaa	Kosipo
Penzi	Éyoum
Peonia	Tento
Pequi	Piquiarana
Pequia cetim	Pau amarelo
Peramancillo	Manil / Manni*
Periquiteira	Tanimbuca / Yellow Sanders*
Perupok	Perupok
Petanang	Kapur
Petata	Ramin
Petir	Sepetir
Petsut yetama	Suren
Peuplier	Poplar
Phay	Duabanga
Pha-yom	Meranti, White
Phay-sung	Duabanga
Phdiek	Mersawa
Pik	Mersawa
Pikimissiki	Timborana
Pikin-misiki	Timborana
Pilapalam	Keledang
Pilava	Keledang
Pili	Kedondong
Pin argenté	Pinus patula* / Patula Pine
Pin d'Oregon	Douglas fir
Pin de Polynésie	Caribbean Pine
Pin de riga	Scots Pine
Pin du mexique	Pinus patula* / Patula Pine
Pin du nord	Scots Pine
Pin jelecote	Pinus patula* / Patula Pine
Pin kesiya	Pinus kesiya* / Kesiya Pine
Pin maritime	Maritime Pine
Pin paraná	Pinho Paraná
Pin sylvestre	Scots Pine

Common names	Pilot name (/commercial name)
Pinang	Melunak
Pinheiro	Pinho Paraná
Pinheiro de Parana	Pinho Paraná
Pinheiro de Paraná	Pinho Paraná
Pinheiro do brasil	Pinho Paraná
Pinhiero bravo	Maritime Pine
Pinho brasileiro	Pinho Paraná
Pinho Paraná	Pinho Paraná
Pinnay	Bintangor
Pino	Pinus patula* / Patula Pine
Pino blanco	Pinho Paraná
Pino candelabro	Pinus patula* / Patula Pine
Pino chuncho	Pashaco / Paricá*
Pino macho	Caribbean Pine
Pino maritimo	Maritime Pine
Pino marittimo	Maritime Pine
Pino Paraná	Pinho Paraná
Pino veta	Caribbean Pine
Pintri	Virola / Dalli*
Pinus	Caribbean Pine
Pinus kesiya	Pinus kesiya* / Kesiya Pine
Pinus merkusii	Pinus merkusii* / Merkusii Pine
Pinus patula	Pinus patula* / Patula Pine
Pioppo	Poplar
Piquia	Piquia
Piquia	Piquiarana
Piquia bravo	Piquiarana
Piquia roxo	Piquiarana
Piquiarana	Piquiarana
Pisi	Louro branco
Pitch pine	Caribbean Pine
Pitchpin	Caribbean Pine
Pituca	Guariúba
Pixixica	Morototo
Platanillo	Morototo
Plave chetti	Keledang
Plong	Kelat
Plumero	Quaruba
Pocouli	Ébiara / Berlinia*
Poga	Ovoga
Polvillo	Ipê
Ponga	Punah
Ponsigue montanero	Uchy
Poon	Bintangor
Poona	Bintangor
Poonnai	Bintangor
Pooti	Balau, Yellow / Bangkirai*

Common names	Pilot name (/commercial name)
Poplar	Poplar
Porokay	Kurokai / Breu*
Poroposo	Koto / Pterygota*
Possentrie	Açacu / Sandbox*
Possum	Açacu / Sandbox*
Possumwood	Açacu / Sandbox*
Pota	Owui
Potrodom	Tali / Missanda*
Poyi	Grenadillo
Pracuúba	Mora
Pracuúba branca	Mora
Pracuúba vermelha	Mora
Preciosa	Preciosa
Precioso	Preciosa
Prokonie	Inga
Pterygota	Koto / Pterygota*
Pudau	Keledang
Puenga	Manil / Manni*
Pulai	Pulai
Pulai	Pulai
Pulupulu	Grenadillo
Pumaquiro	Aracanga
Pumma	Bintangor
Punah	Punah
Punal	Punah
Punam	Punah
Punggai	Durian
Punna	Bintangor
Purperhart	Pau roxo / Purpleheart*
Purpleheart	Pau roxo / Purpleheart*
Puy	Ipê
Pycnantus	Ilomba
Pyinkado	Pyinkado
Pyinma	Bungur
Quarabu	Quaruba
Quarabu jasmirana	Quaruba
Quarabu rem	Quaruba
Quaricica	Quaruba
Quaruba	Quaruba
Quaruba tinga	Cambara
Quaruba vermelha	Cambara
Quarubarana	Cambara
Quarubatinga	Quaruba
Quercia	Oak
Quillo	Quaruba
Quillo caspi	Aracanga
Quillosisa	Quaruba
Quina-quina	Balsamo

Common names	Pilot name (/commercial name)
Quinilla colorada	Maçaranduba / Bulletwood*
Quinillo colorado	Andira
Quon	Pashaco / Paricá*
Rakban	Rengas
Ramin	Ramin
Ramin batu	Ramin
Ramin telur	Ramin
Rayo	Faveira
Red balau	Balau, Red
Red Cedar	Cedro
Red Cedar	Red Cedar
Red Cedar	Suren
Red lauan	Lauan, Red
Red lauan	Meranti, Dark Red
Red louro	Louro vermelho / Determa*
Red meranti	Meranti, Dark Red
Red meranti	Meranti, Light Red
Red pine	Scots Pine
Red selangan	Alan / Alan-Batu*
Red selangan batu	Balau, Red
Reini lout	Curupixa
Rengas	Rengas
Resak	Resak
Riam	Nyatoh
Riemhout	Curupixa
Riesenlebensbaum	Red Cedar
Rifari	Tanimbuca / Yellow Sanders*
Ritangueira	Wacapou
Riu sinu	Muirapiranga
Robinia	Black Locust
Robinie	Black Locust
Robinier	Black Locust
Roble	Catucaém / Louro faia*
Roble	Cerejeira
Roble	Oak
Roble americano	Cerejeira
Roble criollo	Cerejeira
Roble del pais	Cerejeira
Roble morado	Ipê
Rode lokus	Jatobá / Algarrobo*
Rokko	Iroko
Roné	Izombé
Roode djedoe	Tachi / Djedoe*
Roode kabbes	Andira
Rosadinha	Curupixa
Rosadinho	Curupixa

Common names	Pilot name (/commercial name)
Rose gum	Eucalyptus grandis
Rosewood	Padauk Amboina
Rosewood, para	Rosewood, Para
Rosewood, sonokeling	Rosewood, Sonokeling
Rosewood, tamalan	Rosewood, Tamalan
Roxinho	Pau roxo / Purpleheart*
Rubber tree	Hevea / Rubberwood*
Rubberwood	Hevea / Rubberwood*
Rukattana	Pulai
Saandoe	Angelim
Sablier	Açacu / Sandbox*
Saboarana	Rosewood, Para
Sacha-uva	Morototo
Safoukala	Safukala
Safukala	Safukala
Sagwan	Teak
Saino	Cupiuba / Kabukalli*
Saint martin gris	Angelim
Saint martin jaune	Angelim
Saint martin rouge	Andira
Saka	Pau roxo / Purpleheart*
Sakan	Billian
Sal	Balau, Yellow / Bangkirai*
Saladillo	Quaruba
Salao	Bungur
Saleng	Pinus kesiya* / Kesiya Pine
Salgueiro	Curupixa
Sali	Amesclão
Salie	Amesclão
Samba	Ayous / Obeche*
Sambacum	Morototo
Samrong	Kembang Semangkok
Sand dukuria	Uchy
Sandalo	Balsamo
Sandbox	Açacu / Sandbox*
Sande	Sandé
Sandé	Sandé
Sandy	Sandé
Sanga-sanga	Essessang / Erimado*
Sangrino	Virola / Dallii*
Sanguessugueira	Muiracatiara
Sansama	Ako / Antiaris*
San-sugi	Cryptomeria* / Sugi
Santa maria	Jacareúba
Santhanavembu	Suren
Sanu	Angueuk
Sao	Merawan
Sapele	Sapelli / Sapele*

Common names	Pilot name (/commercial name)
Sapelewood	Sapelli / Sapele*
Sapelli	Sapelli / Sapele*
Sapelli-mahogany	Sapelli / Sapele*
Sapin	Fir
Sapin de douglas	Douglas fir
Sapino	Cupiuba / Kabukalli*
Sapote	Chicha
Sapucaia	Sapucaia
Sapucaia vermelha	Sapucaia
Sapupira	Sucupira preta
Sapupira amarella	Angelim
Saput	Chicha
Saputi	Sepetir
Sara	Wacapou
Sarabebballi	Wacapou
Sarkpei	Ébiara / Berlinia*
Sarrapia	Cumaru / Tonka*
Sarrapio montanero	Andira
Sasswood	Tali / Missanda*
Satijnhout	Muirapiranga
Satin Ceylan	Satin, Ceylon
Satin Ceylon	Satin, Ceylon
Satin wood	Satin, Ceylon
Satiné	Muirapiranga
Satiné rouge	Muirapiranga
Satiné rubané	Muirapiranga
Satinwood	Muirapiranga
Saw	Yemane
Sawari	Piquiarana
Sawarie	Piquia
Sawarie	Piquiarana
Saya khao	Meranti, Light Red
Saya lueang	Meranti, Light Red
Sayo	Kékélé
Scented guarea	Guarea, Scented* / Bossé clair
Scots Pine	Scots Pine
Sebo	Virola / Dallii*
Sebrahout	Grenadillo
Seekiefer	Maritime Pine
Sega	Pulai
Sehmeh	Limbali
Seique	Tornillo
Seiqui	Tornillo
Selangan	Merawan
Selangan batu	Balau, Yellow / Bangkirai*
Selangan batu kumus	Balau, Yellow / Bangkirai*
Selangan batu merah	Balau, Red

Common names	Pilot name (/commercial name)
Selangan kaca	Meranti, Yellow
Selangan kuning	Meranti, Yellow
Selangan merah	Alan / Alan-Batu*
Selangan-batu	Giam
Selangan-kasha	Merawan
Selangking	Keledang
Selayar	Kembang Semangkok
Selimbar	Balau, Red
Semayur	Balau, Red
Semli	Iroko
Sena	Padauk Amboina
Sendok-sendok	Sesendok
Sengal	Merawan
Sengawan	Balau, Red
Sengkawan darat	Balau, Yellow / Bangkirai*
Sengkawang	Balau, Yellow / Bangkirai*
Sepam	Mango / Machang*
Sepati	Pulai
Sepau	Keranji
Sepeteh	Sepetir
Sepetir	Sepetir
Sepetir nin-yaki	Sepetir
Sepetir pay	Sepetir
Seraya batu	Meranti, Light Red
Seraya bukit	Meranti, Dark Red
Seraya bunga	Meranti, Light Red
Seraya daun	Meranti, Dark Red
Seraya kuning	Meranti, Yellow
Seraya punai	Meranti, Light Red
Seraya sirup	Balau, Red
Seraya white	Seraya, White
Seraya yellow	Meranti, Yellow
Seri	Balau, Red
Seringa	Hevea / Rubberwood*
Seringueira	Hevea / Rubberwood*
Serungan	Geronggang
Sesendok	Sesendok
Sewan	Yemane
Shaitanwood	Pulai
Shedua	Faro / Ogea*
Shempo	Virola / Dallii*
Shibadan	Aracanga
Shihuahuaco amarillo	Cumaru / Tonka*
Shimbillo	Inga
Shirenga	Hevea / Rubberwood*
Shiunza	Diania
Sibu	Kasai
Sicomoro	Great Maple

Common names	Pilot name (/commercial name)
Sida	Dibétou
Siéléké	Owui
Sifou-sifou	Iatandza
Sikon	Ékaba / Ekop*
Sikon	Osanga
Silk cotton	Sumauma
Silk cotton-tree	Fuma / Fromager*
Silverballi	Louro branco
Simar naka	Keledang
Simarouba	Marupa
Simaruba	Marupa
Simarupa	Marupa
Simia chimi	Tanimbuca / Yellow Sanders*
Simmé	Iroko
Simpoh	Simpoh
Simpur jangkang	Simpoh
Sindru	Émien / Alstonia*
Sindur	Sepetir
Sinduro	Émien / Alstonia*
Sinedon	Tola / Agba*
Singa n'dola	Faro / Ogea*
Singri-kwari	Cambara
Sipiroe	Greenheart
Sipo	Sipo / Utile*
Sipo-mahogany	Sipo / Utile*
Sirioco	Cerejeira
Sisiat	Melunak
Sisiet	Melunak
Sisina	Monghinza
Siton paya	Muirapiranga
Snakewood	Angelim rajado / Snakewood*
Sneki oedoe	Angelim rajado / Snakewood*
So	Yemane
Soemaroeba	Marupa
Sogho	Ossoko
Sokram	Pyinkado
Solia	Olène
So-maeo	Yemane
Sombo	Olène
Son	Pinus kesiya* / Kesiya Pine
Son	Rengas
Song-salung	Perupok
Songtrang	Perupok
Sonokeling	Rosewood, Sonokeling
Sonokembang	Padauk Amboina
Sopo oedoe	Piquiarana

Common names	Pilot name (/commercial name)
Sor	Yemane
Soroga	Quaruba
Sorro	Ossoko
Soryoko	Cerejeira
Sougué	Sougué
Spruce	Fir
Sral	Pinus kesiya* / Kesiya Pine
Sral	Pinus merkusii* / Merkusii Pine
Srâl	Pinus merkusii* / Merkusii Pine
Sralao	Bungur
Stoolwood	Émien / Alstonia*
Sual	Meranti, White
Subaha	Abura
Sucupira	Sucupira preta
Sucupira amarela	Sucupira preta
Sucupira preta	Sucupira preta
Sucupira-pepino	Melancieira
Sugi	Cryptomeria* / Sugi
Suikerhout	Curupixa
Sultan champa	Bintangor
Sulunus	Geronggang
Sumauma	Sumauma
Sumauna	Sumauma
Sumba	African Cordia* / Cordia d'Afrique
Sunsun	Chicha
Sun-sun	Morototo
Suntuch	Morototo
Supa	Sepetir
Surea-bawang	Suren
Suren	Suren
Surian	Suren
Susumenga	Niové
Swamp kapur	Kapur
Swartdriedoring	Grenadillo
Sweet chestnut	Chestnut
Sycomore	Great Maple
Taban	Nyatoh
Tabari	Tauari
Tabek	Bungur
Tabonuco	Gommier
Tabum	Grenadillo
Tacacazeiro	Chicha
Tachi	Tachi / Djedoe*
Tachi preto	Tachi / Djedoe*
Tachigalia	Tachi / Djedoe*

Common names	Pilot name (/commercial name)
Tacula	African Padauk* / Padouk d'Afrique
Taehi preto	Tachi / Djedoe*
Tagahas	Duabanga
Tahuari	Ipê
Taiuva	Moral
Tajibo	Ipê
Takalis	Melunak
Takhian	Giam
Takhian	Merawan
Takian chan	Chengal
Takien	Merawan
Takina	Sandé
Takoradi mahogany	African Mahogany* / Acajou d'Afrique
Tala	Ozouga
Tali	Tali / Missanda*
Tamalan	Rosewood, Tamalan
Tamanou	Bintangor
Tamanqueira	Marupa
Tamaren prokoni	Batibatra
Tamboril	Tamboril
Tambulian	Billian
Tamgang	Keledang
Tami	Balsa
Tampipio	Tauari
Tananeo	Pau roxo / Purpleheart*
Tangama	Faveira
Tanganyka noce	Aniégré / Aningeria*
Tanganyka nuss	Aniégré / Aningeria*
Tangare	Andiroba
Tanga-tanga	Iatandza
Tanghon	Bintangor
Tangile	Lauan, Red
Tanguile	Meranti, Dark Red
Tanimbuca	Tanimbuca / Yellow Sanders*
Tanne	Fir
Taoub	Itaúba
Taoub jaune	Itaúba
Tapaiuna	Basalocus
Tapulau	Pinus merkusii* / Merkusii Pine
Tarco	Parapará
Tasmanian Oak	Tasmanian Oak
Tassit	Melunak
Tatabu	Sucupira preta
Tatagya	Tatajuba
Tatajuba	Tatajuba

Common names	Pilot name (/commercial name)
Tatayiva-saiyu	Moral
Tatbu	Wacapou
Tâu	Resak
Tauari	Tauari
Taun	Kasai
Taun me ok	Pulai
Taung-kaye	KerANJI
Taung-thayet	Merpauh
Tavoy wood	Gerutu
Tchitola	Tchitola
Teak	Teak
Tebako	Naga / Okwen*
Teca	Teak
Teck	Teak
Tega	Teak
Tek	Teak
Tekka	Teak
Tekku maram	Teak
Tembaga	Rengas
Tenasserim-pine	Pinus merkusii* / Merkusii Pine
Tento	Tento
Teraling	Mengkulang
Terap	Keledang
Terbulan	Sesendok
Tetekon	Limbali
Teteroma	Louro vermelho / Determa*
Tetraberlinia	Ékaba / Ekop*
Tfouma	Nieuk
Thabye	Kelat
Thadi	Kedondong
Tharapi	Bintangor
Thayet	Mango / Machang*
Thayet-kin	Merpauh
Thayet-thitsi	Rengas
Thbeng	Keruing
Thekku	Teak
Thia	Pulai
Thingan	Merawan
Thingan-net	Giam
Thitka	Melunak
Thitkado	Suren
Thitlaung	Kembang Semangkok
Thitya	Balau, Yellow / Bangkirai*
Thong	Pinus kesiya* / Kesiya Pine
Thong	Pinus merkusii* / Merkusii Pine
Tiama	Tiama / Gedu Nohor*

Common names	Pilot name (/commercial name)
Tiama mahogani	Tiama / Gedu Nohor*
Tiaon	Lauan, Red
Tigerwood	Dibétou
Timba	Gombé
Timbauba	Batibatra
Timbauba	Tamboril
Timbauba	Timborana
Timbauva	Tamboril
Timbo	Tamboril
Timbo colorado	Tamboril
Timborana	Batibatra
Timborana	Timborana
Timbóuba	Tamboril
Timbo-y-ata	Copaiba
Timburita	Tanimbuca / Yellow Sanders*
Tinajero	Morototo
Tinchi	Louro branco
Tingimoni	Amesclão
Tinguimoni	Kurokai / Breu*
Tinto blanco	Parapará
Tinyu	Pinus kesiya* / Kesiya Pine
Tinyu	Pinus merkusii* / Merkusii Pine
Tobago	Sapucaia
Tobitoutou	Morototo
Toborochoi	Sumauma
Todagatti	Rosewood, Sonokeling
Toemaling	Kempas
Togte	Nogal
Tola	Tola / Agba*
Tola blanc	Tola / Agba*
Tola branca	Tola / Agba*
Tola chinfuta	Tchitola
Tom	Dabéma / Dahoma*
Tongke hutan	Acacia mangium
Tongsuk	Melunak
Tonka	Cumaru / Tonka*
Tonka bean	Cumaru / Tonka*
Toon	Suren
Topa	Balsa
Tornillo	Tornillo
Torotoro	Rengas
Toubaouaté	Gombé
Tougbi	Ozouga
Toum	Dabéma / Dahoma*
Towé	Gombé
Tram	Kelat

Common names	Pilot name (/commercial name)
Trebol	Macacaúba
Trébol	Cerejeira
Trementino azucarero	Amesclão
Tro	Keruing
Truong	Kasai
Tsaik	Tornillo
Tshibudimbu	Tchitola
Tsongoti	Émien / Alstonia*
Tule	Iroko
Tungau	Kasai
Turtosa	Vésámbata
Turupay amarillo	Guariúba
Tusam	Pinus kesiya* / Kesiya Pine
Tusam	Pinus merkusii* / Merkusii Pine
Tutu	Aniégré / Aningeria*
Tuyot	Punah
Uapa	Wallaba
Ubucari	Bacuri
Uchi	Uchy
Uchy	Uchy
Ucuuba	Virola / Dallii*
Udoghogho	Pao rosa / Dina*
Ugu	Ozouga
Uku	Mukulungu
Ulin	Billian
Ulu	Amesclão
Umbambangwe	Grenadillo
Umcnaga	Pao rosa / Dina*
Undia nunu	African Mahogany* / Acajou d'Afrique
Undianuno	Sapelli / Sapele*
Unyom	Andok
Upi	Kedondong
Ura wood	Açacu / Sandbox*
Urat mata	Seraya, White
Urat mata batu	Gerutu
Urat mata bukit	Gerutu
Urat mata daun kechil	Gerutu
Urunday-para	Muiracatiara
Utile	Sipo / Utile*
Uvala	Doussié / Afzelia*
Uya	Faveira
Vaa	Limbali
Vaca	Sandé
Ven	Vêne
Vencola	Macacaúba
Vene	Vêne

Common names	Pilot name (/commercial name)
Vêne	Vêne
Venga	Padauk Amboina
Vengai	Padauk Amboina
Ventak	Bungur
Ventaku	Bungur
Venteak	Bungur
Venthek	Bungur
Ven-ven	Mersawa
Verdolago amarillo	Tanimbuca / Yellow Sanders*
Vésámbata	Vésámbata
Vesi	Merbau
Vintanina	Bintangor
Violettholz	Pau roxo / Purpleheart*
Virola	Virola / Dallii*
Viruviru	Greenheart
Visgueiro	Faveira
Vitali	Padauk Amboina
Volador	Araracanga
Volador	Tanimbuca / Yellow Sanders*
Vovo	Tiama / Gedu Nohor*
Vuku	Abura
Vumma	Bintangor
Vutalau	Bintangor
Wacapoe	Wacapou
Wacapou	Wacapou
Wadaduri	Sapucaia
Wadara	Tauri
Waka	Bubinga
Waka	Wamba
Walaba	Wallaba
Walélé	Ilomba
Wallaba	Wallaba
Walnuss	Walnut
Walnut	Walnut
Wama	Esessang / Erimado*
Wamara	Coração de negro* / Panaccoco
Wamara	Wamara
Wamba	Wamba
Wana	Louro vermelho / Determa*
Wanakwari	Quaruba
Wanu	Louro vermelho / Determa*
Wapa	Wallaba
Water gum	Kelat
Watrakwari	Quaruba
Wawa	Ayous / Obeche*
Wawabima	Lotofa / Brown Sterculia*

Common names	Pilot name (/commercial name)
Wehu	Nganga
Wenge	Wengé
Wengé	Wengé
West african albizia	Iatandza
Western red cedar	Red Cedar
Whismore	Niangon
White afara	Limba / Afara*
White cheese wood	Pulai
White dhup	Kedondong
White gum	Tasmanian Oak
White lauan	Almon
White lauan	Meranti, White
White lauan	Seraya, White
White meranti	Gerutu
White meranti	Meranti, White
White seraya	Gerutu
White seraya	Seraya, White
White sterculia	Éyong / White Sterculia*
Wild cherry	Cherry Wood
Wildkirsche	Cherry Wood
Wiswiskwari	Quaruba
Wnaimeï	Dibétou
Womara	Wamara
Wonton	Difou
Wulo	Essia
Xoai	Mango / Machang*
Xoan moc	Suren
Xoay	Keranji
Xwetin	Ayous / Obeche*
Yachimambo	Parapará
Yacushapana	Tanimbuca / Yellow Sanders*
Yagrumo macho	Morototo
Yakal	Balau, Yellow / Bangkirai*
Yama	Étimoé
Yami	Niangon
Yang	Keruing
Yarumero	Morototo
Yatandza	Iatandza
Yaya	Lati
Yayamadou	Virola / Dalli*
Yayamadou marécage	Virola / Dalli*
Yayamadou montagne	Virola / Dalli*
Yegna	Bomanga / Ariella*
Yellow balau	Balau, Yellow / Bangkirai*

Common names	Pilot name (/commercial name)
Yellow meranti	Meranti, Yellow
Yellow poui	Ipê
Yellow sanders	Tanimbuca / Yellow Sanders*
Yellow seraya	Meranti, Yellow
Yellow sterculia	Éyong / White Sterculia*
Yemane	Yemane
Yemeri	Quaruba
Yesquero	Jequitiba
Yiguire	Timborana
Yi-thongbung	Keranji
Yokar	Inga
Yolombo	Cardeiro
Yomham	Suren
Yongo	Fava amargosa
Yuan	Kempas
Yunjua	Sapucaia
Yutubanco	Jatobá / Algarrobo*
Yuyun	Tanimbuca / Yellow Sanders*
Yvira-père	Garapa
Zamanguila	African Mahogany* / Acajou d'Afrique
Zaminguila	African Mahogany* / Acajou d'Afrique
Zanzangue	Iatandza
Zapan negro	Sucupira preta
Zapatero	Pau roxo / Purpleheart*
Zapote	Chicha
Zapote silvestre	Chicha
Zaputi	Manil / Manni*
Zebe	Grenadillo
Zébrali	Awoura
Zebrano	Zingana
Zebra wood	Zingana
Ziba	Éyoum
Zinbyun	Simpoh
Zingana	Zingana
Zobbi	Grenadillo
Zoélé	Andoung
Zopilote	Mahogany
Zunzatin	Acajou Cailcédrat
Zuwo	Diania
Zwart parelhout	Coração de negro* / Panacoco
Zwart parelhout	Wamara
Zwarte kabbes	Sucupira preta

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This atlas presents technical information for professionals who process and use temperate or tropical timber. It combines the main technical characteristics of 283 tropical species and 17 species from temperate regions most commonly used in Europe with their primary uses. Each data sheet is accompanied by two photos of sawn wood (flat sawn and quarter sawn, or flat sawn and half quarter sawn), two macro photographs, and for certain species, an illustration of how the wood can be used.

This publication will be most useful to operators in the wood industry, including producers (forest managers, operating companies, political decision-makers) and consumers (importers, traders, processors, purchasers, architects, main contractors and builders). The Atlas serves as a tool of reference for teaching and training in the forest and wood sectors in tropical regions. Its purpose is to promote the most appropriate uses for each species according to its characteristics and in line with the motto: "the right wood in the right place".

This book was produced by the Wood team of CIRAD's BioWooEB Research Unit with financial support from the International Tropical Timber Organization (ITTO) and Agropolis Fondation. It is the product of thirty years of research in wood technology science, provided by numerous contributors. It was coordinated using version 7 of Tropix, released by CIRAD.

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