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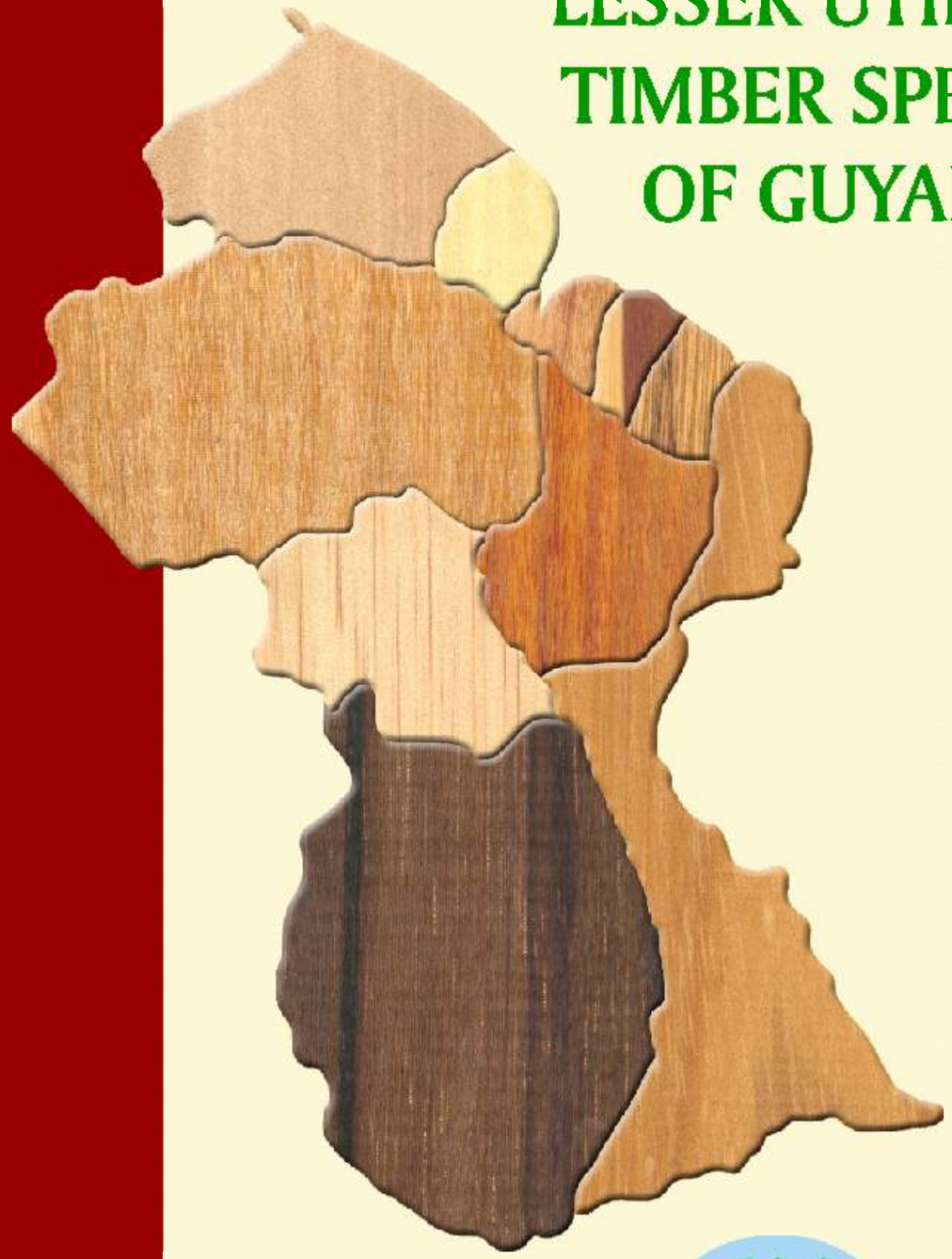
LESSER UTILISED TIMBER SPECIES OF GUYANA



Introduction

This booklet has been formulated to introduce some of the **LESSER UTILISED SPECIES** of Guyana.

With Guyana's vast natural forest resources the forestry sector is one of the most thriving areas of economic growth in the country. However, far too much reliance is placed on the traditional commercial species giving rise to the possibility of exhausting the current supply of these commercial species for both the domestic and export market. Therefore this booklet is in part an effort to acquaint the international community with some of Guyana's Lesser Utilised Species (LUS) which are as valuable as some of the major commercial species being exported today. These species are no less important or usable than the major harvested species. However lack of knowledge and information has been one of the main deterrents of the successful use of these species.

With the assistance of the initial research carried out by the Tropenbos International Foundation, and recent work done by the Timber Research and Development Association (TRADA), information is provided about a few of the many LUS species found throughout Guyana, with the aim of encouraging greater acceptance and utilisation of these LUS species of timber, both domestically and internationally.

This Booklet is one deliverable of a Project financed by the International Tropical Timber Organization (ITTO) and implemented by the Guyana Forestry Commission, entitled: "Utilization of Lesser Used Wood Species in Guyana", PD 344/05 Rev.2 (1).

Index of Species

COMMON NAME	BOTANICAL NAME	INTERNATIONAL TRADE NAME
Fukadi	*Buchenavia fanshawei* (Exell & Maguire) *Terminalia spp.*	Nargusta
Limonaballi	*Chrysophyllum pomiferum* (Eyma) Penn.	Abiurana, Guyana Canarywood
Wadara	*Couratari spp.*	Guyana Oak, Tauari
Futui	*Jacaranda copaia* (Aublet) D.Don	Gobaja, Guyana Birch
Morabukea	*Mora gonggrijpii* (Kleinh.) Sandw.	Guyana Cherry, Morabukea
Burada	*Parinari spp.*	Guyana Pearwood, Parinari
Dalli	*Virola surinamensis* (Rolander) Warb	Guyana Virola, Virola,
Suya	*Pouteria speciosa* (Ducke) Baehni	Guyana Champagne Wood, Pajura
Darina	*Hymenolobium spp.*	Angelim Pedra, Guyana Keruing
Iteballi	*Vochysia spp.*	Quaruba
Muniridan	*Qualea rosea* Aublet	Guyana Royal Cedar, Muniridan
Black Kakaralli	*Eschweilera spp.*	Guyana Maple, Manbarklak
Tonka Bean	*Dipteryx odorata* (Aublet) Willd	Cumaru, Guyana Chestnut
Itikiborolli	*Swartzia spp.*	Guyana Flamewood, Saboraranta
Kurokai	*Protium decandrum* (Aublet) Marchand	Breu

Explanation of Technical Information

The technical information provided is to be used as a guide for understanding the many properties of the species featured in this booklet. The information presented was compiled from listed data of numerous publications by several international research groups. Information was extracted from the research done by Tropenbos International Guyana ©

Physical and Mechanical Properties:

WEIGHT

The weight of a species is the first factor that can indicate the general use of a species. Species that are lower in density are relatively soft, less durable and not very weight bearing. Medium density and high density species are durable, and strong. The table below is to be used as a guide to determine the level of density of each species.

Weight	Kg/m^3 at 12% moisture content
Low	400 - 600
Medium	600 - 800
Heavy	800 - 900
Very Heavy	900 and over

STRENGTH

The strength of a species can be assessed using various methods but in this booklet the general strength is assessed using the modulus of elasticity.

Modulus of Elasticity	000's N/mm^2
Very High	19➔
High	14 - 19
Medium	11 - 14
Low	9 -11
Very Low	➔9

SHRINKAGE

It is common knowledge that trees when felled have high moisture content. Much of this moisture is lost to create equilibrium with the humidity in the atmosphere. This air drying is accompanied with shrinkage in dimensions.

	12% moisture content	
Shrinkage	Tangential %	Radial %
Very Small	←2.5	←1.0
Small	2.5 - 4.0	1.0 - 2.0
Medium	4.0 - 5.5	2.0 - 3.0
Large	5.5→	3.0→

REFERENCES

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Detienne, Pierre; Jacquet, P; Mariaux, A. (1982) Manuel D'identification des Bois Tropicaux

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FUKADI

Buchenavia fanshawei
Exell & Maguire
Terminalia spp.

Family: Combretaceae
International Trade Name: Nargusta
Distribution: The Guianas, Venezuela and Amazonian Brazil

Tree Description

Length of the bole: 18-21m
Height of tree: 20-35 (-45)m
Diameter: 0.5-1.0 m
Shape of the log: cylindrical, sometimes fluted; spreading buttresses

Wood Description

Sapwood: not clearly distinct from heartwood
Heartwood: light brown to light creamy brown, often with darker streaks
Grain: straight to roey
Texture: medium

Processing

Sawing: power required; somewhat difficult
Blunting effect: Moderate
Drying: generally good.
Risks of distortion: moderate
Risks of checking: moderate
Machining: moderately difficult; some tearing may occur in planing because of interlocked grain
Gluing: good
Nailing: pre-boring necessary
Finishing: good; may require little sanding
Veneering: moderate to difficult

Natural Durability

Resistance to decay: good
Resistance to termites: N/A
Resistance to insects of dry wood: poor

Treatability

poor

Uses

interior and exterior joinery; furniture, general construction; cabinet work; turnery; plywood; sleepers

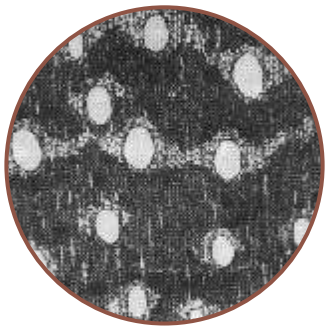
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1080
Air-dry density at 12% (kg/m^3)	840
Total tangential shrinkage (%)	8.4
Total radial shrinkage (%)	4.8
Total volumetric shrinkage (%)	12.6

Mechanical Properties

Bending strength at 12% (N/mm^2)	143
Modulus of elasticity at 12% (N/mm^2)	17,760
Crushing strength at 12% (N/mm^2)	71



Cross-section

LIMONABALLI

Chrysophyllum pomiferum (Eyma) Penn.

Vernacular name:
Guyana: Haimara- kushi, Kwikpa, Paripiballi.
Brazil: Abiurana

Family: Sapotaceae

International Trade Name: Abiurana

Distribution: The Guianas, Venezuela, Columbia, up to Central Amazonian Brazil and Peru

Tree Description

Length of the bole:	16-24m
Height of the tree:	30-40m
Diameter:	0.6-0.9m
Shape of the log:	base buttressed or somewhat flanged

Wood Description

Sapwood:	not clearly distinct, light brown
Heartwood:	pale yellowish brown to dark brown.
Grain:	straight to interlocked
Texture:	fine

Processing

Sawing:	power required; blunting effect because of silica content.
Drying:	air-drying easy to moderate; some checking.
Machining:	moderate to difficult due to silica content.
Nailing:	pre-boring necessary

Natural Durability

Resistance to decay: slight to moderate

Treatability

good

Uses

heavy and light construction; posts.

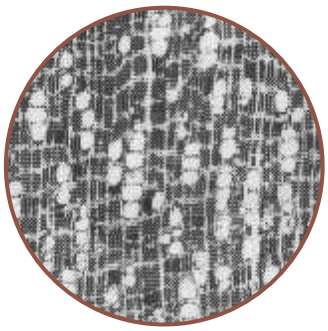
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1110
Air-dry density at 12% (kg/m^3)	950
Total tangential shrinkage (%)	11.2
Total radial shrinkage (%)	5.8
Total volumetric shrinkage (%)	16.4

Mechanical Properties

Bending strength at 12% (N/mm^2)	179
Modulus of elasticity at 12% (N/mm^2)	19,515
Crushing strength at 12% (N/mm^2)	79



Cross-section

WADARA

Couratari spp.
Vernacular name:
Brazil: Tauari

Family: Lecythidaceae
International Trade Name: Tauari
Distribution: Tropical South America

Tree Description

Length of the bole: 16-30 m
Height of tree: 35-50m
Diameter: 0.60-0.85 (-1.0)m
Shape of the log: straight and cylindrical with stout buttresses which can reach heights of 5m

Wood Description

Sapwood: not distinct from heartwood
Heartwood: variable, cream white to light beige with pinkish yellowish tinge
Grain: generally straight, sometimes roey
Texture: medium

Processing

Sawing: Easy. Blunting effect: moderate to high (silica); the use of stellite tipped teething is advisable
Drying: No important problems; kiln schedule for 41 mm listed below.
Risks for distortion: very slight
Risks for checking: very slight
Movement in service medium

Moisture content of wood (%)	Temperature dry bulb (°C)	Temperature wet bulb (°C)	Relative humidity of air (%)
Green	57	51	72
50	57	48	60
40	60	48	50
30	66	49	40
20	77	53	30

continued

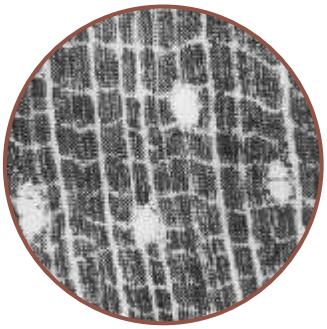
Technological Characteristics

Physical Properties

Green density (kg/m^3)	850 - 950
Air-dry density at 12% (kg/m^3)	620
Total tangential shrinkage (%)	7.0
Total radial shrinkage (%)	4.5
Total volumetric shrinkage (%)	12.2

Mechanical Properties

Bending strength at 12% (N/mm^2)	96
Modulus of elasticity at 12% (N/mm^2)	11,700
Crushing strength at 12% (N/mm^2)	48



Cross-section

WADARA

(continued)

Processing

Machining:	not difficult; tools tipped with tungsten carbide are recommended
Gluing:	good
Nailing:	medium holding of nails
Finishing:	good
Veneering:	peels and slices rather easily; logs are steamed at a temperature between 70° and 80°C

Natural Durability

Resistance to decay:	poor
Resistance to termites:	poor
Resistance to insects of dry wood:	poor

Treatability

good

Uses

interior joinery; plywood; exterior joinery (with treatment); inexpensive furniture; moulding; flooring

FUTUI

Jacaranda copaia (Aublet) D.Don
Vernacular name:
Suriname: Goebaja / Brazil: Para-para

Family: Bignoniaceae
International Trade Name: Gobaja, Para-para
Distribution: Central and South America

Tree Description

Length of the bole: 18-24 m
Height of tree: 20-30 (-43)m
Diameter: 0.3-0.8 (-1)m
Shape of the log: generally cylindrical, more or less straight; base swollen sometimes with roots spurs

Wood Description

Sapwood: not distinct from heartwood
Heartwood: yellowish white or pinkish white with streaks
Grain: straight
Texture: medium to coarse

Processing

Sawing: Easy; presence of more or less important internal stresses; risk of splitting; wooly surface.
Blunting effect: very slight

Drying: Easy and rapid
Risks of distortion: very slight
Risks of checking: very slight
Movement in service medium to large
Kiln schedule for 41mm listed below:

Moisture content of wood (%)	Temperature dry bulb (°C)	Temperature wet bulb (°C)	Relative humidity of air (%)
Green	42	41	94
30	42	41	94
20	42	39	82
15	48	43	74
10	54	46	65

continued

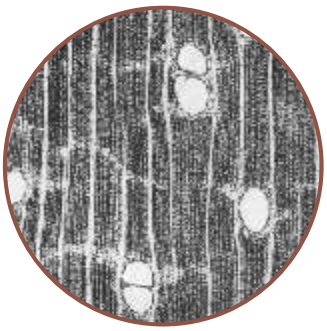
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1050
Air-dry density at 12% (kg/m^3)	430
Total tangential shrinkage (%)	8.5
Total radial shrinkage (%)	5.7
Total volumetric shrinkage (%)	14.6

Mechanical Properties

Bending strength at 12% (N/mm^2)	60
Modulus of elasticity at 12% (N/mm^2)	89,000
Crushing strength at 12% (N/mm^2)	31



Cross-section

FUTUI

(continued)

Processing

Machining:	easy, but the cutters have to be kept sharp to avoid wooliness
Gluing:	good
Nailing:	poor holding of nails
Finishing:	good
Veneering:	interesting for slicing and peeling

Natural Durability

Resistance to decay:	poor
Resistance to termites:	poor
Resistance to insects of dry wood:	poor

Treatability

good

Uses

plywood; inexpensive furniture; moulding; interior joinery; toys; broom sticks

MORABUKEA

***Mora gonggrijpii* (Kleinh.) Sandw.**

Vernacular name:

Suriname: Moraboekea

Family: Leguminosae (Caesalpinioideae)

International Trade Name: Morabukea

Distribution: From Venezuela to Suriname

Tree Description

Length of the bole: 18-24m
Height of tree: 20-45 (50)m
Diameter: 0.4 -0.8 (-1.5) m
Shape of the log: cylindrical; base usually buttressed

Wood Description

Sapwood: distinct, pale pinkish brown (up to 15cm)
Heartwood: pinkish brown or reddish brown to dark brown with paler streaks
Grain: straight, often interlocked, sometimes irregular or wavy
Texture: rather fine to moderate coarse

Processing

Sawing: power required; fairly difficult; tendency to spring
Blunting effect: moderate to high
Drying: slow drying and careful piling are recommended to reduce degrade.
US kiln schedule T2-C2 for 25-38mm (4/4 to 6/4) stock and T2-C1 for 50mm (8/4) stock, or British schedule B (25mm)
Risks of distortion: more or less high
Risks of checking: more or less high
Machining: difficulties due to hardness and highly interlocked grains;
Gluing: special precautions needed
Nailing: good holding of nails; pre-boring necessary
Finishing: good

Natural Durability

Resistance to decay: very good
Resistance to termites: good to very good
Resistance to insects of dry wood: good

Treatability

poor

Uses

sleepers; heavy construction; bridge decking; planking; heavy carpentry; industrial flooring; joinery; boat building

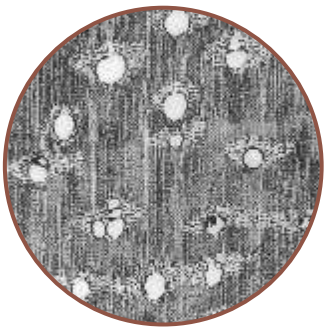
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1300
Air-dry density at 12% (kg/m^3)	1030
Total tangential shrinkage (%)	10.2
Total radial shrinkage (%)	6.3
Total volumetric shrinkage (%)	NA

Mechanical Properties

Bending strength at 12% (N/mm^2)	176
Modulus of elasticity at 12% (N/mm^2)	21,910
Crushing strength at 12% (N/mm^2)	94



Cross-section

BURADA

Parinari spp.

Vernacular name:
Brazil: Parinari

Family: Chrysobalanaceae

International Trade Name: Burada

Distribution: The Guianas and adjacent areas in Venezuela and Brazil

Tree Description

Length of the bole:	12-15m
Height of tree:	20-40m
Diameter:	0.45-0.70 (-1.5)m
Shape of the log:	cylindrical; buttresses low and thick

Wood Description

Sapwood:	not clearly distinct (4cm)
Heartwood:	light brown or yellowish pink-brown
Grain:	generally straight, sometimes slightly interlocked
Texture:	fine

Processing

Sawing:	power required blunting effect: high (silica)
Drying:	rapid; air-drying prior to kiln - drying is recommended US kiln schedule T2 - C2 for 25-38 mm (4/4 to 6/4) stock, or British schedule B (25mm) Risk of distortion; moderate Risk of checking; slight Possible risk of casehardening
Machining:	carbide tipped tools recommended
Nailing:	pre-boring necessary
Finishing:	moderate
Remarks:	logs are inclined to split during felling, transport and conversion

Natural Durability

Resistance to decay:	moderate
Resistance to insects of dry wood:	good

Treatability

good

Remarks

resistant to marine borers

Uses

marine construction (submerged); ship keels; sleepers (treated); heavy construction; flooring

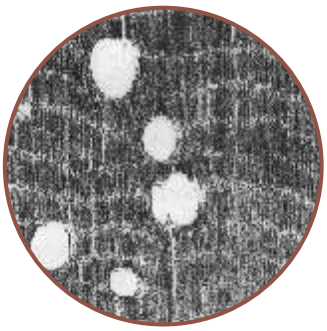
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1100
Air-dry density at 12% (kg/m^3)	890
Total tangential shrinkage (%)	9.8
Total radial shrinkage (%)	5.9
Total volumetric shrinkage (%)	17.0

Mechanical Properties

Bending strength at 12% (N/mm^2)	157
Modulus of elasticity at 12% (N/mm^2)	16,500
Crushing strength at 12% (N/mm^2)	86



Cross-section

DALLI

Virola spp.

Vernacular name:
Guyana: Hill Dalli, Irikwa / Brazil: Virola

Family: Myristicaceae

International Trade Name: Virola

Distribution: The Guianas and Brazil

Tree Description

Length of the bole: 15-20 m
Height of tree: 25-35m
Diameter: 0.4-0.6 (-1.0) m
Shape of the log: straight and cylindrical: with low buttresses

Wood Description

Sapwood: not distinct from heartwood
Heartwood: beige to pale brown
Grain: straight
Texture: medium

Processing

Sawing: easy
Drying: moderate difficultly
Machining: easy
Gluing: good
Nailing: good
Finishing: good
Veneering: peels well

Natural Durability

Resistance to decay: poor
Resistance to termites: poor
Resistance to insects of dry wood: poor

Treatability

good

Uses

interior joinery, moulding, boxes and crates, light carpentry, particleboards, furniture, cigar boxes, coffins

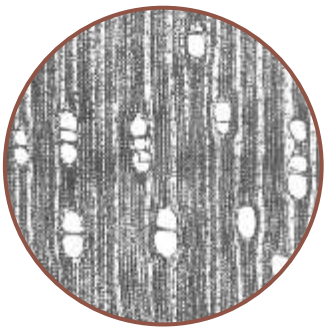
Technological Characteristics

Physical Properties

Green density (kg/m^3)	650 - 900
Air-dry density at 12% (kg/m^3)	560
Total tangential shrinkage (%)	9.40
Total radial shrinkage (%)	5.40
Total volumetric shrinkage (%)	16.3

Mechanical Properties

Bending strength at 12% (N/mm^2)	78
Modulus of elasticity at 12% (N/mm^2)	10,070
Crushing strength at 12% (N/mm^2)	40



Cross-section

SUYA

Pouteria speciosa (Ducke) Baehni

Vernacular name:

Guyana: Chuya, Durban Pine, Por

Brazil: Pajura

Family: Sapotaceae

International Trade Name: Suya, Pajura

Distribution: The Guianas and Brazil

Tree Description

Length of bole: 21-24 m
Height of tree: 25-35 (-45) m
Diameter: 0.35 - 0.90 (-1.2) m
Shape of log: cylindrical, little taper, base slightly swollen

Wood Description

Sapwood: not distinct form heartwood
Heartwood: light brown, occasionally pale purple flushed
Grain: straight
Texture: fine

Processing

Sawing: easy; moderate blunting effect.
Drying: air-dried at a moderate rate.
Machining: moderate difficult due to silica Fuzzy grains may also be a problem.
Finishing: very good

Natural Durability

Resistance to decay: poor
Resistance to termites: poor
Resistance to insects of dry wood: poor

Treatability

moderate

Uses

general construction; flooring; poles and posts; sleepers (treated); plywood.

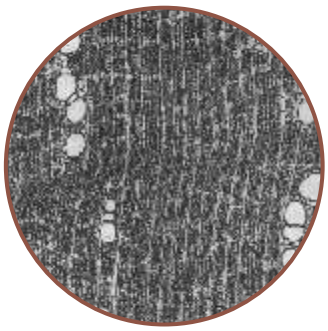
Technological Characteristics

Physical Properties

Green density (kg/m^3)	950
Air-dry density at 12% (kg/m^3)	710
Total tangential shrinkage (%)	11.0
Total radial shrinkage (%)	5.5
Total volumetric shrinkage (%)	16.5

Mechanical Properties

Bending strength at 12% (N/mm^2)	126
Modulus of elasticity at 12% (N/mm^2)	20,888
Crushing strength at 12% (N/mm^2)	NA



Cross-section

DARINA

Hymenolobium spp.:

Family: Leguminosae (Papilionoideae)
International Trade Name: Angelim
Distribution: The Guianas

Tree Description

Length of the bole: 21-24m
Height of tree: 20-35 (-50)m
Diameter: 0.30-0.65 (-1)m
Shape of the log: cylindrical, base buttressed, usually branched and concave

Wood Description

Sapwood: not clearly distinct, light cream to light brown
Heartwood: dark yellow brown to light brown
Grain: straight to interlocked
Texture: coarse

Processing

Sawing: Easy
Drying: moderately difficult to air-season; fast to moderate rate; slight checking
Machining: easy
Gluing: easy
Nailing: N/A
Finishing: smooth
Veneering: N/A

Natural Durability

Resistance to decay: very good
Resistance to termites: N/A
Resistance to insects of dry wood: N/A

Treatability

moderate

Uses

heavy construction; panelling; turnery; boxes and crates; furniture components

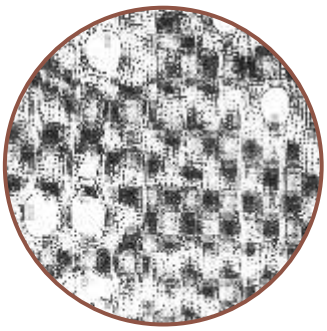
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1210
Air-dry density at 12% (kg/m^3)	750
Total tangential shrinkage (%)	7.1
Total radial shrinkage (%)	4.4
Total volumetric shrinkage (%)	10.2

Mechanical Properties

Bending strength at 12% (N/mm^2)	121
Modulus of elasticity at 12% (N/mm^2)	14,135
Crushing strength at 12% (N/mm^2)	62



Cross-section

ITEBALLI

Vochysia spp.

Vernacular name:
Brazil: Quaruba

Family: Vochysiaceae

International Trade Name: Quaruba, Iteballi

Distribution: The Guianas, Venezuela and adjacent Brazil

Tree Description

Length of the bole: 15-21 m, up to 25 m
Height of tree: 25-30 (-40) m
Diameter: 0.3-0.55 (-0.9) m
Shape of the log: straight, cylindrical, slender, unbuttressed or basally swollen.

Wood Description

Sapwood: distinct, pale yellow or grey
Heartwood: pale pink brown darkening to golden brown often with yellow stripes.
Grain: generally straight to slightly interlocked
Texture: rather coarse

Processing

Sawing: easy; wooly surface
Drying: kiln drying slow, quarter sawing and slow drying are recommended.
risks of distortion: high
risks of checking: high
Machining: easy, use sharp tools
Gluing: good
Nailing: good holding of nails
Finishing: good
Veneering: peels well

Natural durability

Resistance to decay: poor
Resistance to termites: poor
Resistance to insects of dry wood: poor

Treatability

good

Uses

light carpentry, furniture, interior joinery.

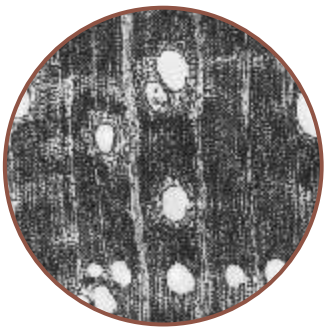
Technological Characteristics

Physical Properties

Green density (kg/m^3)	980
Air-dry density at 12% (kg/m^3)	580 - 620
Total tangential shrinkage (%)	9.5
Total radial shrinkage (%)	3.5
Total volumetric shrinkage (%)	12.8

Mechanical Properties

Bending strength at 12% (N/mm^2)	78 - 81
Modulus of elasticity at 12% (N/mm^2)	9179 - 9700
Crushing strength at 12% (N/mm^2)	43 - 45



Cross-section

MUNIRIDAN

Qualea rosea (Aublet)

Vernacular name:
Suriname: Muniridan

Family: Monimiaceae

International Trade Name: Muniridan

Distribution: The Guianas, Venezuela, Brazil & Suriname

Tree Description

Length of the bole:	20-25 m
Height of tree:	30-60 m
Diameter:	0.60 -1.00 m
Shape of the log:	straight, light to heavily buttressed

Wood Description

Sapwood:	pale yellow to light brown colour
Heartwood:	pink to red brown, occasionally olive brown
Grain:	often slightly to moderately interlocked
Texture::	medium to coarse

Processing

Sawing:	moderately difficult
Drying:	moderate
Machining:	moderate
Gluing:	good
Nailing:	good holding of nails
Finishing:	good
Veneering:	peels well

Natural durability

Resistance to decay:	moderate
Resistance to termites:	poor
Resistance to insects of dry wood:	poor

Treatability

good

Uses

interior and exterior joinery, mill work, flooring, furniture, veneer and plywood

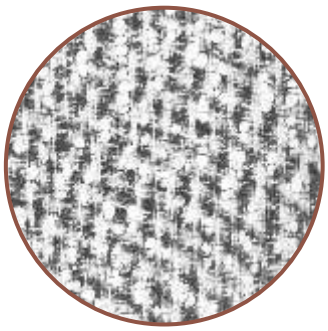
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1260
Air-dry density at 12% (kg/m^3)	630
Total tangential shrinkage (%)	7.9
Total radial shrinkage (%)	4.6
Total volumetric shrinkage (%)	12.3

Mechanical Properties

Bending strength at 12% (N/mm^2)	67
Modulus of elasticity at 12% (N/mm^2)	15,171
Crushing strength at 12% (N/mm^2)	52



Cross-section

BLACK KAKARALLI

Eschweilera spp.

Vernacular name:
Guyana: Common Black Kakralli

Family: Lecythidaceae

International Trade Name: Black Kakaralli

Distribution: The Guianas, Venezuela and Brazil

Tree Description

Length of the bole:	12-16m
Height of tree:	15-30 (40)m
Diameter:	0.3-0.6 (-1)m
Shape of the log:	base straight or buttressed

Wood Description

Sapwood:	light greyish brown
Heartwood:	brown to dark brown
Grain:	straight
Texture:	fine to medium

Processing

Sawing:	power required; blunting effect high
Drying:	moderately difficult to air season, risk of distortion
Machining:	special tools required
Gluing:	difficult
Nailing:	pre-boring necessary
Finishing:	good

Natural durability

Resistance to decay:	very good
Resistance to termites:	very good
Resistance to insects of dry wood:	very good

Treatability

poor

Uses

heavy carpentry, industrial flooring, sleepers, ship building, poles and posts, turnery, frame construction, marine construction

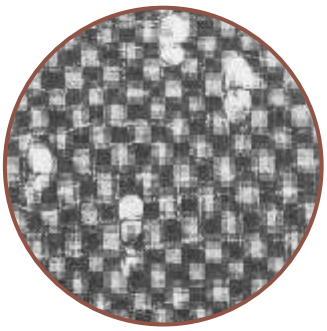
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1250
Air-dry density at 12% (kg/m^3)	1070
Total tangential shrinkage (%)	10.3
Total radial shrinkage (%)	5.8
Total volumetric shrinkage (%)	NA

Mechanical Properties

Bending strength at 12% (N/mm^2)	182
Modulus of elasticity at 12% (N/mm^2)	21,635
Crushing strength at 12% (N/mm^2)	77



Cross-section

TONKA BEAN

Dipteryx odorata (Aublet) Willd.

Vernacular name:
Brazil: Cumaru

Family: Leguminosae (Papilionoideae)

International Trade Name: Cumaru

Distribution: Central & Tropical South America

Tree Description

Length of the bole:	18-24 m
Heightof tree:	30-48 m
Diameter:	0.30 -0.75 m
Shape of the log:	straight, cylindrical base with thick, broad root spurs or buttresses

Wood Description

Sapwood:	yellowish
Heartwood:	purplish pink tinge to red brown
Grain:	frequently interlocked
Texture:	fine to medium

Processing

Sawing:	power required; moderate blunting effect
Drying:	must be handled slowly with care; risk of checking and distortion: high
Machining:	special tools recommended
Gluing:	difficult - special processing needed
Nailing:	pre-boring necessary
Finishing:	good

Natural durability

Resistance to decay:	very good
Resistance to termites:	very good
Resistance to insects of dry wood:	good

Treatability

poor

Uses

sleepers, flooring, heavy carpentry, marine construction, decorative veneer, turnery, decking

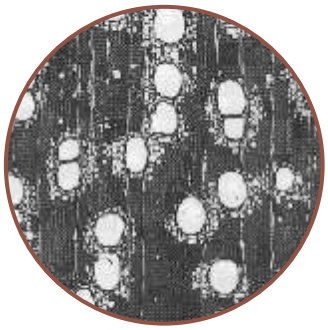
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1200
Air-dry density at 12% (kg/m^3)	1070
Total tangential shrinkage (%)	7.9
Total radial shrinkage (%)	5.3
Total volumetric shrinkage (%)	13.4

Mechanical Properties

Bending strength at 12% (N/mm^2)	200
Modulus of elasticity at 12% (N/mm^2)	22,000
Crushing strength at 12% (N/mm^2)	105



Cross-section

ITIKIBORORALLI

Swartzia spp.

Vernacular name:

Guyana: Morompo, Okraprabu

Brazil: Mututuy da terra firma, Saboarana

Family: Leguminosae (Papilionoideae)

International Trade Name: Saboarana

Distribution: The Guianas, Venezuela and Brazil

Tree Description

Length of the bole: 15-18 m
Height of tree: 27-34 m
Diameter: 0.3 -0.6 m
Shape of the log: straight, cylindrical, sometimes slightly flat in form, base often swollen

Wood Description

Sapwood: distinct, very wide, nearly white
Heartwood: chocolate brown to reddish or purplish brown, occasionally marked by dark olive or purplish brown stripes
Grain: generally straight, but may be variable
Texture: medium to very fine

Processing

Sawing: power required
Drying: slow
Machining: difficult due to hardness - power required
Gluing: N/A
Nailing: pre-boring necessary
Finishing: good

Natural durability

Resistance to decay: very good
Resistance to termites: very good
Resistance to insects of dry wood: good

Treatability

poor

Uses

inlay, cabinet work, walking sticks, parquet flooring, bagpipes, violin bows, turnery, fine furniture, cutlery, marquetry, musical instruments, interior trim

(Information based on S.leiocalycine)

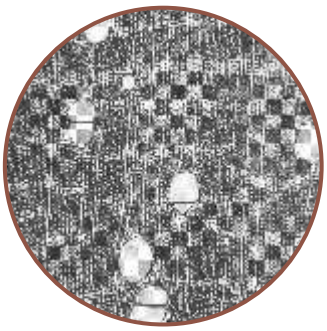
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1200
Air-dry density at 12% (kg/m^3)	890
Total tangential shrinkage (%)	5.1 - 6.1
Total radial shrinkage (%)	3.1 - 4.0
Total volumetric shrinkage (%)	14

Mechanical Properties

Bending strength at 12% (N/mm^2)	163
Modulus of elasticity at 12% (N/mm^2)	23,630
Crushing strength at 12% (N/mm^2)	85



Cross-section

KUROKAI

Protium decandrum (Aublet) Marchand

Vernacular name:

Guyana: Maruwa, Porokai

Brazil: Breu

Family: Burseraceae

International Trade Name: Breu

Distribution: Central & Northern South America

Tree Description

Length of the bole: up to 18 m
Height of tree: 15-25 m (-40)m
Diameter: 0.35 - 0.70 (-1.0)m
Shape of the log: usually well formed; base buttressed

Wood Description

Sapwood: not clearly distinct; pink or pale yellow
Heartwood: pinkish brown sometimes with dark reddish brown
Grain: straight or shallowly interlocked
Texture: fine

Processing

Sawing: power required
Drying: fairly rapid
Machining: easy
Gluing: moderate
Nailing: pre-boring necessary
Finishing: requires a little filling
Veneering: interesting for peeling

Natural durability

Resistance to decay: poor
Resistance to termites: poor
Resistance to insects of dry wood: poor

Treatability

poor

Uses

furniture, house framing, plywood, Interior joinery, interior fittings, veneers, light carpentry

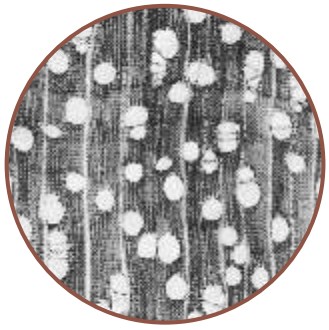
Technological Characteristics

Physical Properties

Green density (kg/m^3)	900
Air-dry density at 12% (kg/m^3)	640
Total tangential shrinkage (%)	3.1-4.0
Total radial shrinkage (%)	5.1-6.5
Total volumetric shrinkage (%)	NA

Mechanical Properties

Bending strength at 12% (N/mm^2)	110
Modulus of elasticity at 12% (N/mm^2)	12,890
Crushing strength at 12% (N/mm^2)	61



Cross-section