INTERNATIONAL TROPICAL TIMBER ORGANIZATION

ITTO

PROJECT DOCUMENT

TITLE:	TIMBERS OF TROPICAL AFRICA PART 2: GROUP 7(2) WITHIN THE PROTA PROGRAMME
SERIAL NUMBER:	PD 479/07 Rev.**2** (M)
COMMITTEE:	ECONOMIC INFORMATION AND MARKET INTELLIGENCE
SUBMITTED BY:	GOVERNMENT OF GHANA
ORIGINAL LANGUAGE:	ENGLISH

BACKGROUND:

As part of a total programme to improve the access to information on the 7000 useful plants of Tropical Africa and to promote their use in a sustainable manner, PROTA (Plant Resources of Tropical Africa) will make a synthesis of all existing but dispersed knowledge on the estimated 1070 'Timbers of Tropical Africa' (Commodity group 7) in two Parts.

This document concerns the second sub-project, on the 570 'Timbers of Tropical Africa' from currently less important timber-producing taxonomic families (Commodity group 7(2)). It is preceded by a sub-project on the 500 'Timbers of Tropical Africa' from the currently more important timber-producing taxonomic families (Commodity group 7(1); ITTO Project PD 264/04 Rev. 3 (M,I)).

PROTA is strongly rooted in the group that successfully delivered the ITTO-funded PROSEA 'Timber trees' Handbook volumes.

IMPLEMENTING AGENCY: PLANT RESOURCES OF TROPICAL AFRICA (PROTA) with the Implementing Bodies:

1. PROTA Network Office Africa
2. PROTA Network Office Europe
3. PROTA Regional Office Anglophone West Africa
4. PROTA Regional Office Central Africa
5. PROTA Regional Office francophone West Africa
6. PROTA Regional Office East Africa
7. PROTA Regional Office Southern Africa
8. PROTA Regional Office Indian Ocean Islands
9. PROTA Country Office France
10. PROTA Country Office United Kingdom
11. PROSEA Foundation

DURATION: 36 MONTHS

BUDGET AND PROPOSED SOURCES OF FINANCING:

SOURCE	CONTRIBUTION IN US$
ITTO	596,419
PROTA	457,216
TOTAL	**1,053,635**

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PART I: CONTEXT

1. Origin

PROTA is a similar initiative for Tropical Africa as PROSEA (Plant Resources of South-East Asia) was for South-East Asia in the 1990s. Both programmes were initiated in recognition of the fact that the sheer amount and dispersion of data on the plant resources has made the information inaccessible to the individual user.

The overall objective of PROTA (Plant Resources of Tropical Africa) is to improve the access to information on the 7,000 useful plants of Tropical Africa and to promote their use in a sustainable manner. To achieve this, PROTA follows a three-step-approach.

* The first step (knowledge synthesis and access) is to make a synthesis of the existing but dispersed knowledge on the 7,000 useful plants of tropical Africa and to make this synthesis widely available through a free on-line database, CD-ROMs and illustrated handbooks. All information is available in both English and French, to guarantee wide access in tropical Africa.

* The second step (stakeholder consultations) consists of consultations with researchers, lecturers, extension workers, policy makers and people working in NGOs or private companies, to agree on recommendations for research, extension, policy and the private sector, based on the knowledge synthesis.

* The third step (end-user impact) is to try out promising plant species and technologies in small development projects in co-operation with grassroots organizations.

The approximately 7,000 species are subdivided into 16 commodity groups:

PROTA
1: Cereals and pulses / Céréales et légumes secs (completed in 2006)
2: Vegetables / Légumes (completed in 2004)
3: Dyes and tannins / Colorants et tanins (completed in 2005)
4: Ornamentals / Plantes ornementales
5: Forages / Plantes fourragères
6: Fruits / Fruits
7: Timbers / Bois d'œuvre
7(1): Part 1 (to be completed in 2008)
7(2): Part 2 **(this proposal)**
8: Carbohydrates / Sucres et amidons
9: Auxiliary plants / Plantes auxiliaires
10: Fuel plants / Bois de feu
11: Medicinal plants / Plantes médicinales
11(1): Part 1 (to be completed in 2008)
11(2): Part 2
11(3): Part 3
11(4): Part 4
12: Spices and condiments / Epices et condiments
13: Essential oils and exudates / Huiles essentielles et exsudats
14: Vegetable oils / Oléagineux (completed in 2007)
15: Stimulants / Plantes stimulantes
16: Fibres / Plantes à fibres

PROTA 7(1): 'Timbers 1' and PROTA 11(1): 'Medicinal plants 1' are due for completion in 2008. The present project proposal concerns PROTA 7(2): 'Timbers 2', due for completion in 2008–2010.

2. Sectoral policies

'Natural resources management' is quite prominent as a focal sector at the regional level in Africa, e.g. in the regional plans under the European Development Fund (EDF), and at the pan-African level, e.g. 'Africa's Science and Technology Consolidated Plan of Action' and the 'Comprehensive Africa Agriculture Development Plan' of NEPAD.

For instance, in the planning 2002-2007 under the European Development Fund (EDF) for the Region of Eastern and Southern Africa and the Indian Ocean, 'management of natural resources' is one of the 3 focal sectors. The regional plan recognizes the need '.... to ensure the sustainable management of the natural resource base of the region in order to contribute to the overall aim of the reduction of poverty. Special attention is needed to improve the quality and quantity of information available to the authorities and to the markets, to develop and harmonize regional strategies and policies for food security, environmental protection, and natural resource management at the regional level'. In the 2002-2007 planning of the Region of Central Africa, 'sustainable management of natural resources' is one of the 3 focal sectors. It recognizes the importance of awareness of the economic and scientific potential of the biological treasure of the region, and especially of sustainable management of the forest ecosystems. In the West African regional plan 2002-2007, special attention is given to 'food security'.

PROTA's comprehensive information system on the 7,000 useful plants of the whole of tropical Africa constitutes a sound basis for regional and pan-African programmes.

PROTA's knowledge synthesis, with ample attention for the conservation status of the African useful plants, evidences its commitment to the implementation of the Convention on Biological Diversity (CBD). By understanding and documenting plant diversity, it makes a substantial contribution to the 16 targets of the Global Strategy for Plant Conservation (GSPC). Through its impact on food production, nutrition, health, and enhancement of income, it is a pillar for the realization of the Millennium Development Goals (MDG) in tropical Africa.

3. Programmes and other operational activities

Prime objectives in present-day development policies are poverty alleviation and environmental protection, and this in a sustainable and participatory way. In silviculture this implies a focus on community or social forestry. However, these 'grassroots' activities can only be successful if a number of conditions have been fulfilled at higher integration levels, in particular a good understanding and knowledge of the 'environment' in the broadest sense.

PROTA contributes to poverty alleviation and the sustainable management of natural resources by making a comprehensive synthesis of knowledge on the plant resources of tropical Africa, and by making this information widely available.

PROTA is a logical consequence of the successful PROSEA programme. PROSEA described in 15 years (1989-2003) the approximately 7,000 useful plants of South-East Asia.

The 'Timber trees' were in PROSEA by far the largest commodity group, which led to 3 volume-parts describing a total of about 3,000 timber trees (primary use and secondary use):

- 5(1): Timber trees: Major commercial timbers (1993)
- 5(2): Timber trees: Minor commercial timbers (1995)
- 5(3): Timber trees: Lesser-known timbers (1998).

The successful realization of the PROSEA Timber volumes was made possible through 2 successive contracts between ITTO and the PROSEA Foundation, the first one from 1992-1995 (PD 10/92), the second one from 1995-1998 (PD 2/95).

The PROSEA 'Timber' volumes have been praised as an unprecedented overview of the 'Timber trees' of South-East Asia, and they are extensively used as source material for the CABI Forestry Compendium, for the ICRAF Agroforestry Database and for many national derived products such as leaflets, brochures, training manuals and training courses.

PROTA was initiated in 2000. During the Preparatory Phase 2000-2003, the format and content of databank and handbook have been worked out in sample products (www.prota.org, 'PROTA Precursor / Précurseur'), the PROTA Network has been established (11 organizations in 11 countries), international consensus was reached on organization and set-up through an international Workshop (Proceedings Workshop Nairobi, 2002), and subsequently PROTA was registered as an international non-profit Foundation domiciled in the Netherlands. The PROTA Preparatory Phase was financially supported by the European Commission, by Netherlands Government Agencies and by Wageningen University.

During the First Implementation Phase 2003-2007 the PROTA Network was extended through contactpersons into 12 countries without PROTA office (Benin, Botswana, Cameroon, Central African Republic, Côte d'Ivoire, Ethiopia, Mauritius, Nigeria, Réunion, Sierra Leone, Tanzania and Zambia). About 700 freely accessible review articles on African plants were published in the PROTA webdatabase, and 4 volumes of the PROTA Handbook were published ('Cereals and pulses', 'Vegetables', 'Dyes and tannins' and 'Vegetable oils'). For three commodity groups ('Cereals and pulses', 'Vegetables', 'Dyes and tannins') stakeholder consultations were held, leading to tangible conclusions and recommendations. Small projects were started in collaboration with grassroot organizations in Burkina Faso, Ghana, Kenya and Madagascar. In September 2007 the second PROTA International Workshop and Investors' Forum was held. The First Implementation Phase was financially supported by Netherlands Government Agencies, ITTO, NWO (Netherlands Organization for Scientific Research), CTA (Technical Centre for Agricultural and Rural Cooperation) and Wageningen University.

For the Second Implementation Phase 2008-2012, commitments have been made already by all participating institutions, by some Netherlands Government Agencies and by CTA. The international donor community is presently actively approached to lend support to PROTA.

The commodity group 'Timbers' is the second largest group distinguished by PROTA, comprising about 1070 primary use species. Another 800 species have 'timber' as secondary use, but they will be included in other commodity groups where also the 'timber' aspects will be dealt with. Because of the large number of species, PROTA 7 is subdivided into two parts:

- 7(1): Timbers 1 (500 species in the more important timber-producing taxonomic families)
- 7(2): Timbers 2 (about 570 species in the currently less important timber-producing taxonomic families)

PROTA 7(1) is scheduled for completion in the period 2006-2008 (3 years), PROTA 7(2) in the period 2008-2010 (3 years).

Implementation of PROTA 7(1) (ITTO Project PD 264/04 Rev. 3) started on 1 January 2006. The project will lead to approximately 275 review articles (English and French) dealing with about 500 timber species of tropical Africa. On 1 July 2007, 146 review articles had been completed, treating 260 species, and another 32 articles with 64 species were in the advanced editing stage. A total of 146 review articles had been translated into French. Already 96 validated TEXTFILE review articles, treating 159 species, were inserted in the Webdatabase PROTABASE and are accessible on-line.

As for the supporting databases, the WORLDREFS (international literature) database contained about 33,000 literature references on Timber species (including abstracts), and the AFRIREFS ('grey' literature) database about 1,050. The literature information in these databases is available in all PROTA nodes and is made available to editors/authors at request. The EXPERTISE (potential contributors) database contained 178 'Timber' experts. Through this compilation, the editors have been able to contract out nearly all of the Major species to external authors. The IMAGEFILE (drawings, maps, photographs) database contained 174 entries referring to 'Timbers'.

The TGA (Target Group Address) database contained 279 records of organizations with a specific interest in the commodity group 'Timbers'. This adds to the 401 records of organizations with a broad general interest (all commodity groups).

A Wood Anatomy Workshop was organized for young African scientists to enhance their knowledge of wood anatomy and to compile data on the wood anatomical properties of African timbers. The workshop, held at CIRAD Forêt in Montpellier, France, from 16-25 May 2007, was attended by seven African students (from Gabon, Ghana, Mozambique, Senegal, Tanzania, Uganda and Zambia). The very successful workshop resulted in anatomical data on more than 200 African species being compiled and the capacity of African scientists in wood anatomy being boosted. The anatomical descriptions will be included in the PROTA webdatabase, books and CD-ROMs.

PART II: THE PROJECT

1. Project objectives

1.1 Development objective

The development objective of the project is improved access to interdisciplinary data on the timbers of Tropical Africa as a basis for sustainable tropical forest management, and to improve networking leading to better cooperation and information exchange between forestry actors.

1.2 Specific objectives

The specific objectives of the project are:

1. To gather, evaluate and synthesize the dispersed information on the 'Timbers of Tropical Africa' through improved networking.
2. To facilitate wide access of target beneficiaries to the information on the 'Timbers of Tropical Africa' in electronic and printed forms.
3. To contribute to networking and capacity building in Tropical Africa in the fields of scientific editing and wood anatomy.

2. Justification

2.1 Problems to be addressed

Tropical forest and timber supplies are rapidly diminishing in many tropical countries. FRA (2000) estimates that there is an annual decline of 5 million ha. Over 175 million ha of tropical forests in Africa has been degraded. Part of the solution is sustainable management. In this respect it is important to gather, organize and disseminate information on national biological diversity in a form useful to national policy-makers and others involved in African forestry.

Decision-makers, researchers and producers, students and scholars, extension workers and educators in Tropical Africa still depend for an overview of the utilization of the plant resources on a few botanically oriented and regionally focused handbooks. Most handbooks treat the plant resources from a single-discipline angle.

Research in tropical agronomy, horticulture, forestry and economic botany is continuing and expanding rapidly, aided by new techniques. Food values are checked and corrected, new properties, medicinal efficacy or dangers discovered, new applications invented, ecological relations between cultivated and wild plants unravelled, the prevention of erosion, weed invasion and many other related subjects studied.

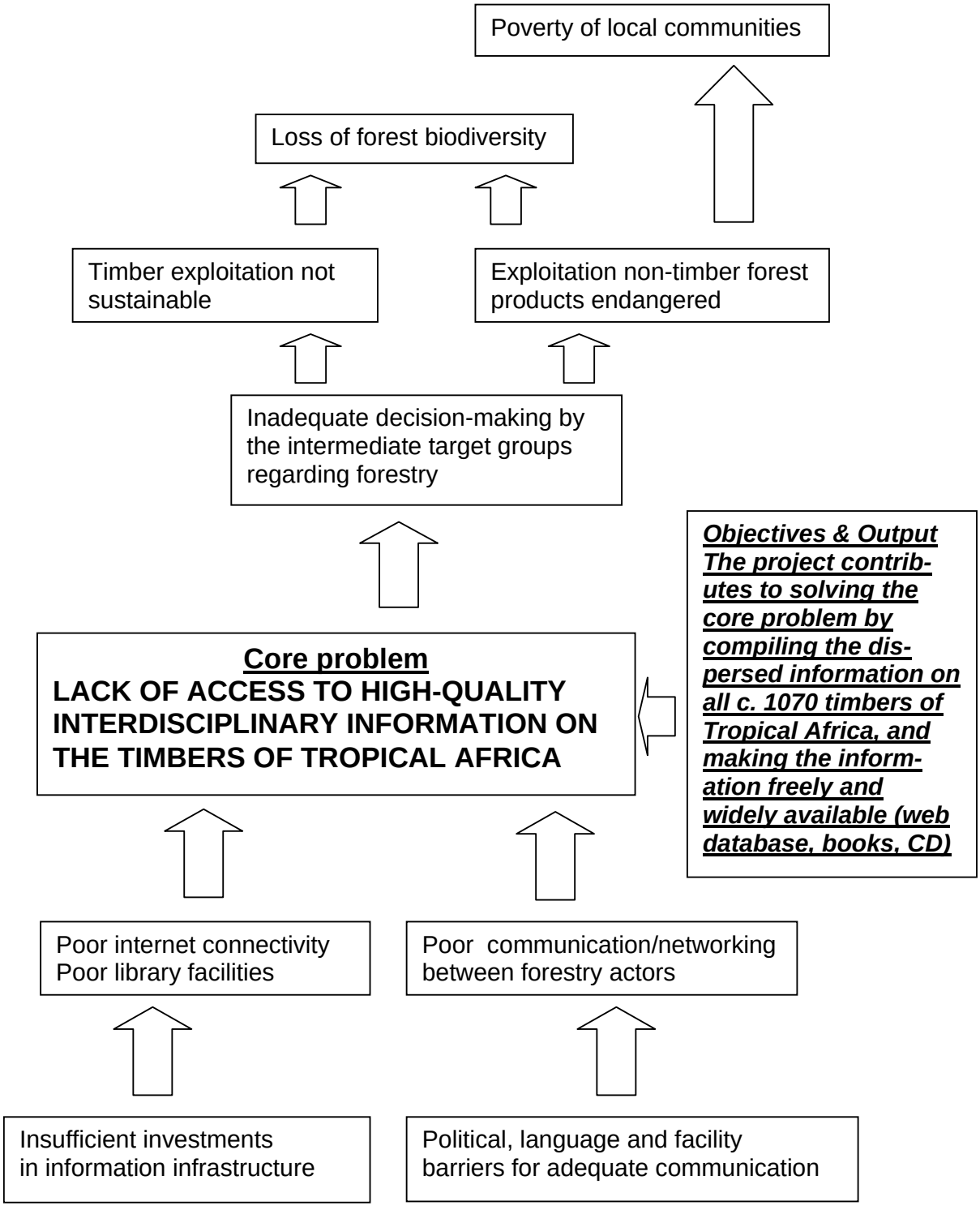
Although tropical Africa is such a vast area with many countries, it contains only a few libraries where current world literature can be consulted.

What is urgently needed is a modern databank and handbook, providing up-to-date information about the useful plants of the continent, both cultivated and growing wild. This is what the PROTA Programme aims at.

A great majority of the population in Tropical Africa, a total of 600 million people, largely depends on the plant cover, the useful plants in particular, for its survival and well-being.

High-quality, interdisciplinary information has to reach the intermediate target groups, whose decisions affect the communities depending on timbers and non-timber forest products. PROTA's Target Group Address (TGA) database is developing fast (July 2007: 680 records of forestry actors in government, rural development, vocational training, research, higher education and private sector). PROTA's vision of success is to reach the decision-makers in above-mentioned sectors of society and provide them with better knowledge of the plants that are important in the daily life of the rural poor.

Problem tree



In Tropical Africa, the timber trees constitute a major element of the natural vegetation, and in a large number of economies, exploitation of the timber plays an important role. The present exploitation of natural forest by timber extraction, shifting cultivation and other human activities, may lead to the total destruction of tropical forests if not properly complemented by programmes ensuring sustainable exploitation.

Fortunately, efforts to protect and conserve tropical forests have worldwide support. Not only are alternatives for the use of forest resources (e.g. fuel-wood farming) considered and developed, but also generation of alternative sources of income for the local population is envisaged.

Beside improved silvicultural management of natural forests, cultivation of valuable timbers is being encouraged. Commercialization of other products produced by timber trees (e.g. edible fruit and nuts, resin and other exudates, medicines, fibres, essential oils, dyes and tannins) may give additional income to forest village communities and may protect forests from destruction.

For trials on species cultivation, knowledge concerning ecological requirements, methods of propagation, seed production and longevity, growth and development, diseases and pests, geographic distribution, vernacular names, correct scientific name and productivity, is a necessity.

For commercialization of non-timber products, information on the quantity of harvested products, the season to harvest, the area and density of tree stands, the value and possibilities for trade of the product, is required. Wood anatomical properties are key indicators of wood quality and therefore important for effective wood utilization. Anatomical properties are also highly important for the identification of species. Unfortunately, adequate anatomical data are not available for many African timbers.

To promote the conservation of tropical forests or to decide on export and import restrictions of timber species threatened with extinction, knowledge on the characteristics of the tree species and their timber is necessary.

All these efforts should start from the same sound base: up-to-date knowledge of the tree.

As for the wild flora, Tropical Africa is in the favourable position of having a number of current taxonomic works that provide excellent (although incomplete) basic information (e.g. Flora of west tropical Africa, Flora of tropical East Africa, Flora Zambesiaca, Flore de l'Afrique centrale, Flore de Madagascar et des Comores, Flora of Southern Africa, national flora's).

The PROTA Handbook will combine this taxonomic information with all other aspects of existing knowledge.

The present project on PROTA 7(2): 'Timbers 2' focuses on the approximately 570 species in the currently less important timber-producing taxonomic families. It supplements PROTA 7(1): 'Timbers 1' dealing with the 500 species in the more important timber-producing taxonomic families. Together, the 2 projects will give a complete overview of the 'Timbers of Tropical Africa'.

The division of timber species over the 2 parts of PROTA 7 according to taxonomic families has the advantage of publishing information on related species simultaneously. This is beneficial to users, but also to the editors from the efficiency point of view. In the Webdatabase, the artificial subdivision will disappear.

2.2 Intended situation after project completion

The elaborate inventory and critical compilation of existing knowledge on the 'Timbers of Tropical Africa' in the form of a Webdatabase, Handbook and CD-ROM will be a reference framework for policy-makers, education and extension workers, researchers and employers in industry (**target beneficiaries**). **Key actors registered in PROTA's TGA database will be actively approached with high-quality, interdisciplinary information.**

It will allow for an improved identification of the wide variety of plant resources in tropical forest ecosystems and thus provide the tools for biodiversity conservation. It will also be a rich source for the production of derived materials and the identification of projects for communities depending on the forest (**end-users**).

Wide availability of the Core Output will be ensured as follows:

- The bilingual Webdatabase (www.prota.org) will be freely accessible.
- The Handbook volume PROTA 7(2): 'Timbers 2' (English edition) and 'Bois d'œuvre 2' (French edition) will be distributed complimentary by ITTO and ATO (totals to be decided by Steering Committee).

- The Handbook volumes PROTA 7(2) will also be distributed complimentary by the Technical Centre for Agricultural and Rural Cooperation–CTA (credit point system for institutions/individuals in ACP countries).
- The Handbook volumes PROTA 7(2) will be distributed complimentary by the PROTA Network to contributors, donors, etc.
- The Handbook volumes PROTA 7(2) will be distributed commercially by Backhuys Publishers (price differentiation between industrialized countries and developing countries).
- The CD-ROM PROTA 7(2) will be distributed by the same means as the Handbook volumes.

2.3 Project strategy

The project strategy is to involve African institutions and individuals in an elaborate inventory of all published sources of information on the Timbers of Tropical Africa (international as well as 'grey' literature), identify expertise who will assist the PROTA team in compiling review articles at the species level, and identify and interact with the key actors in the intermediate target groups (government, rural development, vocational training, research, higher education, industry) on the basis of high-quality, interdisciplinary information to improve decision-making in forestry.

PROTA has built over the past 8 years a solid formal and informal network of cooperating institutions and individuals: European network of 3 nodes, African network of 7 regional nodes and 16 country contacts, hundreds of contributing editors/authors worldwide. PROTA can draw on top expertise in the field of wood anatomy as witnessed by the Wood Anatomy Workshop under project PD 264/04 Rev.3 (M,I).

Communication within the network is instantaneous through appropriate and reliable internet, telephone and fax connections. At regular intervals, PROTA meetings bring together the Board of Trustees and the Executive Board for policy issues, the Regional Officers and Country Officers for implementation issues, and editors for scientific issues.

The framework of the PROTA Programme and the lay-out of the Webdatabase and Handbook are soundly based. A commodity group approach was chosen because this enables one group to be handled at a time and allows group specialists (editors) to be involved in an efficient way. Moreover, arrangement by commodity group relates closely to daily practice and to the interest of the readers.

For the purpose of PROTA, Tropical Africa covers the 47 countries that for their greater part lie within the tropics of Cancer and Capricorn (the whole of Africa except 6 countries in North Africa and 3 countries in southern Africa, but including Madagascar and nearby islands in the Indian Ocean).

The project on 'Timbers 2' will be carried out by experienced PROTA staff members in 7 African and 3 European countries and an experienced team of editors from institutions linked to the PROTA programme, in this case especially the Forest Research Institute of Ghana (FORIG) and Agropolis, France (CIRAD-Forêt).

The project will provide opportunities for many plant resources specialists in Africa to participate in its various activities (information gathering, documentation, publishing and dissemination).

The PROTA Programme is not overlapping but clearly complementary to taxonomical projects such as the various flora projects. There is good cooperation. Cooperation is also sought with relevant IUFRO (GFIS), IAWA, TROPENBOS and CABI (Forestry Compendium) projects.

PROTA is committed to voluntarily apply the highest possible standards of compliance with the evolving norms regarding the protection of Traditional Knowledge (TK) and Intellectual Property Rights (IPR). To this end, the 'Instructions for Authors' contain a Code of Conduct (Annex 1). PROTA staff involved in documentation work have to follow a 'Documentation PROTA-col' (Annex 2).

2.4 Target beneficiaries

At the national level, the key beneficiaries are the major timber-producing countries in Tropical Africa such as Cameroon, Congo, Côte d'Ivoire, Democratic Republic of Congo, Gabon, Ghana and Liberia, but also the other countries in Tropical Africa will benefit.

In these countries the direct beneficiaries of the electronic (Webdatabases, CD-ROMs) and printed output (Books) are those professionally concerned with timbers (in government, research, education, extension, industry). Within these broad target categories, the PROTA Network will identify the key actors to ensure that the PROTA information is within easy reach. Existing directories at the level of ITTO, ATO, IUFRO will be of great help in this respect. **PROTA's TGA database is developing fast and had in July 2007 already 680 records of key actors in the 6 intermediate target groups with an interest in timbers. The records cover already institutions in nearly 20 African countries.**
About 44% of the institutions are EXTENSION AGENCIES who work directly at 'grassroots' level and are in the position to reach the end-users and to 'translate' PROTA information to their benefit.
About 15% are PRIVATE ENTERPRISES who can benefit from PROTA's information for innovative economic initiatives.
About 12% are RESEARCH INSTITUTIONS with forestry activities who can use PROTA information for identifying research gaps and avoiding duplication in research efforts.
About 10% are VOCATIONAL TRAINING CENTRES who can use PROTA information for improving practical training of students.
Also about 10% are POLICY MAKERS IN GOVERNMENT who can take PROTA information into account in legislation affecting the forestry sector and end-users (e.g. conservation of endangered species).
About 9% are UNIVERSITIES with forestry departments and university libraries who can use PROTA information for curriculum improvement and diversification of thesis research.

The strength of the PROTA Programme is that the direct recipients are at the same time the contributors: a large cross-section of the professionals engaged in the sectors described above contributes to the core output of the PROTA Programme as editor or author. For PROTA 7 on the 'Timbers', it is estimated that at least 150 authors and editors will be involved.

Information should be presented to the indirect beneficiaries (communities depending on the forest) through specially prepared materials, such as brochures and leaflets, by the extension service or through other means. Such information has to be based on the most up-to-date knowledge (databank and handbook), but, of course, has to be reshaped from these primary sources and adapted to local conditions. This can be done by other actors, because the PROTA information will be widely available, but it will also done in the second and third step of PROTA's three-step-approach (which are not included in the present proposal, but for which separate funding requests will be submitted to other donors).

In the second step ('stakeholder consultations'), Special Products on the 'Timbers' will be made based on international consultation, drawing conclusions from the Core Output for the various target groups on 'policy issues' (for government), 'conservation needs' (for research community and nature conservation agencies), 'research gaps' (for research community), 'thesis subjects' (for higher education), 'candidate technologies' (for rural development agencies and vocational training centres) and 'development gaps' for private enterprises.

In the third step ('end-user impact'), promising plant species and technologies are tried in small development projects in co-operation with grassroots organizations.

2.5 Technical and scientific aspects

The PROTA review articles will focus on species in order to emphasize differences between species instead of similarities.

Out of the 570 species to be dealt with in PROTA 7(2), about 100 species will be described according to the 'major' format: 28 text sections, drawing, geographic distribution map, pictures (see Annex 3). About 200 species will be described according to the 'minor' format in which certain text sections are combined: 17 text sections. The remaining 270 species will have no separate article because too little information is available; they are only mentioned in the articles of related species.

Standard 'Instructions for authors' have been made in which 'timber' aspects such as wood properties are adequately covered (see Annex 1). To arrive at standardized (IAWA) wood anatomical descriptions and to train African scientists, a Wood Anatomy Workshop will be organized at FORIG in Ghana, bringing together promising African wood anatomists. Under expert guidance and based on existing wood collections (National Herbarium Netherlands, CIRAD-Forêt, Africa Museum Belgium, CSIRO Australia, North Carolina State University USA) descriptions of major woods will be made during the Workshop.

Special effort will be made to illustrate the 100 'major' species with anatomical microphotographs.

2.6 Economic aspects

PROTA is committed to rural development through diversification of resources and application of farmers' knowledge. More investment is needed to enhance the productivity of the resource sectors. Such efforts include reforestation, fuelwood development, watershed protection, soil conservation, agroforestry, and small-scale agriculture.

The PROTA Volumes on 'Timbers' will include many 'lesser-known' species that may have great potential. Some of them are already of local importance. As this information becomes more widely available such a species may prove to be of use elsewhere as well. With the depletion of natural timber resources, the now lesser-known timber species will gain interest in the near future. This relates the project to the maintenance and expansion of the trade in tropical timber and also offers reasonable prospects for positive economic returns.

The project is related to the efficient production and use of industrial tropical timber and will be of benefit to the tropical timber economy as a whole and to both producing and consuming countries.

2.7 Environmental aspects

There is some concern that a detailed knowledge on the lesser-known timbers might actually worsen their preservation situation. However, the predominant consensus is that wise utilization of plant resources is only possible based on facts, information and knowledge.

Making widely available the present-day knowledge and information on well-known and lesser-known timbers will on one hand be a tool for a more economic use of wood harvested from tropical forests, and on the other hand be essential for the development of sustainable management and conservation of such forests.

2.8 Social aspects

The important issue for the coming years is how to combine agriculture and forestry to raise the productivity of the land for food, fuelwood and timber, and how to improve income and living standards of the rural population. The field of Agroforestry is complex, because the forests also have to maintain the environmental stability on which continued agricultural production depends. Rural development should contain the following major elements: (1) the increase and diversification of agricultural production on existing crop land and pastures, and (2) the planting of trees and forests near the villages and the reforestation of eroded lands unsuited for agricultural use for the benefit of the local population.

2.9 Risks

PROTA implementation will yield such an enormous 'knowledge system' on 7,000 species, allowing so many spin-off activities, that (semi-)permanence of the African PROTA Network is foreseen, guaranteeing long-term sustainability of the project output. This is facilitated by the strong embedding of the PROTA Regional Offices in institutions of high standing and reliable performance in the field of biodiversity.

With respect to Traditional Knowledge (TK) and Intellectual Property Rights (IPR), PROTA will voluntarily apply the highest possible standards of compliance with the spirit of evolving norms regarding the protection of TK and IPR (see Annex 1 and Annex 2).

The current low rate of the US dollar compared to the euro could give some difficulties for a programme like PROTA, where most expenses are in euro, whereas ITTO funding is in dollars.

3. Outputs

3.1 Specific objective 1: Information gathering, evaluation and synthesis through networking

- Output 1.1: WORLDREFS–TIMBERS: a supporting database of international literature on the 'Timbers of Tropical Africa' (present at start of project: 33,000 records; present at end of project: 40,000 records; target: 7,000 new records)

- Output 1.2: AFRIREFS–TIMBERS: a supporting database of 'grey' local literature on the 'Timbers of Tropical Africa' (present at start of project: 1,060 records; present at end of project: 1500 records; target: 440 new records)

- Output 1.3: EXPERTISE **& TGA**–TIMBERS: a supporting database serving as Directory of Experts on the 'Timbers of Tropical Africa' (present at start of project: 178 records; present at end of project: 250 records; target: 72 new records) **and as Directory of key actors in the intermediate target groups (present at start of project: 680 records; present at end of project: 1000 records; target 320 new records).**

- Output 1.4: IMAGEFILE–TIMBERS: a supporting database with illustration material (drawings, maps, photographs) on the 'Timbers of Tropical Africa' (present at start of project: 960 records; present at end of project: 1760 records; target: 800 new records)

- Output 1.5: TEXTFILE–TIMBERS: state-of-the-art review articles (English version) on the 'Timbers of Tropical Africa' (present at start of project: 275 records; present at end of project: 575 records; target: 300 new records)

- Output 1.6: TRANSLATION–TIMBERS: French version of Textfile (present at start of project: 275 records; present at end of project: 575 records; target: 300 new records)

3.2 Specific Objective 2: Facilitating access to the information in electronic and printed forms

- Output 2.1: WEBDATABASE–TIMBERS (English & French): Webdatabase 'Timbers of Tropical Africa': 300 Textfile, 800 Imagefile records (100 drawings, 100 geographic distribution maps, 100x3 microphotographs, 100x3 habit photographs)

- Output 2.2: HANDBOOK–TIMBERS (English & French editions): Volume PROTA 7(2) on the 'Timbers of Tropical Africa': 500 pages, 300 Textfile, 500 Imagefile records (100 drawings, 100 geographic distribution maps, 100x3 microphotographs)

- Output 2.3: CD–TIMBERS (English & French): CD-ROM on the 'Timbers of Tropical Africa': 300 Textfile, 800 Imagefile records (100 drawings, 100 geographic distribution maps, 100x3 microphotographs, 100x3 habit photographs)

3.3 Specific Objective 3: Networking and capacity building in Tropical Africa

- Output 3.1: INCREASED CAPACITY IN SCIENTIFIC WRITING AND EDITING

- Output 3.2: INCREASED CAPACITY IN WOOD ANATOMY

4. Activities

4.1 Output 1.1: WORLDREFS–TIMBERS

- Activity 1.1.1: Scanning large international on-line literature databases (AGRICOLA, AGRIS, BIOSIS, CABI, MEDLINE, TROPAG) for references on the 'Timbers of Tropical Africa' with the scientific names in PROTA's Baselist as search terms

- Activity 1.1.2 Making WORLDREFS–TIMBERS available for editors and authors and for consultation in all PROTA nodes

4.2 Output 1.2: AFRIREFS–TIMBERS

- Activity 1.2.1: Manual scanning of 'grey' literature collections for references on the 'Timbers of Tropical Africa' with the scientific names in PROTA's Baselist as search terms

- Activity 1.2.2: Making AFRIREFS–TIMBERS available for editors and authors, for consultation in all PROTA nodes and for exchange with contributing agencies

4.3 Output 1.3: EXPERTISE & TGA–TIMBERS

- Activity 1.3.1: Survey of experts **and intermediate target groups** working on the 'Timbers of Tropical Africa'

- Activity 1.3.2: Making EXPERTISE–TIMBERS available for editors to assist in the identification of associate editors and authors

4.4 Output 1.4: IMAGEFILE–TIMBERS

- Activity 1.4.1: Surveying and digitizing illustration materials (drawings, anatomical microphotographs, habit photographs, geographic distribution maps) on the 'Timbers of Tropical Africa'

4.5 Output 1.5: TEXTFILE–TIMBERS

- Activity 1.5.1: Writing, editing and illustration process (authors/editors/associate editors/general editors/drawing artists/language correctors) including editor meetings.

4.6 Output 1.6: TRANSLATION–TIMBERS

- Activity 1.6.1: Translation process (translation from English into French, technical editing)

4.7 Output 2.1: WEBDATABASE–TIMBERS

- Activity 2.1.1: Insertion of Textfile–Timbers (English & French) and Imagefile–Timbers in PROTABASE on www.prota.org, including the linkages to overall Literature list and overall Contributor list

4.8 Output 2.2: HANDBOOK–TIMBERS

- Activity 2.2.1: Desk-Top-Publishing PROTA 7(2): 'Timbers 2' (Textfile and Drawings & Maps from Imagefile), English edition

- Activity 2.2.2: Desk-Top-Publishing PROTA 7(2): 'Bois d'œuvre 2' (Textfile and Drawings & Maps from Imagefile), French edition

- Activity 2.2.3: Sponsored distribution in Tropical Africa (a.o. through CTA–Technical Centre for Agricultural and Rural Cooperation; **also to TGA database addresses**)

4.9 Output 2.3: CD–TIMBERS

- Activity 2.3.1: Development of bilingual (English and French) CD-ROM 'Timbers 2' / 'Bois d'œuvre 2' (Textfile and Imagefile)

- Activity 2.3.2: Sponsored distribution (in combination with book) in Tropical Africa (a.o. through CTA–Technical Centre for Agricultural and Rural Cooperation; **also to TGA database addresses**)

4.10 Output 3.1: INCREASED CAPACITY IN SCIENTIFIC WRITING AND EDITING

- Activity 3.1.1: Involvement and training of African authors in the preparation of scientific review articles on the Timbers of Tropical Africa

- Activity 3.1.2: Training of African scientists in scientific editing at the PROTA Network Office Europe

4.11 Output 3.2: INCREASED CAPACITY IN WOOD ANATOMY

- Activity 3.2.1: Organization of Wood Anatomy Workshop at FORIG in Ghana to train 10 young African scientists in wood anatomy

- Activity 3.2.2: Provision of FORIG with essential equipment and literature to be used during and after the workshop

5. Logical Framework

The realization of the output under Specific Objective 1, being supporting databases (1.1-1.4) and the not-yet-published core output (1.5-1.6), can be easily monitored in the course of the project through the increase in the number of records in the various databases. The substance can be verified and demonstrated during the Project Steering Committee meetings.

The realization of the output under Specific Objective 2, being the resulting Webdatabases, Books and CD-ROMs (2.1-2.3), can be easily verified by delivery of complementary copies to ITTO and by consultation of the PROTA Webdatabase (www.prota.org).

The realization of the output under Specific Objective 3, being the increased capacities in scientific writing and editing and in wood anatomy (3.1-3.2), can be verified by the number of persons trained.

For the utilization of the output by direct and indirect beneficiaries, a monitoring system will be set up in co-operation with CTA.

LOGICAL FRAMEWORK

PROJECT ELEMENTS	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Development Objective			
Improved access to interdisciplinary data on the 'Timbers of Tropical Africa' as a basis for sustainable tropical forest management, and to improve networking leading to better cooperation and information exchange between forestry actors	Utilization of PROTA 'Timber' products as resource material for decision-making, research, education and extension	- Quotation Survey - User statistics - Evaluation workshops - Peer reviews	**Political focus on sustainable forestry**
Specific Objectives			
1) To gather, evaluate and synthesize the dispersed information on the 'Timbers of Tropical Africa' through improved networking.	Networking and information gathering for PROTA databases	- Operational Network	**Adherence to evolving norms on access and benefit sharing (TK and IPR)**
2) To facilitate wide access of the target beneficiaries to the information on the 'Timbers of Tropical Africa' in electronic and printed forms.	Access of the direct beneficiaries to the information	- Electronic and printed core output	**Stable working relationships with the hosting and distribution agencies**
3) To contribute to capacity building in Tropical Africa in the fields of scientific editing and wood anatomy.	Training activities	- Trained editors and wood scientists	**Stable working relationships with training agencies**
OUTPUT			
1) Supporting databases	Supporting 'Timber' databases completed	- Outputs 1.1-1.4: WORLDREFS **(40,000)**, AFRIREFS **(1500)**, EXPERTISE **(250)**, TGA **(1000)**, IMAGEFILE **(1760)**	**Forestry actors providing access to information**
	Networking in 47 target countries	- PROTA Offices **(10)** - Contactpersons **(25)**	**Political/social stability for a country's involvement**
2) PROTA Databank	Second half of databank 'Timbers' completed	- Outputs 1.5-1.6: **300** illustrated review articles (bilingual)	**Experienced editing staff available to PROTA**
3) Public access	Electronic and printed forms (production and distribution)	- Outputs 2.1-2.3: Webdatabase **(8000 visits per month)**, Handbook **(2000 copies)**, CD-ROM **(1000 copies)** - Utilization by direct beneficiaries	**Hosting/distribution agencies remaining committed to PROTA**
4) Capacity building	Author and Editor training	- Number of persons trained **(50 authors, 1 editor)**	**Staff, trainers and trainees available to PROTA**
	Wood Anatomy Workshop	- Number of persons trained **(10)**	

6. Workplan

Output / Activity	Partie responsible	year 1				year 2				year 3			
		1	2	3	4	1	2	3	4	1	2	3	4
1.1 WORLDREFS-TIMBERS													
1.1.1 Scanning international literature databases	**NOE**	x				x				x			
1.1.2 Making Worldrefs-Timbers available for editors/authors	**NOE**			x	x	x	x	x	x	x	x		
1.2 AFRIREFS-TIMBERS													
1.2.1 Manual scanning of 'grey' literature	**NOA/ROs/COs/CPs**	x	x	x	x	x	x	x	x	x	x		
1.2.2 Making Afrirefs-Timbers available for editors/authors	**NOA**			x	x	x	x	x	x	x	x		
1.3 EXPERTISE **& TGA**-TIMBERS													
1.3.1 Survey of experts **and intermediate target groups**	**NOA/ROs/CPs**	x	x			x	x						
1.3.2 Making Expertise-Timbers available for editors	**NOA**			x	x								
1.4 IMAGEFILE-TIMBERS													
1.4.1 Surveying and digitizing illustration materials	**NOE/NOA**	x	x	x	x	x	x	x	x	x	x		
1.5 TEXTFILE-TIMBERS													
1.5.1 Writing, editing and illustration process	**NOE/NOA**			x	x	x	x	x	x	x	x		
1.6 TRANSLATION-TIMBERS													
1.6.1 Translation process (English into French)	**NOE/CO France**					x	x	x	x	x	x		
2.1 WEBDATABASE-TIMBERS													
2.1.1 Insertion Textfile/Imagefile-Timbers in www.prota.org	**NOE/NOA**				x		x		x		x		
2.2 HANDBOOK-TIMBERS													
2.2.1 Desk-Top-Publishing 'Timbers 2', English edition	**NOE**										x		
2.2.2 Desk-Top-Publishing 'Bois d'œuvre 2', French edition	**NOE**											x	
2.2.3 Sponsored distribution in Tropical Africa (a.o. CTA; **TGA**)	**NOE/NOA**											x	
2.3 CD-TIMBERS													
2.3.1 Development CD-ROM 'Timbers 2' / 'Bois d'œuvre 2', bilingual	**NOE**											x	
2.3.2 Sponsored distribution in Tropical Africa (a.o. CTA, **TGA**)	**NOE/NOA**												x
3.1 INCREASED CAPACITY IN SCIENTIFIC WRITING AND EDITING													
3.1.1 Author training	**NOE/NOA**	x	x	x	x	x	x	x	x	x	x	x	x
3.1.2 Editor training	**NOE/NOA**	x	x	x	x	x	x	x	x	x	x	x	x
3.2 INCREASED CAPACITY IN WOOD ANATOMY													
3.2.1 Wood Anatomy Workshop	**NOA/NOE/RO Ghana**						x						
3.2.2 Provision of FORIG with equipment and literature	**NOA/NOE/RO Ghana**					x	x						

Note: NOE = Network Office Europe; NOA = Network Office Africa; ROs = Regional Offices; COs = Country Offices; CPs = Contact Persons.

7. Budget

Total costs for realizing PROTA 7(2) are US$ 1,053,635. These are lower than for PROTA 7(1) due to the fact that most infrastructure and networks are well in place.

The total amount requested from ITTO is, however, of the same magnitude as for PROTA 7(1), the reason being that the funding situation of the PROTA Foundation in 2009 is quite different from the funding situation in 2006 (presently much less funding from public sources like the Dutch Government). Moreover, because a considerable part of the activities is taking place in the EURO currency zone, the poor exchange rate of the US$ against the EURO further complicates the project's financing.

PROTA's own contribution to the project is considerable and is already for most part derived from general support contributions by the Dutch Government to PROTA. The extra specific contribution by the Dutch Development Cooperation Ministry to project PD 264/04 was in that sense an exception and certainly not the rule.

PROTA has tried hard to find co-financing from other sources (a.o. Worldbank's PROFOR) but without success. It is impossible to cut the costs of the project substantially without seriously affecting the quality of the output

Nevertheless, the PROTA contribution has been increased with US$ 25,000 (by taking charge of all French translation costs), and the amount requested from ITTO has been decreased with almost US$ 30,000.

The amount for ITTO Monitoring and Review costs (Item 81) has been slightly increased as suggested.

10 Project Personnel

The PROTA Foundation is strongly embedded in the 11 cooperating institutions. PROTA does not have its own employees, but only temporary staff seconded by the cooperating institutions to the programme as a function of the projects for which the PROTA Foundation has been able to procure contracts/financial means. Seconded staff are fully and only accountable to the PROTA Board of Trustees, and the host institutions are financially compensated for the manpower input for each project.

With respect to the height of salary unit costs, the PROTA Foundation completely adheres to the recruitment procedures, staff evaluations and salary schemes of the institutions that host the PROTA Offices. Salaries at the PROTA Network Office Africa are according to the ICRAF system, salaries at the PROTA Network Office Europe follow the Wageningen University tariff system, salaries at the PROTA Regional Office in Ghana are in accordance with FORIG rules and practices.

If some unit costs seem rather high, this is also a consequence of the present high value of the EUR against the US$ (1 EUR = US$ 1.40).

11 Network Office Europe (US$ 160,200)
Salary costs are charged to the project proportional to the time input in the project. The costs are charged to PROTA's own resources.

- General Editor Botany: 6 mm x US$ 9,500
- General Editor Agronomy: 6 mm x US$ 9,500
- Databank Manager: 6 mm x US$ 7,700

12 Network Office Africa (US$ 54,600)
Salary costs are charged to the project proportional to the time input in the project.

- Databank Manager: 6 mm x US$ 4,200
- General Editor Forestry: 6 mm x US$ 4,900

13 Coordinators NOE/NOA (US$ 269,700)
Allowance for the part-time General Project Coordinator (FORIG) and salary costs of a near full-time Editorial Coordinator.

- General Project Coordinator: 30 mm x 10% x US$ 4900
- Editorial Coordinator: 30 mm x US$ 8,500

20 Informal Network (Sub-contracts)

21 External Editors (US$ 102,000)
Salary costs of External Editors, one experienced (CIRAD) and one trainee (FORIG).
- CIRAD: 12 mm x US$ 8,500
- FORIG: trainee for 36 mm (see 32)

22 Authors/Artists (US$ 13,500)
Standard fees for Authors, Artists (drawings) on output basis.
- Authors: 250 pages x 1.5 persons x US$ 28
- Artists: 100 pieces x US$ 30

23 French Translation (**US$ 56,000**)
Standard fees for French translators on output basis.
- French translation: 400 pages x US$ 140

30 Duty travel

31 Editor Meetings (US$ 5,400)
Includes travel and living costs for 1 'Timber' Editor Meeting. 2 Air journeys averaged at US$ 1,800 and 10 DSA units averaged at US$ 180.

32 Trainees (US$ 72,000)
Includes travel and living costs for long-term training at Network Office Europe. 4 Air journeys averaged at US$ 1,800. Living costs for long-term training (36 manmonths) are estimated US$ 1,800 per month.

33 Wood Anatomy Workshop (US$ 60,000)
Lumpsum for Wood Anatomy Workshop (10 trainees, 4 expert guides, one-week duration, transport costs wood collections, equipment).

50 Consumable items
None (included in PROTA Management Costs)

60 Miscellaneous

61 Distribution Costs Publications (US$ 14,000)
Distribution costs are estimated at 1,000 copies of the printed output (500 English, 500 French) at the average cost of US$ 14, to satisfy the obligations towards donors, policy-makers, editors, authors, cooperators and contributing agencies.

62 Auditing (US$ 12,000)
Allocation for 3 annual audits.

63 Project Steering Committee (US$ 14,040)
3 Annual meetings. Duty travel estimated at 6 air journeys (averaged at US$ 1,800) and 18 DSA units (averaged at US$ 180).

70 Executing Agency Management Costs (US$ 125,856)
15% of the Overall project Budget by Activity (Table 1)

80 ITTO Monitoring/Evaluation and Administration Costs

81 Monitoring and Review Costs (US$ 40,000)
Includes ITTO attendance in the annual meetings of the Project Steering Committee.

82 Evaluation Costs (US$ 11,000)
2 Air journeys (at US$ 1,800), 10 DSA units (at US$ 180), 10 fee units (at US$ 500).

83 Programme Support Costs (**US$ 44,179**)
8% of ITTO part of the Budget by Activity + the Monitoring and Review Costs (Table 2).

The Project Volume 7(2) with a budget of US$ 1,023,849 is still open for funding, apart from a contribution of US$ 457,216 from PROTA's own resources.

Herewith a request is made to ITTO to consider funding of this project entitled: 'TIMBERS OF TROPICAL AFRICA Part 2', Group 7(2) within the PROTA Programme.
The total budget needed to realize the project objectives is US$ 596,419 (including ITTO Monitoring, Evaluation and Administration costs of US$ 95,179).

The request to ITTO is:

Budget deficit Volume 7(2): US$ 596,419

Table 1. OVERALL PROJECT BUDGET BY ACTIVITY (US$)

	BUDGET COMPONENTS							
OUTPUTS/ACTIVITIES + Non-Activity Based Expenses	**10. Project Personnel**	**20. Sub-Contracts**	**30. Duty Travel**	**40. Capital Items**	**50. Consum-able Items**	**60. Miscella-neous**	**Year**	**GRAND TOTAL**
OUTPUT 1.1 Worldrefs-Timbers								
Activity 1.1.1 Compilation	\						1, 2, 3	\
	7,700 (P)							7,700 (P)
Activity 1.1.2 Distribution	/						1, 2, 3	/
Subtotal	**7,700 (P)**							**7,700 (P)**
OUTPUT 1.2 Afrirefs-Timbers								
Activity 1.2.1 Compilation	8,400 (I)						1, 2, 3	8,400 (I)
Activity 1.2.2 Distribution	4,200 (I)						1, 2, 3	4,200 (I)
subtotal	**12,600 (I)**							**12,600 (I)**
OUTPUT 1.3 Expertise-Timbers								
Activity 1.3.1 Compilation	8,400 (I)						1, 2, 3	8,400 (I)
Activity 1.3.2 Distribution	4,200 (I)						1, 2, 3	4,200 (I)
subtotal	**12,600 (I)**							**12,600 (I)**
OUTPUT 1.4 Imagefile-Timbers								
Activity 1.4.1 Compilation	7,700 (P)						1, 2, 3	7,700 (P)
subtotal	**7,700 (P)**							**7,700 (P)**
OUTPUT 1.5 Textfile-Timbers								
Activity 1.5.1 Compilation	114,000 (P)	102,000 (P)					1, 2, 3	216,000 (P)
	299,100 (I)	13,500 (I)						312,600 (I)
subtotal	**114,000 (P)**	**102,000 (P)**						**216,000 (P)**
	299,100 (I)	**13,500 (I)**						**312,600 (I)**
OUTPUT 1.6 Translation-Timbers								
Activity 1.6.1 Translation		56,000 (P)					1,2, 3	56,000 (P)
subtotal		**56,000 (P)**						**56,000 (P)**
OUTPUT 2.1 Webdatabase-Timbers								
Activity 2.1.1 Incorporation	7,700 (P)						1,2,3	7,700 (P)
subtotal	**7,700 (P)**							**7,700 (P)**
OUTPUT 2.2 Handbook-Timbers								
Activity 2.2.1 DTP (English)	7,700 (P)						3	7,700 (P)
Activity 2.2.2 DTP (French)	7,700 (P)						3	7,700 (P)
Activity 2.2.3 Distribution	-					14,000 (P)	3	14,000 (P)
subtotal	**15,400 (P)**					**14,000 (P)**		**29,400 (P)**

	BUDGET COMPONENTS							
OUTPUTS/ACTIVITIES + Non-Activity Based Expenses	**10. Project Personnel**	**20. Sub-Contracts**	**30. Duty Travel**	**40. Capital Items**	**50. Consum-able Items**	**60. Miscella-neous**	**Year**	**GRAND TOTAL**
OUTPUT 2.3 CD-Timbers								
Activity 2.3.1 Production (English/ French)	\ 7,700 (P)						3	\ 7,700 (P)
Activity 2.3.2 Distribution	/						3	/
subtotal	**7,700 (P)**							**7,700 (P)**
OUTPUT 3.1 Increased capacity in writing and editing								
Activity 3.1.1 Author training			-					
Activity 3.2.1 Editor training			77,400 (I)				1, 2, 3	77,400 (I)
subtotal			**77,400 (I)**					**77,400 (I)**
OUTPUT 3.2 Increased capacity in wood anatomy								
Activity 3.2.1 Workshop			50,000 (I)				2	50,000 (I)
Activity 3.2.2 Physical facilities			10,000 (I)				2	10,000 (I)
subtotal			**60,000 (I)**					**60,000 (I)**
Activity-based subtotal	**484,500**	**171,500**	**137,400**			**14,000**		**807,400**
NON-ACTIVITY BASED EXPENSES						**26,040 (I)**	1, 2, 3	**26,040 (I)**
Subtotal (ITTO)	**324,300**	**13,500**	**137,400**			**26,040**		**501,240**
Subtotal (PROTA)	**160,200**	**158,000**	**-**			**14,000**		**332,200**
TOTAL	**484,500**	**171,500**	**137,400**			**40,040**		**833,440**

(I) = contribution of the ITTO

(P) = contribution of PROTA

Table 2. YEARLY BUDGET BY SOURCE – ITTO (US$)

Budget Components	**Total**	Year 1	Year 2	Year 3
10. Project personnel	**324,300**	108,100	108,100	108,100
20. Sub-contracts	**13,500**	4,500	4,500	4,500
30. Duty travel	**137,400**	29,400	84,000	24,000
40. Capital items	**-**	-	-	-
50. Consumable items	**-**	-	-	-
60. Miscellaneous	**26,040**	8,680	8,680	8,680
Subtotal 1	**501,240**	150,680	205,280	145,280
80. ITTO Monitoring/Evaluation and Administ. costs				
81. Monitoring and Review costs	**40,000**			
82. Evaluation Costs	**11,000**			
Subtotal 2	**552,240**			
83. Programme Support Costs (8% of subtotal 2)	**44,179**			
ITTO TOTAL	**596,419**			

Table 3. YEARLY BUDGET BY SOURCE – PROTA (US$)

Budget Components	**Total**	Year 1	Year 2	Year 3
10. Project personnel	**160,200**	45,700	45,700	68,800
20. Sub-contracts	**158,000**	52,667	52,667	52,666
30. Duty travel	**-**	-	-	-
40. Capital items	**-**	-	-	-
50. Consumable items	**-**	-	-	-
60. Miscellaneous	**14,000**	-	-	14,000
70. PROTA Management costs (15%)	**125,016**	41,672	41,672	41,672
PROTA / DUTCH GOVERNMENT TOTAL	**457,216**	140,039	140,039	177,138

Table 4. **CONSOLIDATED TOTAL AND YEARLY BUDGET - ITTO (US$)**

Budget Components		TOTAL	YEAR 1	YEAR 2	YEAR 3
10.	**Project Personnel (all national)**				
	11. Network Office Europe (NOE)	-	-	-	-
	12. Network Office Africa (NOA)	54,600	18,200	18,200	18,200
	13. NOE/NOA	269,700	89,900	89,900	89,900
	19. **Component Total**	**324,300**	**108,100**	**108,100**	**108,100**
20.	**Sub-contracts**				
	21. External Editors (CIRAD/FORIG)	-	-	-	-
	22. Authors/Artists	13,500	4,500	4,500	4,500
	23. French translation	-	-	-	-
	29. **Component Total**	**13,500**	**4,500**	**4,500**	**4,500**
30.	**Duty Travel (travel + allowances)**				
	31. Editor Meetings	5,400	5,400	-	-
	32. Trainees	72,000	24,000	24,000	24,000
	33. Wood Anatomy Workshop	60,000	-	60,000	-
	39. **Component Total**	**137,400**	**29,400**	**84,000**	**24,000**
40.	**Capital Items**				
	49. **Component Total**	**-**	**-**	**-**	**-**
50.	**Consumable Items**				
	59. **Component Total**	**-**			
60.	**Miscellaneous**				
	61. Distribution costs Publications	-	-	-	-
	62. Auditing	12,000	4,000	4,000	4,000
	63. Project Steering Committee	14,040	4,680	4,680	4,680
	69. **Component Total**	**26,040**	**8,680**	**8,680**	**8,680**
70.	**Executing Agency Management Costs (15%)**				
	79. **Component Total**	**-**	**-**	**-**	**-**
	SUBTOTAL	**501,240**	**150,680**	**205,280**	**145,280**
80.	**ITTO Monitoring, Evaluation & Administration**				
	81. Monitoring and Review Costs	**40,000**			
	82. Evaluation Costs	11,000			
	83. Program support costs (8%)	**44,179**			
	89. **Component Total**	**95,179**			
90.	Refund of Pre-Project Costs	-			
100	**GRAND TOTAL**	**596,419**			

Table 5. CONSOLIDATED TOTAL AND YEARLY BUDGET – PROTA (US$)

Budget Components		TOTAL	YEAR 1	YEAR 2	YEAR 3
10.	**Project Personnel (all national)**				
	11. Network Office Europe (NOE)	160,200	45,700	45,700	68,800
	12. Network Office Africa (NOA)	-	-	-	-
	13. NOE/NOA	-	-	-	-
	19. **Component Total**	**160,200**	**45,700**	**45,700**	**68,800**
20.	**Sub-contracts**				
	21. External Editors (CIRAD/FORIG)	102,000	34,000	34,000	34,000
	22. Authors/Artists	-	-	-	-
	23. French translation	56,000	18,667	18,667	18,666
	29. **Component Total**	**158,000**	**52,667**	**52,667**	**52,666**
30.	**Duty Travel (travel + allowances)**				
	31. Editor Meetings	-	-	-	-
	32. Trainees	-	-	-	-
	33. Wood Anatomy Workshop	-	-	-	-
	39. **Component Total**	**-**	**-**	**-**	**-**
40.	**Capital Items**				
	49. **Component Total**	**-**	**-**	**-**	**-**
50.	**Consumable Items**				
	59. **Component Total**	**-**	**-**	**-**	**-**
60.	**Miscellaneous**				
	61. Distribution costs Publications	14,000	-	-	14,000
	62. Auditing	-	-	-	-
	63. Project Steering Committee	-	-	-	-
	69. **Component Total**	**14,000**	**-**	**-**	**14,000**
70.	**Executing Agency Management Costs (15%)**				
	79. **Component Total**	**125,016**	**41,672**	**41,672**	**41,672**
	SUBTOTAL	**457,216**	**140,039**	**140,039**	**177,138**
80.	**ITTO Monitoring, Evaluation & Administration**				
	81. Monitoring and Review Costs	-			
	82. Evaluation Costs	-			
	83. Program support costs (8%)	-			
	89. **Component Total**	**-**			
90.	Refund of Pre-Project Costs	-			
100.	**GRAND TOTAL**	**457,216**			

PART III: OPERATIONAL ARRANGEMENTS

1. Management Structure (see Organogram)

PROTA is a Foundation under Dutch law, domiciled in Wageningen, with an international charter. It is an autonomous, non-profit, international agency, governed by a Board of Trustees. It is linked with and seeks further linkages with existing regional and international organizations. At present, the Board of Trustees is chaired by prof. dr. M.J. Kropff, Rector of Wageningen University (WU), and vice-chaired by Dr. Z.L.K. Magombo, Deputy Director of the National Herbarium and Botanic Gardens of Malawi (NHBGM).

The participating institutions of PROTA, which are represented in the Board of Trustees, are:

(1) Forestry Research Institute of Ghana (FORIG), Kumasi, Ghana; it accommodates the PROTA Regional Office for anglophone West Africa;
(2) Centre National de la Recherche Scientifique et Technologique (CENAREST), Libreville, Gabon; it hosts the PROTA Regional Office for Central Africa;
(3) Centre National de Semences Forestières (CNSF), Ouagadougou, Burkina Faso; it accommodates the PROTA Regional Office for francophone West Africa;
(4) Makerere University (MU), Kampala, Uganda; it hosts the PROTA Regional Office for East Africa;
(5) National Herbarium and Botanic Gardens of Malawi (NHBGM), Zomba, Malawi; it accommodates the PROTA regional Office for southern Africa;
(6) Parc Botanique et Zoologique de Tsimbazaza (PBZT), Antananarivo, Madagascar; it accommodates the PROTA Regional Office for the Indian Ocean Islands;
(7) Agropolis International (AGROPOLIS), Montpellier, France; it hosts the PROTA Country Office France;
(8) Royal Botanic Gardens Kew (RBGKEW), Kew, United Kingdom; it accommodates the PROTA Country Office UK;
(9) PROSEA Foundation (PROSEA), Bogor, Indonesia.
(10) World Agroforestry Centre (ICRAF), Nairobi, Kenya; it accommodates the PROTA Network Office Africa;
(11) Wageningen University (WU), Wageningen, the Netherlands; it hosts the PROTA Network Office Europe;

The Heads of the Network Office Africa and the Network Office Europe are the Chief Executive Officers, appointed by and accountable to the Board of Trustees.

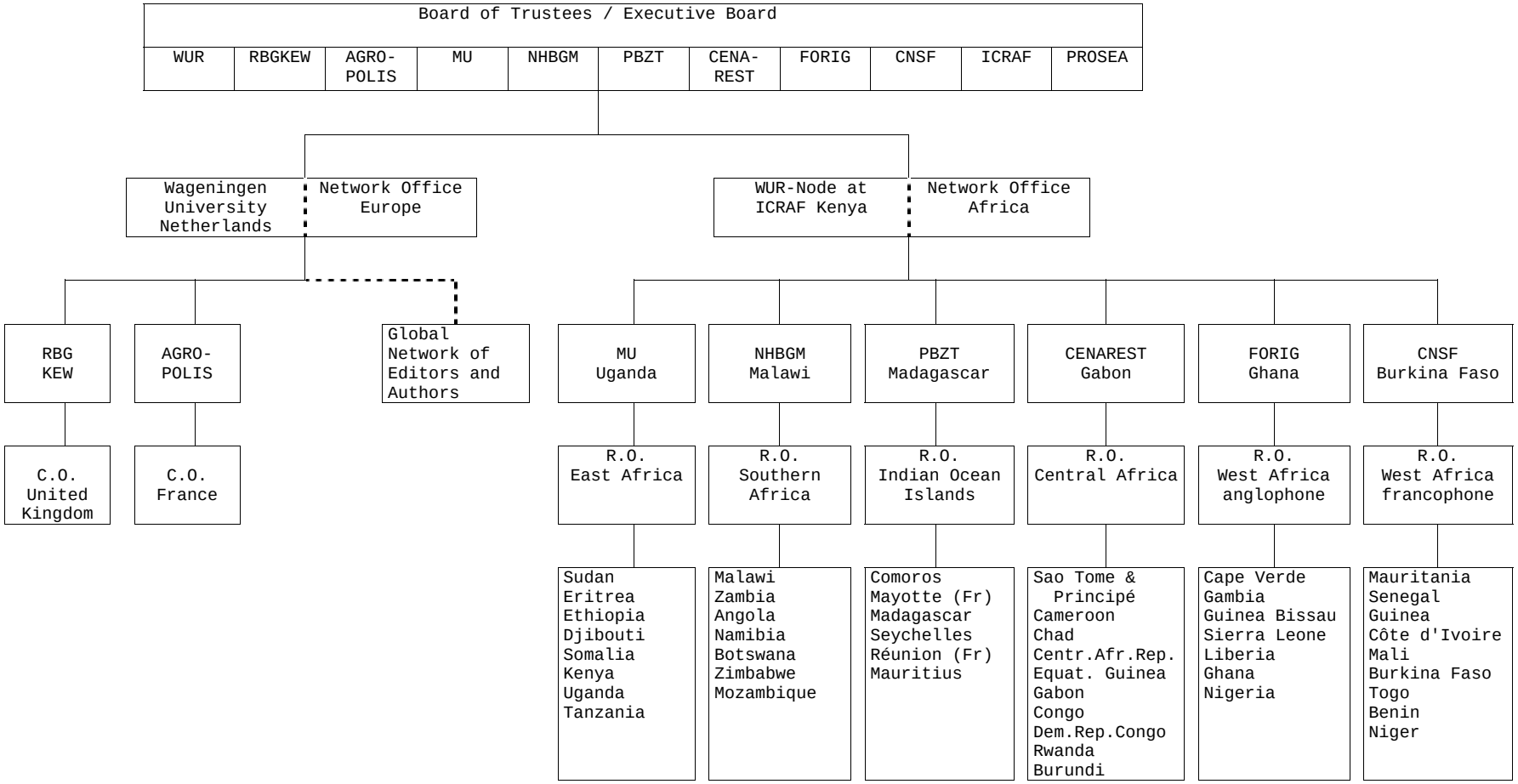
The PROTA Network Office Africa, hosted at ICRAF in Nairobi (Kenya) has presently a staff of 6 Kenyans and is headed by Mrs. Dr. E. Omino. It coordinates 6 Regional Offices at above-mentioned African host institutions. Staffing of the Regional Offices varies from 1 to 2 persons.

The objectives of the Regional Office Network are to collect literature data at the source, to ensure optimal participation of African institutions and scientists in the PROTA undertaking, and to disseminate PROTA products and derivatives.

The 6 Regional Offices will serve more and more as focal points for the National Research Systems and Regional Research Networks in their region, involving them in the information gathering and making the accumulated information widely available. The Regional Offices will coordinate a network of Contact Persons in the countries without a formal PROTA Office.

The PROTA Network Office Europe (formerly PROSEA Publication Office), with a staff of 7 persons and headed by Dr. J.S. Siemonsma, supervises the 2 Country Offices at above-mentioned European host institutions and is responsible for the editorial activities of the project, coordinating a large external network of editors and authors.

The proposed project will be undertaken within the larger PROTA Programme having its formal and informal networks firmly in place and operational. The PROTA Network in Tropical Africa will guarantee a smooth cooperation between institutes, authors and editors.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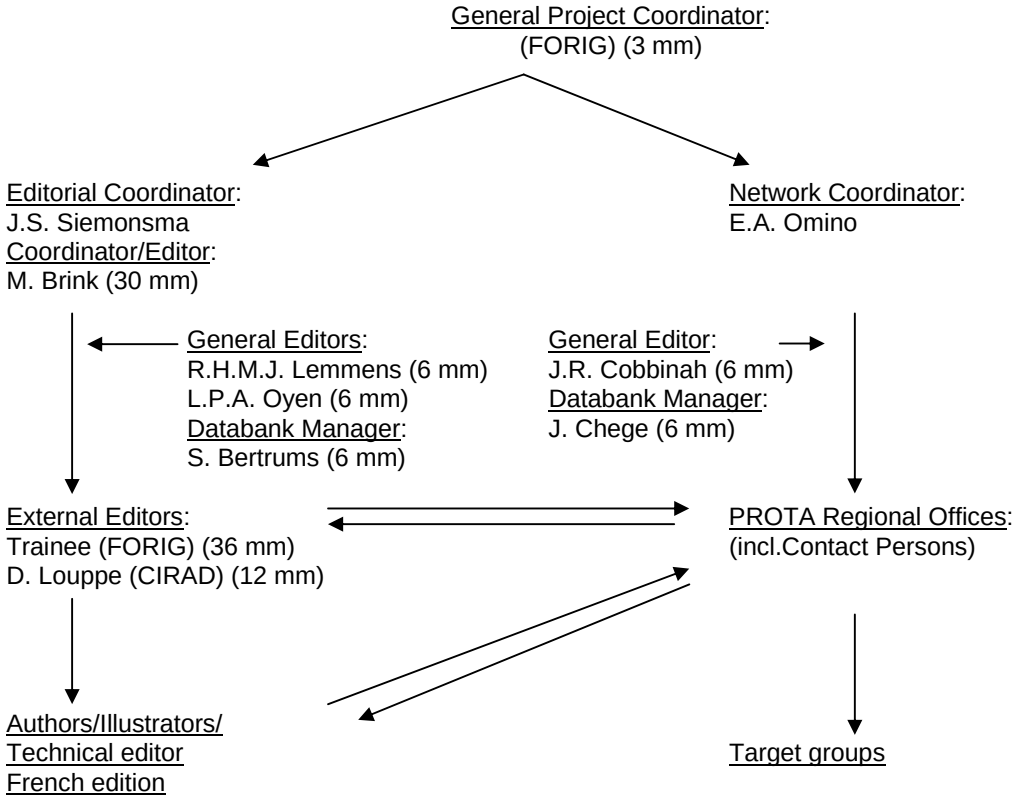
Senegal
Guinea
Côte d'Ivoire
Mali
Burkina Faso
Togo
Benin
Niger

Overall coordination of the project PROTA 7(2): 'Timbers 2' will be in the hands of the General Project Coordinator (to be appointed by FORIG), but the day-to-day activities are coordinated by the Editorial Coordinator (Dr. J.S. Siemonsma, PROTA Network Office Europe at Wageningen University) and the Network Coordinator (Mrs. Dr. E.A. Omino, PROTA Network Office Africa at ICRAF, Nairobi, Kenya).

This leads to the following Management Structure for the project:



The appointment of the General Project Coordinator is at the discretion of FORIG, and will be the Director (Dr. V. Agyeman) or his delegate.

All project positions exist already in the context of the overall PROTA programme. Key staff from this pool assigned to the 'Timbers' project (Editorial Coordinator, Network Coordinator, Coordinator/Editor, General Editors) are all very senior (Ph.D) and very experienced in project management and editorial/publication work (many of them through the PROSEA Programme).

The brief CVs of Siemonsma, Omino, Brink, Cobbinah, Lemmens, Oyen are attached in Annex 6.

Specific non-structural PROTA positions in this project are the external Editor positions 'Timbers' which are subcontracted to FORIG (in the form of a trainee) and CIRAD-Forêt (experienced Editor).

The TOR for the Editors 'Timbers' **(see also Annex 6)**:
The Editor positions 'Timbers' require long forestry research experience, preferably in tropical Africa, and proven experience in scientific publishing (Ph.D. or equivalent experience), in order to be able:

- to write scientifically accurate review articles on individual timber species, that on the basis of the world literature ('international' as well as 'grey') adequately represent the state of our knowledge in all relevant research disciplines, and with special attention for the geographic target area (tropical Africa);
- to take scientific responsibility for the realization of PROTA 7(2): 'Timbers 2', in the larger context of the whole PROTA series (for which the PROTA General Editors have overall responsibility). Per species, the best experts are identified and contracted as authors; the submitted manuscripts have to be scrutinized, corrected and supplemented by the editors. The editors coordinate an editorial team (associate editors) in which the most important relevant disciplines for the 'Timbers' are represented. Progress is regularly evaluated in international editor meetings.

During the project period a Project Steering Committee will be active according to ITTO regulations.

The Management strategy is in short:

The General Project Coordinator, the Editorial Coordinator and the Network Coordinator are responsible for the organizational aspects of the project.
The Editors and General Editors are responsible for the scientific quality of the Core Output, and they have to ensure African relevance and African ownership by involving many Africans in the writing and editing process.

Editorial process

- Appointment editors
- Finalization species list for PROTA 7(2) (see Annex 5)
- Call for authors for major species (100)
- Internal writer teams for minor species (470)
- Editing by Editors/General Editors
- Illustrations by artists
- Wood Anatomy Workshop for 100 IAWA descriptions and microphotographs
- Translation into French
- Publication as Webdatabase, book and CD-ROM

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C. Kouamé, Contact Person Côte d'Ivoire

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N.G. Nyirenda, Assistant Regional Officer
O. Oagile, Contact Person Botswana
V.K. Kawanga, Contact Person Zambia
S. Kativu, Contact Person Zimbabwe

Madagascar
S. Rapanarivo, Programme Leader
Mrs. M.E. Rahelivololona, Regional Officer
Mrs. A. Gurib-Fakim, Contact Person Mauritius
Mrs. S. Brillant, Contact Person Réunion

Network Office Africa, Nairobi, Kenya
Mrs. E.A. Omino, Head
Mrs. D.J. Borus, Dissemination Officer
Ms. J. Chege, Databank Manager
B.O. Obongoya, Programme Officer
Mrs. M.W. Kamanda, Secretary
D. Laur, Office Assistant/Driver

France
M. Chauvet, Programme leader
Mrs. C. Dorthe, Country Officer

United Kingdom
S.D. Davis, Programme leader
Ms. O. Grace, Country Officer

Network Office Europe, Wageningen, the Netherlands
J.S. Siemonsma, Head
L.P.A. Oyen, General Editor
R.H.M.J. Lemmens, General Editor
Ms. G.H. Schmelzer, Editor/Dissemination Officer
M. Brink, Editor
C.H. Bosch, Editor/Dissemination Officer
E.J. Bertrums, Database Manager
Mrs. A.D. Bosch-Jonkers, Secretary

Key Staff PROTA 7(2): 'Timbers 2'

General Project Coordinator
(to be appointed), FORIG, Ghana

Editorial Coordinator
J.S. Siemonsma, PROTA Netherlands

Network Coordinator
Mrs. E.A. Omino, PROTA Kenya

Internal Editor/Coordinator
M. Brink, PROTA Netherlands

General editors
J.R. Cobbinah, PROTA Ghana
R.H.M.J. Lemmens, PROTA Netherlands
L.P.A. Oyen, PROTA Netherlands

External Editors
(trainee to be identified), FORIG, Ghana
D. Louppe, CIRAD-Forêt, France

Illustrators
Iskak Syamsudin (drawings), PROSEA Indonesia
CIRAD-Forêt, France (microphotographs/drawings)
Africa Museum, Belgium (microphotographs)
CSIRO, Australia (microphotographs)

Technical editor French edition
M. Chauvet, PROTA France

2. Monitoring, reporting and evaluation

1) Monitoring

A Project Steering Committee is proposed with the following composition:

- Representative Government of Ghana (Chairman)
- Representative ITTO, Japan
- PROTA General Project Coordinator/Representative FORIG: (to be identified)
- PROTA Editorial Coordinator: J.S. Siemonsma
- PROTA Network Coordinator: Mrs. E.A. Omino
- PROTA Internal Editor/Coordinator: M. Brink
- Representatives donor countries

The Committee will meet once a year in Ghana. This means 3 meetings over a 3-year project period.

2) Project Progress Reports

Semi-annual reports will be submitted by PROTA to ITTO and the Government of the Republic of Ghana.

3) Project Completion Report

A final report shall be submitted within three months of completion of the Project, with due consideration of the provisions within the ITTO Project Cycle.

4) Audit

The Project will be subject to annual audits.

5) Evaluation

The Project will be subject to evaluations in accordance with ITTO procedures. The organization, terms of reference, and timing of the evaluation should be decided by ITTO, the Government of Ghana and PROTA in mutual consultation.

6) Copyrights/Acknowledgment

Copyrights are best vested in the PROTA Foundation, representing 7 African, 3 European and 1 South-East Asian institution. This will guarantee African ownership of the data (by simple majority).

As an 'information brokerage' programme, utilization of the PROTA information by third parties will be allowed and even actively pursued, as long as proper reference to the source is being made.

All 'Timbers 2' output will bear clear witness of the financial support by ITTO through a specific statement and inclusion of the logo.

3. Future operations and maintenance

PROTA is an ongoing programme, which started in 2000. Obligations and prerequisites, e.g. release of staff and provision of working space by the directly related institutions, have been fulfilled. Therefore, the project on PROTA 7(2): 'Timbers 2' can be directly implemented after approval by the ITTO Council. Work may overlap with the work on PROTA 7(1) or at least immediately follow PROTA 7(1) in order to profit maximally from the established infrastructure and networking.

By the year 2015, the whole PROTA compilation will be completed and information on all commodity groups (16) of useful plants (approx. 7,000) will have been entered into the PROTA databank. The African component of the PROTA Network is meant to become a permanent network to maintain and further develop the databank, to make updates, and to serve as a focal point for information on the plant resources of Tropical Africa. This in the longer term with resources from the participating institutions in Tropical Africa.

Specifically for the Commodity group PROTA 7(2): ‘Timbers 2’ it would not be too difficult and costly to add important new information or to make adjustments to new insights. The main body of the species reviews, however, has long-lasting validity.
(This is demonstrated by the fact that there are no indications yet for the need to update the PROSEA ‘Timber trees’ Handbooks, of which the first one was published almost 15 years ago).

PART IV: TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTA 1994 objectives

Primary goal of the proposed project is to compile up-to-date knowledge on the timbers of Tropical Africa and to publish it in electronic (Webdatabase, CD-ROM) as well as in printed forms (Handbook). Information on a wide variety of aspects (e.g. uses, trade, properties, anatomy, taxonomy, ecology, silviculture, genetic resources, prospects) will be presented. As such the project output will be an elementary tool and is in compliance with all of the ITTO Objectives laid down in the International Tropical Timber Agreement (ITTA 1994). Direct relationships can be pointed out with the following objectives:

Objective c. To contribute to the process of sustainable development.

Objective f. To promote and support research and development with a view of improving forest management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest values in timber-producing tropical forests.

Objective g. To develop and contribute towards mechanisms for the provision of new and additional financial resources and expertise needed to enhance the capacity of producing members to attain the objectives of this Agreement.

The proposed project complies with six of the criteria for project activities (ITTA, 1994):

Criterion b. Environmental and social effects: the comprehensive approach of the proposed project in complementing information on the timber aspects with ample attention for the by-products of the timber trees, contributes to a well-balanced use of natural forests. As such it contributes to conservation, but also to appropriate returns from sustainably managed forests for local communities.

Criterion c. Maintaining an appropriate geographical balance: the proposed project is a regional project (Tropical Africa) in which producer countries closely work together with consumer countries (European Union members).

Criterion d. Interests and characteristics of each of the developing producing regions: the information resulting from the proposed project will be an excellent complement to the 'Timber' project done by PROSEA for South-East Asia. It may serve as an example for a similar undertaking for South America.

Criterion e. Equitable distribution of resources among the priority fields: the proposed project is directly related to the areas of wood use, natural forest management, reforestation development, harvesting, and training of technical personnel and indirectly to the area of institutional framework and national planning.

Criterion f. Cost-effectiveness: the proposed project makes use of the existing infrastructure of the PROTA Programme with her operational network in Tropical Africa.

Criterion g. Avoid duplication of efforts: the PROTA programme, besides its formal network, has built up an extensive informal network of contributing institutions and specialists. Maximum use is made of existing expertise.

2. Compliance with ITTO Action Plan

Information on lesser-known timber species is basic for many aspects of the objectives formulated in the ITTO Action Plan (1990) and Priorities (e.g. for sustainable forest management, sustainable production of timber together with non-timber products, training, forest policy, rural development, etc.).

A priority ITTO objective related to the present project is to arrest the decline and degradation of tropical forests by incorporating sustainable management. All export of tropical timber products should originate ultimately from sustainably managed forests. Lesser-known timber species constitute up till now a largely unknown element in sustainable management. This situation will definitely be improved by the proposed

project as it will contribute to a better understanding of lesser-known timber species in the timber trade.

Another objective formulated in the ITTO Action Plan concerns the promotion of cooperation between institutes through networks. The PROTA Network in Tropical Africa and Europe, in which key research institutions are cooperating and are able to exchange information and experience, is operational and will be further developed within the project period.

The ITTO Action Plan is also directed to enhancing the ability of local communities, particularly those within or near the forest, to obtain appropriate returns and other benefits from sustainably managed forests. Regulated collection, cultivation and trade of by-products of the timber trees will provide employment and income to forest village communities. Up-to-date information on all aspects of timber species, as is the objective of this project, will greatly contribute to reach this goal.

Annex 1

PLANT RESOURCES OF TROPICAL AFRICA (PROTA)

INSTRUCTIONS FOR AUTHORS AND EDITORS

(including Code of Conduct regarding TK and IPR)

January 2006

CODE OF CONDUCT

Traditional Knowledge (TK)

Traditional knowledge refers to the knowledge, innovations and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of crops and animal breeds. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, forestry and post-harvest technologies (Ref.: CBD).

Intellectual Property Rights (IPR)

Intellectual Property Rights regarding Traditional Knowledge are gradually internationally acknowledged. Many widely used products, such as plant-based medicines and cosmetics, agricultural and non-wood forest products as well as handicraft are derived from or based on traditional knowledge. Third party use of TK is governed by CBD guidelines on Access and Benefit Sharing. The issue of IPR is strongly related to patent law.

xxxxxxxxxxxxx

The PROTA Foundation will voluntarily apply the highest possible standards of compliance with the spirit of evolving norms regarding the protection of traditional knowledge (TK) and intellectual property rights (IPR).

PROTA aims to make a synthesis of published information, occasionally complemented with unpublished information covered by ‘prior informed consent’. A published document is defined as a document that can be accessed by the public as soft or hard copy through sale, rental, lease, lending or other transfer of ownership. PROTA authors and editors have the obligation to handle published information with care and make sure that the sources for their statements in the review articles appear in the References. ‘Reproducing’ literally extended parts of source literature in the PROTA review articles is not in accordance with normal scientific practice and may violate copyrights.

Unpublished information is defined as information that has not been made public and is usually difficult to find. A typical example is collector’s notes on herbarium sheets. It includes also personal knowledge (of uncertain origin) and information obtained by

personal communication. PROTA authors and editors should not use unpublished information for their review articles, unless there is 'prior informed consent' from the information owner (as evidenced by a written statement allowing its use for PROTA aims).

PROTA supporting databases

The references in the database WORLDREFS all concern published information, the references in the database AFRIREFS concern 'grey' literature. The term 'grey' refers to *limited availability and distribution.* 'Grey' literature can thus be published information as well as unpublished information. PROTA will ensure that unpublished information in the AFRIREFS database is covered by 'prior informed consent' from the information holders.

General instruction to authors and editors:

- Make sure that the PROTA review article under your responsibility is based on published information and make sure the sources are included in the References.
- When you come across an unpublished paper regarding uses of a plant by a local community, and the paper clearly describes the local knowledge holders as the source of that information, then reproduction for the PROTA review article is allowed, but only with 'prior informed consent' from the writer of the unpublished paper (as evidenced by a written statement allowing its use for PROTA aims).
- 'Alarms should start ringing' when you come across an unpublished paper regarding uses of a plant by a local community, but the paper does not describe any local knowledge holder as the source of that information. 'Alarms should ring louder' when the information appears to be of a particularly sensitive nature. In such cases the PROTA authors and editors are instructed to contact PROTA Management for guidance.
- PROTA may then decide simply not to reproduce the information, or to approach the writer of the original report or to contact the community to whom the information pertains. In this way PROTA might contribute to proper documentation of TK and IPR for appropriate Access and Benefit Sharing.

GENERAL REMARKS

a. As the number of plant resources to be treated in the PROTA Databank and Handbook is about 7,000, the length of contributions is limited and varies from 1!5 pages in print (750!3,750 words excluding the literature references). Please stick to the specific length indicated in the invitation letter (it reflects the relative importance of the species).

b. PROTA covers the whole of Tropical Africa. A Map of Tropical Africa with the 47 countries/territories involved is attached to these instructions. Please follow the indicated spelling of country names.

c. Manuscripts have to be submitted in English and will be edited in English. Although English is preferred, francophone authors may submit in French, but editing takes place in English. French editions of PROTA products will be made. They will be verbatim translations of the English editions.

d. Use the same captions of text sections as in these instructions.

e. No tables are allowed in the text. The data should be written out in full.

f. Well-known plants may be referred to in the text by their English vernacular name.

g. Avoid very specialist terms. The work is intended for a broad public including extension workers, teachers and students.

h. Restrict the use of abbreviations to generally accepted terms.

i. Mention ranges if relevant and try to avoid the use of circa, about, approximately, etc.

j. Please include clear photocopies of potential illustrations of the habit and botanical characteristics; if possible, include also illustrations of plant parts used. Add all data about the source of the provided illustrations!

k. High-quality photographs/slides of the species, which you want to make available (in print or electronically) for the PROTA Photfile database, are most welcome. For each image or set of images from the same source, a 'limited use contract' (form attached) has to be made up.

l. To facilitate editorial work, make reference to your sources of information wherever possible, but at least at the end of each text section. Put the author(s) and year of publication of the relevant reference between brackets in the text, and make sure that the complete data of the reference are in your literature list at the end of your manuscript. However, the editors decide whether a reference will be maintained or omitted in the list of references. Please send photocopies of important source material, especially less-accessible 'grey' literature (e.g. project reports, student thesis).

m. Please be complete and very accurate in giving your literature references. Some examples are given under text section 27.

n. For some pieces of specific information you are advised to consult the following websites:

Germplasm collections	http://singer.grinfo.net/index.php
Production/trade data	apps.fao.org
Directory for Botany	www.botany.net/IDB
Intern. Plant Name Index	www.ipni.org
Chromosome numbers a.o.	mobot.mobot.org/W3T/Search/vast.html
Species (semi-)arid regions	www.rbgkew.org.uk/ceb/sepasal (registration required)
Mansfeld database	mansfeld.ipk-gatersleben.de/mansfeld/Query.htm
Collection of Kew Databases	www.rbgkew.org.uk/searchepic/main

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INSTRUCTIONS PER TEXT SECTION

<1> **Species name**
Correct scientific name with author.

<2> **Protologue**
Cite the original publication of the correct name. Can be left for PROTA taxonomists if not known.

<3> **Family name**

<4> **Chromosome number**
2*n* = ...

<5> **Synonyms**
Cite the important synonyms with author and year of publication, especially the ones which are often encountered in non-taxonomic literature.

<6> **Vernacular names**
Mention the most important vernacular names, at the most 3 names per language. English (En), French (Fr), Portuguese (Po), Swahili (Sw).

<7> **Origin and geographic distribution**
Treat in this order: origin of the species, natural and planted distribution over the world, idem within Tropical Africa. For spelling of country names, consult the Map of Tropical Africa for PROTA, for other names the Times Atlas of the World. For accurate indication, the distribution can be accompanied by the country numbers in the same map, e.g. 'distributed along the coast from Senegal to Nigeria [Countries 3,4,5,6,7,8,9,12,13,14,16]'. Also specify terms like West Africa, East Africa with country numbers.

<8> **Uses**
In PROTA, the following main 'Use groups' or 'Commodity groups' are distinguished:

PROTA 1: Cereals and pulses
PROTA 2: Vegetables
PROTA 3: Dyes and tannins
PROTA 4: Ornamentals
PROTA 5: Forages
PROTA 6: Fruits
PROTA 7: Timbers
PROTA 8: Carbohydrates
PROTA 9: Auxiliary plants
PROTA 10: Fuel plants
PROTA 11: Medicinal plants
PROTA 12: Spices and condiments
PROTA 13: Essential oils and exudates
PROTA 14: Vegetable oils
PROTA 15: Stimulants
PROTA 16: Fibres

Describe concisely not only the use for which the plant is best known, but all uses in the PROTA area, and try to give for each usage the number of the Commodity group between brackets, e.g. '.... worldwide the young immature fruits are consumed as a vegetable [PROTA 2]. The leaves are sometimes used in western Africa as spinach [PROTA 2] or cattle feed [PROTA 5], the stem fibres for cord [PROTA 16], the plant mucilages for medical purposes [PROTA 11], and the seeds as a substitute for coffee [PROTA 15]'.
If the plant is also prominent outside Tropical Africa, indicate the uses in other areas of major importance too. Mention the plant parts which are used and the type of preparation.

<9> **Production and international trade**

If possible, use only representative data of the 1990s and 2000s, with averages for the last 5 years. Mention world production (t/year; m^3/year), world area under cultivation or standing stock (ha; m^3). Mention for Tropical Africa, its subregions or relevant countries the total area cultivated or standing stock, total production, local consumption or utilization, amount exported, ratio production by smallholders and by estates. If a commodity is traded internationally, mention major sources and destinations and world price (US$/t; US$/m^3).

<10> **Properties**

State all properties relevant to the respective uses.

Describe all relevant constituents of the plant parts and preparations used. Use the most accepted names for compounds. Give the chemical structure of the active compounds when known. Mention also constituent groups (inorganic and organic) such as carbohydrates, alkaloids, fibres and ash, and mention the contents of these constituent groups when available. Use the standardized figures from pharmacopoeias if possible. State usable portion as fraction of the plant part used or whole plant.

For the nutritional composition, use preferably well-known reference works like:

- UK Food Standards Agency, 2001. McCance and Widdowson's the composition of foods. 6th Edition. Royal Society of Chemistry, London, United Kingdom. 500 pp.
- USDA, 2003. USDA National Nutrient Database for Standard Reference, Release 16. Internet: www.nal.usda.gov/fnic/foodcomp
- Leung, W.-T.W., Busson, F. & Jardin, C., 1968. Food composition table for use in Africa. FAO, Rome, Italy. 306 pp. Internet: www.fao.org/docrep/003/x6877e/X6877E00.htm
- West, C.E., Pepping, F. & Temaliwa, C.R. (Editors), 1988. The composition of foods commonly eaten in East Africa. Wageningen Agricultural University, Netherlands. 84 pp.

In all cases clearly state the source of your data. Give composition in g/100 g fresh or dry product, in particular for important nutritive components such as water, protein, fat, carbohydrate, fibre, ash, vitamins and the energy value (kJ/100g). Give this information within the context of specific uses. The pharmacological and biological activity, biomedical uses and toxicity should be mentioned if data are available.

In the case of timbers, give data on the following characteristics:

- *wood appearance*: heartwood (width, colour), sapwood (width, colour), demarcation of heartwood and sapwood, grain, texture, lustre, presence or absence of growth rings;
- *physical properties*: general characteristics (softwood; heavy, medium-weight, light-weight hardwood), density at a certain moisture content, seasoning and kiln-drying properties, rates of shrinkage from green to a certain moisture content (radial and tangential), movement in service;
- *mechanical properties*: modulus of rupture, modulus of elasticity, compression parallel and perpendicular to grain, shear (all in N/mm^2 (=MPa) at a certain moisture content), cleavage (in N/mm), Janka side and end hardness (in N);
- *working properties*: workability (sawing, planing, nailing, blunting, gluing, steam bending, polishing/varnishing, painting, sanding), stability, Si-content, suitability for plywood and veneer (peeling properties) and hardboard;
- *durability and permeability*: durability (very durable, durable, moderately durable, non-durable), permeability and treatability with preservatives (treatable, moderately treatable, resistant, highly resistant).

If possible give information on the chemical contents of the wood in relation to pulp production.

In the case of exudates, indicate the type, colour, hardness, and solubility, and describe relevant constituents with molecular weight.

<11> **Adulterations and substitutes**

In relation to specific uses or properties, mention other species or products which are used as adulterant or substitute of this species (not the opposite; in case this species is used as an adulterant or substitute of another species, mention this in the section 'Uses').

<12> **Description**

Make a botanical description. Use the following sequence for the botanical description: habit, root, stem, bark surface, crown, branch, leaf, inflorescence, flower, pedicel, calyx, corolla, androecium, gynoecium, fruit, seed, seedling. Be concise, but indicate ranges of variation.

Make appropriate use of the main African floras (Flora of West Tropical Africa, Flora of Tropical East Africa, Flora Zambesiaca, Flora of Ethiopia, Flore du Gabon, Flore du Cameroun, Flore d'Afrique

Centrale, Flore de Madagascar et des Comores).

<13> **Other botanical information**
Discuss sub-classifications (subspecies, varieties, cultivar groups) with characteristics and nomenclature. Give some relevant data on the genus to which the species belongs (e.g. estimated number of species). Mention different phenotypes or genotypes, when they are relevant in view of different chemical composition or uses. Discuss subjects that cannot be put in any of the other paragraphs.

<14> **Anatomy**
Describe the anatomy of plant parts if relevant (e.g. for fibre plants).

For timbers, anatomical characters do not need to be described by the authors as these characters will be described in a standardized way (using IAWA codes) during the PROTA Wood Anatomy Workshop in 2007.

<15> **Growth and development**
Describe the sequence of germination, vegetative growth (including seedling growth), diameter and height increment, generative development (flower initiation, flowering, pollination, fruiting, maturation and mode of natural dispersal) with emphasis on turning points in the developmental path. For perennial plants add: phenological cycle, longevity (plant, leaves), functioning of shoots (dimorphism, alternate flowering/fruiting).

<16> **Ecology**
State climatic factors such as daylength, temperature (EC), water requirement (mm/year, distribution), relative humidity (%), altitude (m).
Mention favourable soil types; indicate physical and chemical limitations.
For wild plants indicate the type of vegetation.

<17> **Propagation and planting**
Mention methods of propagation (generative, vegetative, *in vitro*). Mention seed weight if seed is used for propagation. Discuss requirements for storage, dormancy-breaking, methods of propagation, sowing, seed-bed preparation and maintenance, selection of material to be planted, preparation of planting stock, land preparation; mention plant spacing and cropping system (e.g. sole cropping, intercropping, agroforestry).

<18> ***In vitro* production of active compounds**
If relevant, mention methods and procedures used for *in vitro* production of compounds.

<19> **Management**
Mention weeding, staking, pruning, thinning, irrigation, organic and chemical fertilizers, green manure, mulching, mechanization, crop rotations.
In the case of timbers, mention silvicultural systems, number of trees per hectare in natural stands, and treatment, inventory, planning and cutting regulation of natural stands as well as plantations.

<20> **Diseases and pests**
Describe major diseases, pests and noxious weeds and indicate extent of damage and control measures. Scientific names of causal agents of diseases and pests can be mentioned without author names.

<21> **Harvesting**
Mention time or period of harvesting and harvesting methods.

<22> **Yield**
Give average yield (and range) (t/ha; m^3/ha; kg/plant) in Tropical Africa and compare with world data. If possible, give also maximum yield. Give the yield of important constituents or products (mg/kg of fresh material).

<23> **Handling after harvest**
Treat transport from the harvesting site, processing to primary products, grading, storage and packing.

Mention information on industrial standardization of products if available.

<24> **Genetic resources**
Mention *in situ* and *ex situ* conservation. Indicate whether the species is threatened with extinction or genetic erosion. Mention existing germplasm collections.

<25> **Breeding**
Mention main selection and breeding objectives and activities, and important cultivars with their characteristics. Mention characteristics sought in available wild relatives. Discuss relevant biotechnology (e.g. molecular markers, DNA fingerprinting).

<26> **Prospects**
Give in a few sentences a synopsis of your manuscript with respect to expected developments for the future with reasons why. If prospects are good, recommend research priorities related to major constraints.

<27> **Literature**
Make a subdivision in 'Major references' (maximum of 10), 'Other references' (maximum of 20) and 'Sources of illustrations'. List all literature alphabetically per subgroup by author and year. Start a new line for every new reference. Do not use abbreviations for book titles, periodicals, and names of publishers. Present complete information about authors, editors, titles, edition, volumes, year of publication, publisher, place and country of publishing, first and last page number, and also total number of pages for books. See examples below:

Book:
Ochse, J.J. & Bakhuizen van den Brink, R.C., 1980. Vegetables of the Dutch East Indies. 3rd English edition. Asher & Co., Amsterdam, Netherlands. 1016 pp.

Authored chapter in an edited book:
Hemmingway, J.S., 1995. Mustards. In: Smartt, J. & Simmonds, N.W. (Editors). Evolution of crop plants. 2nd Edition. Longman Scientific & Technical, Harlow, United Kingdom. pp. 82!86.

Journal article:
Pino, J.A., Rosado, A. & Fuentes, V., 2000. Volatile flavor compounds from Allium fistulosum L. Journal of Essential Oil Research 12: 553!555.

<28> **Author(s)**
Name(s) and full adress(es) of the author(s) of the paper. Family names in full, given names abbreviated.

January 2006.

ANNEX 2

DOCUMENTATION PROTA-COL

(For Regional Office staff, Country Office staff and Contact Persons)

Introduction

Collection of 'grey' literature forms a core activity of the Regional and Country Offices in the PROTA programme. The 'grey' literature collected by various Regional and Country Offices, including Contact Countries is compiled and sent to Network Office Africa, Nairobi, where it is merged to form the contents of the AFRIREFS database. Grey literature is therefore synonymous to AFRIREFS in the PROTA context.

Definition of 'Grey Literature'

The term 'grey' literature, also known as non-conventional literature or "semi-published" literature describes any document, regardless of medium, that is *not readily available* through normal bookselling and distribution channels and which is therefore difficult to identify and obtain. The word 'grey' describes the *limited availability and distribution* of documents.

The Fourth International Conference on Grey Literature in Washington, DC, in October 1999 defined 'grey' literature as follows: "That which is produced on all levels of government, academics, business and industry in print and electronic formats, but *which is not controlled by commercial publishers."*

Grey print literature is primarily characterized by limited, restricted target audience, its small runs, variable standards of editing and production, specialized nature and originator/source.

Publication Status of 'grey' Literature

Grey literature can be published or unpublished, or later published after a lengthy delay.

What is publishing?

This is the activity of putting information in the public arena. Traditionally, the term referred to distribution of printed works such as books and newspapers. With the advent of digital information systems and the Internet, the scope of publishing has expanded to include web sites, and other forms of new media (http://en.wikipedia.org/wiki/Publishing)

What is published information?

This is information that is put into print and disseminated to the public. The media of publication may be electronic or hard copy.

It is fundamentally information that has gone through reviewing, editing and printing process, and is made available to the wider public through multiple copies, usually, but not always in printed form.

A published document can be accessed by the public as soft or hard copy through sale or other transfer of ownership, or by rental, lease, or lending. “Fair use’’ in reproduction, citation, displaying and distribution needs to be observed.

What is unpublished information?

"Unpublished information" means any information not disseminated to the public.

It is also defined as any text (written on paper or stored in electronic form or audiovisual recording) which is related to the activities of an organization and kept by it, but which has not been made public, hence constitutes information that is not publicized (not in public domain).

Unpublished information can be difficult to find, although, with developments in image software, material is now appearing on the World Wide Web (www).

Copyright of unpublished information

Unpublished information enjoys stringent copyright/intellectual property rights protection; hence reproduction, citation, distribution and / or broadcast must be requested in writing from the custodian and consent given in writing. It should also be understood that custody of unpublished material does not mean owning copyright.

Typical Examples of unpublished information

- Theses/dissertations, project reports, research papers, faculty papers, minutes of meetings, lab reports and film posters.
- Letters, diaries, manuscripts, oral histories, photographs, birth, death and marriage records and electoral rolls, title deeds to property.
- The minutes of meetings of trade unions, political parties, local councils, ratepayers associations etc.
- Company information, including memos, architects' drawings, lab reports and marketing plans.
- Court transcripts, legal case notes and files.

GENERAL INSTRUCTIONS TO ROs/COs and Contact Persons

1. **Collection of grey literature:** All Regional/Country officers and Contact Persons should ensure that they obtain prior informed consent from institutions where they are collecting “grey’ literature, whether the information is published or not. The authority to collect should be requested and granted in written and not verbal form.
2. **Thesis and dissertations (In the French system Memoirs etc.):** Regional officers or Contact Persons must ensure that they have a written consent in form of a letter or an MoU from the University faculty or department where they are collecting theses. These and dissertations should not be collected unless prior informed consent is obtained from the relevant University authority.
3. **Published information:** Can be collected without any problem. However as indicated in (1) it is always appropriate to get permission for use of library/collection of information in an institution.

4. **Unpublished research work and private documents:** All 'grey' literature collected should be in form of a bound report which is already in the public domain like a library. Unpublished research work found in a scientist's office for example and private documents belonging to an institution should not be collected whatsoever.

Examples of 'grey' literature in the AFRIREFS database

A survey of the types of grey literature currently being collected by PROTA includes the following:

1. **Books:** All books are published and always indicate the publishers, City, Country and ISBN number. Examples are:

    a) Beentje, H. (1994). Kenya trees shrubs and lianas. National museums of Kenya, Nairobi, Kenya
    b) Kokwaro, J.O (1999). Medicinal plants of East Africa. East African literature bureau, Nairobi, Kenya

2. **International Journals:** All international journals are published. Examples include:

    a) Martin, J. D. (1940) The Baikiaea forests of Northern Rhodesia. **Empire Forestry Journal** 19: 8-18.
    b) Morton, J.F. & Voss, G.L.(1997). The argan tree (*Argania sideroxylon*, Sapotaceae), a desert source of edible oil. **Economic Botany** 41(2): 221-234
    c) Tripathi, B., Sharma, M., Upadhyay, B.N., Shukla, R.C. and Suresh Kumar, D. (1997). Antioxidant properties *of Rubia cordifolia*. **British Journal of Phytotherapy** 4 (4): 163-167.

3. **African Journals.** All African journals are published. Examples include:

    a) Musoke, C., Rubaihayo, P.R. & Magambo, M. (1999). Gamma rays and ethylmethane sulphonate in vitro induced fusarium with resistant mutants in bananas. **African Crop Science Journal** 7(4): 313-320.
    b) Jumah, A. (1997). Studies on morphology of pollen grains of the leguminosae-the Mimosoideae. **Ghana Journal of Science** (Special food and agriculture edition) 31-36 1991-1996): 29-35
    c) Ishengoma, R.C., Gillah, P.K. & Kimu, M.M.(1994). Properties of juvenile and nature wood of *cupressus lusitanica* grown in Kawetire forest plantation, Mbeya-Tanzania. **East African Agricultural and Forestry Journal** 59(4): 287-292.

4. **Proceedings of: congresses, conferences, workshops, symposia, and seminars:** Most proceedings are published although a few may be unpublished, depending on the scope of the meeting (private seminar), in this case however the material would not be released into the public domain. Examples are:

a) Alacho, O.F. (1997). Effect of desprouting on potato tuber yield and yield component. In Proceedings of the 4th Triennial **Congress** of The African Potato Association held in Pretoria, South Africa, 23-28, February 1997. Pp. 89.

b) T.U Esekhade, J.R.Orimoloye I.K. Ugwa and S.O. Idoko. (2001). Potentials of multiple cropping in young rubber plantation. In Proceedings of African crop science **Conference** proceedings; Vol 5 Pp 991-998 Lagos- Nigeria Part 2.
c) Mwanga, R.O.M. & Otim- Nape, W. (1992). Collection, conservation and utilization of root and Tuber crops. In Proceedings of the first National **Workshop** in Genetic Resources Conservation and Utilisation, Mukono, Uganda. Pp139 – 150
d) Rakotondravony, D. & Volaharisolo, F. (2000). L'utilisation des produits naturels en protection des végétaux à Madagascar: test de plantes toxiques et de produits d'ingestion à actions toxiques rodenticides. In proceedings of **Symposium** national du 29 Juin au 03 juillet 1998 à Antananarivo, Madagascar
e) Yassin, A.M., Aminel, E.M. & Decker H. (1992). The impact of plant-parasitic nematodes on major food crops in the Sudan. In Proceedings of National Organic Fertilizer **Seminar**, March 26 –27, 1991, Kaduna, Nigeria Pp. 17-18.

5. **Theses and dissertations:** All theses and dissertations in Africa are not published. Examples are:

1. BSc-
    - Kufasi, S. (2003. Indigenous forest management practices on communal and private lands: A case study of Mkwinda EPA in Lilongwe West RDP. BSc. Agriculture (Agroforestry), Bunda College, University of Malawi.
    - Siddle, B.W. (1995). Growth models of Julbernadia paniculata (Benth) Troupin. Thesis for BSc degree submitted to the University of Aberdeen.
2. MSc-
    - Van der Bergh, C. (1993). Fuel wood availability and women's work in the dry season. MSc degree report, Agricultural University Wageningen, the Netherlands.
    - Ssebukyu, E.K. (2002). Fungi and Aflatoxin in maize grains from some districts of Uganda. MSc (Botany), Botany Department, Faculty of Science Makerere University, Kampala, Uganda.
3. PhD-
    - Akanvou, L.M.A.K. (1998*).* Inheritance of resistance to Striga hermonthica (Del) Benth. in an open pollinated maize population, TZL composite -1 C1. PhD. Crop Science (Breeding) degree, Department of Crop Science, Faculty of Agriculture, University of Ghana, Accra, Ghana.
    - Chilima, C.Z. (1999). Aspects of the ecology of *Pineus boerneri* Annand (Homoptera: Adelgidae) in Malawi. PhD degree thesis. University of London, UK.

6. **Newsletters:** Most regular newsletters are published. Examples are:

1. Brewbaker, J.I. & Styles, B.K. (1982). Economically important nitrogen fixing tree species. IBPGR Regional Committee for Southeast Asia Newsletter 6(4): 8-10.
2. Adoyo, F., Mukalama, J.B. & Enyola, M. (1997) Using *Tithonia* concoctions for termite control in Busia district Kenya. LEISA, ILEIA Newsletter, 13 (4): 24-25.
3. Latham, P. (1999). Edible caterpillars and their food plants in Bas Congo, Democratic Republic of Congo. Botanic Gardens Conservation News 3 (3): 40-42

7. Annual Reports: Most annual reports are published. Examples are:

a) Annual Report 1987 Oxford Forestry Institute Oxford UK

b) Annual Report 1993-94 Season Chitedze Agricultural Research Station Lilongwe Malawi
c) Annual Report Achievements in Agroforestry Research and Development in Malawi
d) Annual Report Cocoa Research Institute of Ghana 1985

8. **Others: Training series; Technical Bulletins; Technical reports, working papers; Manuals; Guidelines; Reports; Progress reports and Research papers**. Most of the above cited are published. A few like the *progress reports* may be unpublished. In this case, they would not be released to a public domain like a library.

a) Arum, G. (1989) Baobab: *Adansonia digitata*. KENGO, **Indigenous Trees Training Serie**s.
b) Gyimah, A. (1984). Storage of *Mansonia altissima* seeds. **Technical Bulletin** of the Forest Products Research Institute 4: 16-20
c) Aboagye, L.M. & Bennett-Lartey, S.O. (2001). Evaluation of Acquisition and distribution of cereal, legume and vegetable genetic. **Technical Report** Plant Genetic Resources Centre
d) Cunningham, A.B. & Mbenkum, F.T. (1993). Sustainability of harvesting *Prunus africana* bark in Cameroon: a medicinal plant in international trade. People and plants **working paper 2**, UNESCO, Paris, France
e) Biotechnology trust Africa (2001). **Guidelines** for tissue culture citrus cultivation. Biotechnology trust Africa, Nairobi, Kenya.
f) Jahn, SAA. (1981). Traditional water purification in tropical developing countries - existing methods and potential application. **Manual no. 117**. GTZ, Eschborn, Germany.
g) Cunningham, A.B. (1992). People, park and plant use: Research and recommendation for Multiple-Use zones and development alternatives around Bwindi Impenetrable National Park, Uganda. **Report** prepared for CARE - International, Kampala, Uganda
h) Kanzikwera, R.C., Osiru, D.S.O., Kidane-Mariam, Baghsari, A. & Tenywa, J.S. (1994). Development and dissemination of true potato seed technology in Uganda. **Progress report** for period January – December 1994. Production and Dissemination of true potato seed in Uganda. Department of Crop Science, Makerere University, Kampala, Uganda.
i) Msonthi, J.D. (1984). The use of Salix subserrata Wild (Salicaceae) Mdolondodzi, Mphungabwi-Chewa in the treatment of nightmares in children. **Research Paper**, Chancellor College, Malawi.

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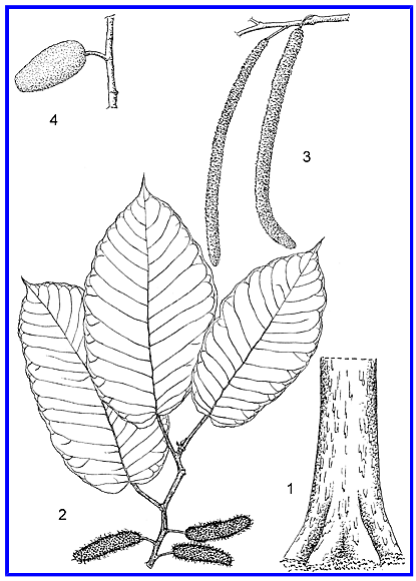
Protabase
Record display
www.prota.org

PROTA homepage
questionner Protabase (version française)

Milicia excelsa (Welw.) C.C.Berg

wild

Protologue
Bull. Jard. Bot. Belg. 52: 227 (1982).
Family
Moraceae
Synonyms
Maclura excelsa (Welw.) Bureau (1873), *Chlorophora excelsa* (Welw.) Benth. (1880).
Vernacular names
Iroko, rock elm, African teak, African oak (En). Iroko, chêne d'Afrique, teck d'Afrique, teck kambala (Fr). Câmbala, amoreira, moreira, teca africana, tumbiro, magundo (Po). Mvule (Sw).
Origin and geographic distribution
Milicia excelsa is distributed from Guinea Bissau eastward to Ethiopia and southward to Angola, Zimbabwe and Mozambique. It has been introduced into India and the United States.
Uses
The wood of *Milicia excelsa* and the closely related *Milicia regia* (A.Chev.) C.C.Berg are not distinguished in the timber trade, and are traded under the trade name 'iroko', or 'odum' in Ghana. Other frequently used trade names for *Milicia excelsa* are 'kambala' and 'mvule'. Iroko is a highly valued commercial timber in Africa, for which demand is large. It is used for construction work, shipbuilding and marine carpentry, sleepers, sluice gates, framework, trucks, draining boards, outdoor and indoor joinery, stairs, doors, frames, garden furniture, cabinet work, panelling, flooring and profile boards for decorative and structural uses. It is also used for carving, domestic utensils, musical instruments and toys. As it is resistant to acids and bases, it is used for tanks and barrels for food and chemical products and for laboratory benches. It is used as sliced veneer but only rarely as rotary veneer. The wood is also used as firewood and for making charcoal.
The ripe fruits and cooked young leaves of *Milicia excelsa* are edible. The fruit juice is used for flavouring in India. Mature leaves have been used as sandpaper. The bark is used for dyeing leather and cloth and for roofs of houses. Formerly the bark of young trees was used for making loincloths. The tree is used for soil conservation and mulch production, and as an ornamental and shade tree. In Nigeria it is planted to mark boundaries between farms or villages. It has also been planted to attract edible caterpillars. The wood is being tested as a



1, base of bole; 2, twig with female inflorescences; 3, male inflorescences; 4, infructescence.
Redrawn and adapted by Iskak Syamsudin

substrate for the cultivation of the mushroom *Lentinus subnudus*, popular e.g. in Nigeria.
Milicia excelsa is widely used in African traditional medicine. A root decoction is taken to treat female sterility. A decoction of the root and stem bark is taken as an aphrodisiac. Preparations from the bark are taken to treat cough, asthma, heart trouble, lumbago, spleen pain, stomach pain, abdominal pain, oedema, ascites, dysmenorrhoea, gonorrhoea, general fatigue, rheumatism, sprains, and as a galactagogue, aphrodisiac, tonic and purgative. Bark preparations are externally applied to treat scabies, wounds, loss of hair, fever, venereal diseases and sprains. They are applied as an enema to cure piles, diarrhoea and dysentery. The latex is applied on burns, wounds, sores and against eczema and other skin problems. It is also taken against stomach problems, hypertension and as a galactagogue, and it is used for treatment of tumours and obstructions of the throat. Leaves are eaten to treat insanity; a leaf maceration is drunk as a galactagogue. A decoction of the leaves is taken for treatment of gallstones. Leaf preparations are externally applied to treat snakebites and fever and as eye drops to treat filariasis.
Milicia excelsa is often considered a sacred tree and is frequently protected near houses and in cultivated fields. In Benin the foliage is used as a fetish, and in Nigeria the tree has a special place in the folklore and traditions of the people.

Production and international trade

Milicia excelsa and *Milicia regia* are both traded as iroko and the share of *Milicia excelsa* in that commerce is unknown. Iroko is a major timber in international trade; during the 1960s Côte d'Ivoire exported about 55,000 m³ of iroko logs and 6000 m³ of iroko sawnwood per year, and Ghana 28,000 m³ of sawnwood. In 1973 Côte d'Ivoire exported as much as 136,500 m³ of logs and 16,000 m³ of sawnwood. In 1994 Cameroon exported 65,000 m³ of logs and 12,000 m³ of sawnwood, Congo 10,000 m³ of logs, and Ghana at least 47,000 m³ of sawnwood. In the season 1998–99, an estimated 133,400 m³ of iroko timber was cut in Cameroon. From 1998 to 2003 Gabon exported about 28,500 m³ of logs per year. Exportation of iroko logs is now forbidden in Côte d'Ivoire, Ghana and Cameroon, but export of sawnwood is allowed. In 2003 Cameroon exported 33,000 m³ of iroko sawnwood (US$ 948/m³), Congo 28,000 m³ of iroko logs (US$ 221/m³) and 1000 m³ of iroko veneer (US$ 343/m³), the Central African Republic 2000 m³ of logs (US$ 412/m³) and 5000 m³ of sawnwood (US$ 465/m³), Ghana 8000 m³ of sawnwood (US$ 754/m³) and Togo 1000 m³ of sawnwood (US$ 260/m³). In the past Tanzania and Uganda were major suppliers of iroko, and small volumes are still exported from East Africa.

Properties

The heartwood is pale yellow to yellow, darkening on exposure to yellowish or greenish brown or sometimes to chocolate brown; it is clearly demarcated from the 5–7.5 cm wide yellowish white sapwood. The grain is interlocked, texture medium to coarse, figure mottled. The wood is

tree habit

tree habit

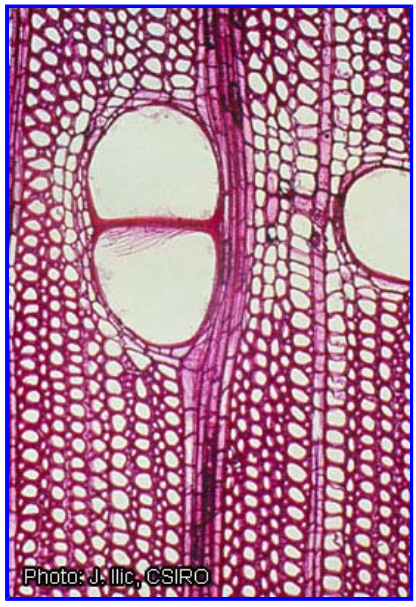
somewhat greasy and is odourless. Logs from closed forest are usually straight and cylindrical, but savanna trees are often damaged by fire and their wood is affected by eccentric growth, ingrown bark or calcium carbonate plugs.
The wood has a density of 550–750 kg/m³ at 12% moisture content. Shrinkage rates from green to oven dry are 1.7–4.1(–5.6)% radial and 2.4–6.3(–9.8)% tangential. The wood dries well in open air and kilns, with little degrade. Boards of 4.2 cm thick can be kiln dried from 60% to 15% moisture content in 8 days at a drying temperature of 50–80°C, and a corresponding relative humidity of 85% to 40%. Once the wood is dry, movement in service is small.
At 12% moisture content, the modulus of rupture is 75–156 N/mm², modulus of elasticity 8300–13,300 N/mm², compression parallel to grain 42–65 N/mm², shear 5.4–14.1 N/mm², cleavage 10.3–20.9 N/mm, Janka side hardness 4400–5610 N, and Janka end hardness 5360–6640 N.
Working properties for hand and machine tools are generally good but variable; the interlocked grain may hamper sawing and planing. The wood is rather abrasive due to the presence of hard deposits ('iroko stones', mainly consisting of calcium carbonate), which can blunt cutting edges. Tearing in planing can be avoided by using cutting angles of 15° or less. The wood has good nailing, screwing, mortising and gluing properties and turns easily. It finishes well, but filler is needed.
The wood contains the stilbene derivative chlorophorin, which prevents oil-based paints from drying, and which corrodes metal in contact with it. Steam-bending properties of the wood are moderate.
Although the heartwood is generally considered very durable, reports on its resistance to marine borers and termites vary. It is resistant to fungal attack. The sapwood is liable to attack by *Lyctus* beetles. The heartwood is impermeable to preservatives, but sapwood is permeable.
The wood and sawdust may cause dermatitis, irritation to nose and throat, and asthmatic reactions, due to the presence of chlorophorin. Chlorophorin has shown inhibitory effects on melanin biosynthesis; its more stable derivative hexahydrochlorophorin may have potential for use in skin-whitening agents and for treating disturbances in pigmentation.
Two phenolic compounds (chlorophorin and iroko) have shown in-vitro anti-amoebic activity. A methanol extract of the stem bark has shown in-vivo anti-inflammatory properties in mice and rats.

Adulterations and substitutes

The wood properties of iroko are similar to those of teak (*Tectona grandis* L.f.). The wood of *Guibourtia arnoldiana* (De Wild. & T.Durand) J.Léonard (trade name: mutenye) has uses similar to iroko and teak. As iroko is locally overexploited, it is recommended that for some specific uses it is replaced by species such as *Piptadeniastrum africanum* (Hook.f.) Brenan (trade name: dabéma), *Lophira alata* Banks ex P.Gaertn. (trade name: azobé), *Nauclea diderrichii* (De Wild. & T.Durand) Merr. (trade name: bilinga) or *Afzelia* spp.

tree habit


young leaf



wood in transverse section

(trade name: doussié). Logs of *Morus mesozygia* Stapf ex A.Chev. (trade name: difou) have sometimes been sold mixed with iroko logs.

Description

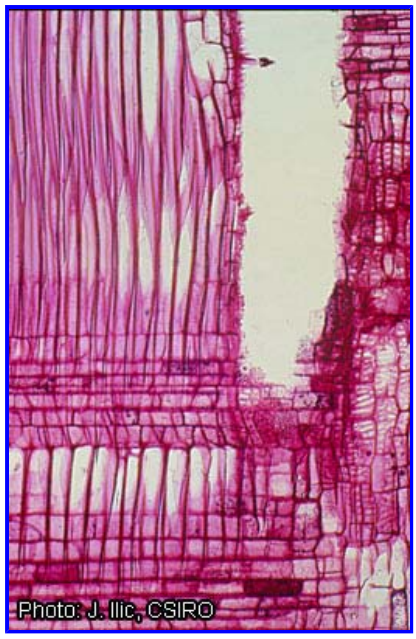
Large, dioecious tree up to 50 m tall; bole straight, cylindrical, branchless for up to 25(–30) m, up to 2.5(–3) m in diameter, buttresses absent or small; surface roots often long and prominent, red-brown with yellow lenticels; outer bark grey to dark brown or black, lenticelled, becoming scaly, inner bark thick, fibrous, cream-coloured speckled with orange-brown spots, exuding a white or yellowish latex; crown spreading; branches obliquely ascending. Leaves distichously alternate, simple; stipules free, slightly clasping the stem, up to 5 cm long, caducous; petiole 1–6 cm long; blade oblong to elliptical, 6–20(–33) cm × 3.5–10(–15) cm, base cordate to obtuse, often very unequal, apex acuminate, margin almost entire to wavy but toothed in juvenile specimens, papery to leathery, above glabrous or slightly hairy on the main veins, below densely short-hairy between the finest veins, pinnately veined with 10–22 pairs of lateral veins. Inflorescence a catkin, usually solitary in leaf axils or on leafless nodes at the base of twigs, white hairy, flowers numerous in longitudinal rows alternating with rows of bracts; male inflorescence 8–20(–32) cm × 0.5–1 cm, hanging, peduncle 0.5–2.5 cm long; female inflorescence 2–4 cm × 0.5–2 cm, peduncle 0.5–2 cm long. Flowers unisexual, 4-merous, sessile; male flowers c. 1.5 mm long, white, tepals 4, basally fused, stamens 4 and inflexed in bud, rudimentary pistil present; female flowers 2–3 mm long, with 4 basally fused tepals, greenish, ovary superior, c. 1 mm long, 1-celled, stigmas 2, one 3–7 mm long, the other up to 1 mm long. Fruit an ellipsoid, compressed achene 2.5–3 mm long, arranged in infructescences up to 5 cm × 1.5 cm. Seed c. 2 mm long. Seedling with epigeal germination.

Other botanical information

Milicia comprises 2 species, *Milicia regia* and *Milicia excelsa*, both in tropical Africa. The 2 species mainly differ in the venation and hairiness of the leaves. *Milicia excelsa* has 10–22 pairs of lateral veins and is short-hairy below between the finest veins, *Milicia regia* has 6–11 pairs of lateral veins and is glabrous below between the finest veins. Juvenile plants of the 2 species can be distinguished by differences in leaf hairiness and in the colour of the midrib beneath (yellow in *Milicia excelsa*, red in *Milicia regia*), and by growth habit and leaf arrangement (in *Milicia excelsa* sympodial, leaves in 2 rows; in *Milicia regia* monopodial, with spirally arranged leaves).

Anatomy

Wood-anatomical description (IAWA hardwood codes): Growth rings: 2: growth ring boundaries indistinct or absent. Vessels: 5: wood diffuse-porous; 13: simple perforation plates; 22: intervessel pits alternate; 23: shape of alternate pits polygonal; 27: intervessel pits large (⩾ 10 µm); (30: vessel-ray pits with distinct borders; similar to intervessel pits in size and shape throughout the ray cell); 31: vessel-ray pits with much reduced borders to apparently simple: pits rounded or angular;



wood in radial section

wood in tangential section

transverse surface of wood

32: vessel-ray pits with much reduced borders to apparently simple: pits horizontal (scalariform, gash-like) to vertical (palisade); 43: mean tangential diameter of vessel lumina ⩾ 200 µm; 46: ⩽ 5 vessels per square millimetre; (47: 5–20 vessels per square millimetre); 56: tyloses common. Tracheids and fibres: 61: fibres with simple to minutely bordered pits; 66: non-septate fibres present; 69: fibres thin- to thick-walled. Axial parenchyma: 80: axial parenchyma aliform; (81: axial parenchyma lozenge-aliform); (82: axial parenchyma winged-aliform); 83: axial parenchyma confluent; (84: axial parenchyma unilateral paratracheal); (85: axial parenchyma bands more than three cells wide); (86: axial parenchyma in narrow bands or lines up to three cells wide); 91: two cells per parenchyma strand; 92: four (3–4) cells per parenchyma strand. Rays: 98: larger rays commonly 4- to 10-seriate; 106: body ray cells procumbent with one row of upright and/or square marginal cells; (107: body ray cells procumbent with mostly 2–4 rows of upright and/or square marginal cells); 115: 4–12 rays per mm. Secretory elements and cambial variants: 132: laticifers or tanniferous tubes. Mineral inclusions: 136: prismatic crystals present; 137: prismatic crystals in upright and/or square ray cells; 141: prismatic crystals in non-chambered axial parenchyma cells; (154: more than one crystal of about the same size per cell or chamber); (155: two distinct sizes of crystals per cell or chamber).
(D. Louppe, P. Détienne & E.A. Wheeler)

Growth and development

Seeds normally germinate 2–4 weeks after sowing. Young *Milicia excelsa* trees grow continuously, but growth of adult trees is periodical. In the dry season *Milicia excelsa* is deciduous for a short period. From West Africa to Sudan it flowers from December to March. It takes 5–6 weeks from fertilization to fruit maturation. Seed dispersal is mostly by birds, bats and squirrels.

In a 6-year-old plantation in northern Côte d'Ivoire some trees were over 6 m tall, but the variability was large. In Ghana the annual increment in diameter is 0.33–0.59 cm. In Cameroon a mean diameter growth of over 1 cm per year has been recorded for trees about 25 years old. In the south-western Central African Republic (annual rainfall 1500 mm; dry period 2 months) the average annual increment in diameter of *Milicia excelsa* trees is 0.57 cm; it decreases with age from 0.93 cm for trees with a diameter of less than 10 cm to 0.45 cm for trees with 110–120 cm diameter. On average it takes 130 years here for a tree to reach a diameter of 80 cm. In Uganda 32-year-old trees planted at a spacing of 4 m × 4 m were 18 m tall and well shaped.

Ecology

Milicia excelsa occurs in deciduous, semi-deciduous or evergreen, primary or secondary forest, with an apparent preference for drier forest types. It often occurs in gallery forest and in forest islands or as lone trees in savanna regions, and is sometimes left as a lone tree in old cultivated areas. It is usually found up to 1200(–1500) m altitude, although it has

been found at 4500 m altitude on Mount Kilimanjaro in Tanzania. In West Africa *Milicia excelsa* occurs in regions with an average annual temperature of 25–35°C and an average annual rainfall of 1150–1900 mm. It is considered a pioneer species, demanding intense light and unable to stand deep shade. In young secondary forest, for example, it cannot compete with climbers and shrubs.
Although *Milicia excelsa* grows on a large variety of soils, it is reported to be rather demanding with respect to soil fertility, especially the presence of K and P. It is considered to be an indicator of fertile soil suitable for cultivation. It prefers well-drained soils and does not tolerate impeded drainage.

Propagation and planting

Milicia excelsa is mostly propagated by seed. The 1000-seed weight is 1–4 g. About 40 kg of fruits is needed for 1 kg of seeds. As the colour of the infructescences does not change during ripening, maturity has to be determined by cutting the infructescence to see if the pulp has softened. If unripe infructescences are picked from the tree, it is necessary to leave them in the shade for some days to ripen. It is easier to collect them from the ground, but seeds should be extracted before the infructescences have begun to ferment. Seeds can be separated by crushing the infructescences after immersing them in water for about one day. Viable seeds sink in water and can be easily separated from floating unviable seeds. Fresh seeds normally germinate well; the germination rate may be more than 90% within 4 weeks. Seeds are best sown within 3 months after collection, because viability decreases rapidly. Seeds dried to 8% moisture content can be stored at 0–5°C for at least a year.
Seeds are sown in a seedbed and transplanted to pots or nursery beds 3 weeks after germination. Seedlings should be grown under shade to limit attacks by *Phytolyma* spp. About 4 months after sowing the seedlings are around 30 cm tall and ready for planting out in the field. Young plants transplant well. In Ghana seedlings planted during the long rainy season have shown much better growth than seedlings planted during the short rainy season. The better growth persisted for at least 9 years. Planting in a mixed stand with *Terminalia superba* Engl. & Diels (in equal proportions at planting) gave better growth than planting in pure stands.
Milicia excelsa can be propagated vegetatively by stem and root cuttings, grafting, layering and in-vitro tissue culture. Successful propagation has been achieved using stem cuttings from 1- and 2-year-old trees, but from mature trees cuttings should be taken from coppice shoots. Stakes and posts made of branches may strike root like cuttings.
The wide sapwood of *Milicia excelsa* means that thinnings in plantations are of little value, so it is recommended to plant at wide spacings.

Management

Milicia excelsa is mostly extracted from natural forest, as plantations are severely affected by pest problems. It prunes and coppices well.

Diseases and pests
The major constraint on the cultivation of *Milicia excelsa* and *Milicia regia* are gall-forming *Phytolyma* spp. (iroko gall flies). Eggs are laid on buds, shoots or young leaves, and after the emergence of nymphs galls are formed, followed by dieback of foliage down to the woody tissue. This disrupts physiological processes, causes growth reduction, and in many cases kills seedlings. Secondary infection by fungi probably aggravates the damage. Mature leaves are not seriously affected. Efforts to control this pest have had little success, but the development or selection of more resistant *Milicia* genotypes may offer prospects. Planting in light shade, in mixtures and in low plant densities seems to help to reduce damage by *Phytolyma*. Elephants eat the bark and may destroy plantations.

Yield
In Gabon *Milicia excelsa* is scattered in all forest types with a commercial bole volume of about 0.1 m^3/ha.

Handling after harvest
Immediately after felling, the wood of *Milicia excelsa* is too heavy to be transported by river, and transport is by trucks. The sapwood is usually removed before shipping. Bark to be used medicinally is sometimes pounded, dried and compressed into balls that are kept in wrappers.

Genetic resources
Exploitation is often unsustainable: in the 1980s the extraction rate of iroko timber (from *Milicia excelsa* and *Milicia regia*) in Ghana was estimated to be about 173,000 m^3 per year, whereas the regeneration rate was estimated to be only about 29,000 m^3 per year. *Milicia excelsa* is classified as 'lower risk but near threatened' in the 2006 IUCN Red list of threatened species, the main threats being habitat loss and degradation due to expanding agriculture, overexploitation of the wood, and *Phytolyma* attacks. *Milicia excelsa* is considered a priority for in-situ conservation. As genetic diversity within populations is low, but diversity between populations large, it is recommended that different populations are included in in-situ conservation efforts. This may be facilitated by the fact that in some areas *Milicia excelsa* is conserved on farm, in sacred groves, in public places and in cemeteries. It is protected by legislation in Côte d'Ivoire and Mozambique; in Ghana and Tanzania a permit is needed for its exploitation. It is subject to a log export ban in various countries, such as Côte d'Ivoire, Ghana, Cameroon and Tanzania.

Breeding
Partial genetic resistance to *Phytolyma* within natural *Milicia* populations has been identified, which may lead to the development of resistant lines for vegetative propagation. Selection work is underway in Ghana.

Prospects
Iroko belongs to the most valuable timbers of Africa, due to its attractive appearance, durability, stability and good working properties. At present its exploitation is not sustainable in most countries. It requires protection and exploitation has to be

limited if it is to become sustainable. Plantation is difficult due to a pest problem. The identification of sources of resistance to the iroko gall fly deserves high priority and can possibly be complemented by the development of effective control methods, especially the use of natural parasites or predators of the iroko gall fly.

Major references

• Berg, C.C., 1977. Revisions of African Moraceae (excluding Dorstenia, Ficus, Musanga and Myrianthus). Bulletin du Jardin Botanique National de Belgique 47(3–4): 267–407.
• Berg, C.C., 1982. The reinstatement of the genus Milicia Sim (Moraceae). Bulletin du Jardin Botanique National de Belgique 52(1–2): 225–229.
• Berg, C.C. & Hijman, M.E.E., 1989. Moraceae. In: Polhill, R.M. (Editor). Flora of Tropical East Africa. A.A. Balkema, Rotterdam, Netherlands. 95 pp.
• Bolza, E. & Keating, W.G., 1972. African timbers: the properties, uses and characteristics of 700 species. Division of Building Research, CSIRO, Melbourne, Australia. 710 pp.
• Burkill, H.M., 1997. The useful plants of West Tropical Africa. 2nd Edition. Volume 4, Families M–R. Royal Botanic Gardens, Kew, Richmond, United Kingdom. 969 pp.
• Cobbinah, J.R. & Wagner, M.R., 1995. Phenotypic variation in Milicia excelsa to attack by Phytolyma lata (Psyllidae). Forest Ecology and Management 75(1–3): 147–153.
• Ofori, D.A., 2001. Genetic diversity and its implications for the management and conservation of Milicia species. PhD Thesis, University of Aberdeen, United Kingdom. 158 pp.
• Ofori, D.A., Swaine, M.D., Leifert, C., Cobbinah, J.R. & Price, A.H., 2001. Population genetic structure of Milicia species characterised by using RAPD and nucleotide sequencing. Genetic Resources and Crop Evolution 48: 637–647.
• Takahashi, A., 1978. Compilation of data on the mechanical properties of foreign woods (part 3) Africa. Shimane University, Matsue, Japan, 248 pp.
• UNEP-WCMC, 2006. Contribution to an evaluation of tree species using the new CITES Listing Criteria. [Internet]. UNEP World Conservation Monitoring Centre, Cambridge, United Kingdom. http://www.unep-wcmc.org/species/tree_study/ contents1_en.htm. Accessed October 2006.

Other references

• Apetorgbor, M., Mancini, F., Turco, E., Cobbinah, J.R. & Ragazzi, A., 2001. The involvement of fungal pathogens in dieback-decline of Milicia excelsa saplings in plantations. Zeitschrift fuer Pflanzenkrankheiten und Pflanzenschutz 108 (6): 568–577.
• Arung, E.T, Yoshikawa, K., Shimizu, K. & Kondo, R., 2005. The effect of chlorophorin and its derivative on melanin biosynthesis. Holzforschung 59(5): 514–518.
• Bosu, P.P., Cobbinah, J.R., Nichols, J.D., Nkrumah, E.E. & Wagner, M.R., 2006. Survival and growth of mixed plantations of Milicia excelsa and Terminalia superba 9 years after planting in Ghana. Forest Ecology and Management 233:

352–357.
• Durrieu de Madron, L., 2003. Accroissement diamétrique du bété et de l'iroko. Bois et Forêts des Tropiques 275(1): 83–87.
• Durrieu de Madron, L., Nasi, R. & Détienne, P., 2000. Accroissements diamétriques de quelques essences en forêt dense africaine. Bois et Forêts des Tropiques 263(1): 63–74.
• FAO, 1986. Some medicinal forest plants of Africa and Latin America. FAO Forestry Paper 67. Rome, Italy. 252 pp.
• Farmer, R.H., 1972. Handbook of hardwoods. 2nd Edition. Her Majesty's Stationary Office, London, United Kingdom. 243 pp.
• Gérard, J., Edi Kouassi, A., Daigremont, C., Détienne, P., Fouquet, D. & Vernay, M., 1998. Synthèse sur les caractéristiques technologiques des principaux bois commerciaux africains. Document Forafri 11. Cirad, Montpellier, France. 185 pp.
• Hawthorne, W.D., 1995. Ecological profiles of Ghanaian forest trees. Tropical Forestry Papers 29. Oxford Forestry Institute, Department of Plant Sciences, University of Oxford, United Kingdom. 345 pp.
• InsideWood, undated. [Internet] http://insidewood.lib.ncsu.edu/search/. Accessed May 2007.
• Jøker, D., 2005. Milicia excelsa (Welw.) C.C.Berg. Seed leaflet No 63 (2002, revised 2005). Danida Forest Seed Centre, Humlebaek, Denmark. 2 pp.
• Neuwinger, H.D., 2000. African traditional medicine: a dictionary of plant use and applications. Medpharm Scientific, Stuttgart, Germany. 589 pp.
• Nyong'o, R.N., Cobbinah, J.R. & Appiah-Kwarteng, J., 1994. Flowering and fruiting patterns in Milicia excelsa and Milicia regia Welw. Ghana Journal of Forestry 1: 19–29.
• Ofori, D.A., Cobbinah, J.R. & Appiah-Kwarteng, J., 2001. Genetic variation, heritability and expected genetic gains in Milicia excelsa (iroko). Journal of Tropical Forest Science 13 (2): 344–361.
• Ofori, D.A., Newton, A.C., Leakey, R.R.B. & Grace, J., 1997. Vegetative propagation of Milicia excelsa by leafy stem cuttings: effects of maturation, coppicing, cutting length and position on rooting ability. Journal of Tropical Forest Science 10(1): 115–129.
• Olajide, O.A., Kolawole, O.T., Fagbohun, T.R. & Ajayi, F.F., 2005. Evaluation of the anti inflammatory properties of Chlorophora excelsa stem bark extract. Pharmaceutical Biology 43(9): 746–748.
• Ouinsavi, C., Sokpon, N. & Bada, O., 2005. Utilization and traditional strategies of in situ conservation of iroko (Milicia excelsa (Welw.) C.C. Berg) in Benin. Forest Ecology and Management 207(3): 341–350.
• Padayachee, T. & Odhav, B., 2001. Anti-amoebic activity of plant compounds from Virgilia oroboides and Chlorophora excelsa. Journal of Ethnopharmacology 78(1): 59–66.
• Sales, C., 1979. Quelques durées de séchage. Bois et Forêts des Tropiques 186: 52–53.
• Wagner, M.R., Atuahene, S.K.N. & Cobbinah, J.R., 1991.

Forest entomology in West Tropical Africa: Forest insects of Ghana. Kluwer Academic Press, Dordrecht, Netherlands. 210 pp.
• White, M.G., 1966. The problem of the Phytolyma gall bug in the establishment of Chlorophora. Institute Paper No 37. Commonwealth Forestry Institute, University of Oxford, Oxford, United Kingdom. 52 pp.

Sources of illustration

• Berg, C.C., 1977. Revisions of African Moraceae (excluding Dorstenia, Ficus, Musanga and Myrianthus). Bulletin du Jardin Botanique National de Belgique 47(3–4): 267–407.
• Hawthorne, W., 1990. Field guide to the forest trees of Ghana. Natural Resources Institute, for the Overseas Development Administration, London, United Kingdom. 275 pp.
• Wilks, C. & Issembé, Y., 2000. Les arbres de la Guinée Equatoriale: Guide pratique d'identification: région continentale. Projet CUREF, Bata, Guinée Equatoriale. 546 pp.

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Annex 4. List of species for PROTA 7(1): 'Timbers 1' (16/07/2007)

Family	Number of Genera	Number of 'Major'species	Number of 'Minor'species	Total Species
Apocynaceae	3	2	4	6
Araucariaceae	1	0	3	3
Arecaceae	2	0	1	1
Avicenniaceae	1	2	0	2
Bombacaceae	3	2	2	4
Burseraceae	4	3	4	7
Clusiaceae	4	3	10	13
Combretaceae	2	5	19	24
Cupressaceae	3	3	5	8
Lauraceae	3	4	16	20
Malvaceae	2	2	2	4
Meliaceae	15	16	15	31
Mimosaceae	17	11	65	76
Moraceae	6	7	1	8
Myrtaceae	2	5	13	18
Papilionaceae	21	18	87	105
Pinaceae	1	3	3	6
Poaceae	7	3	6	9
Podocarpaceae	1	2	3	5
Rhizophoraceae	2	1	8	9
Rutaceae	8	4	20	24
Sapotaceae	13	11	34	45
Simaroubaceae	4	1	3	4
Sterculiaceae	12	7	25	32
Tiliaceae	4	0	13	13
Verbenaceae	4	4	11	15
Total	**145**	**119**	**373**	**492**

	Species	Family	Major/Minor	Status
1	Alstonia boonei De Wild.	Apocynaceae	Major	Finished
2	Alstonia congensis Engl.	Apocynaceae	Major	Finished
3	Alstonia macrophylla Wall. ex G.Don	Apocynaceae	Mention	Finished
4	Pleiocarpa pycnantha (K.Schum.) Stapf	Apocynaceae	Minor	Finished
5	Tabernaemontana penduliflora K.Schum.	Apocynaceae	Mention	Finished
6	Tabernaemontana stapfiana Britten	Apocynaceae	Minor	Finished
7	Araucaria angustifolia (Bertol.) Kuntze	Araucariaceae	Mention	Finished
8	Araucaria cunninghamii Aiton ex D.Don	Araucariaceae	Minor	Finished
9	Araucaria hunsteinii K.Schum.	Araucariaceae	Mention	Finished
10	Dypsis madagascariensis (Becc.) Beentje & Dransf.	Arecaceae	Minor	Finished
11	Avicennia germinans (L.) L.	Avicenniaceae	Major	Received
12	Avicennia marina (Forssk.) Vierh.	Avicenniaceae	Major	Received
13	Bombax brevicuspe Sprague	Bombacaceae	Major	
14	Bombax rhodognaphalon K.Schum.	Bombacaceae	Minor	
15	Ceiba pentandra (L.) Gaertn.	Bombacaceae	Major	Received
16	Ochroma pyramidale (Cav. ex Lam.) Urb.	Bombacaceae	Minor	
17	Aucoumea klaineana Pierre	Burseraceae	Major	Finished
18	Canarium madagascariense Engl.	Burseraceae	Major	
19	Canarium paniculatum (Lam	Burseraceae	Minor	
20	Commiphora pterocarpa H.Perrier	Burseraceae	Minor	
21	Commiphora woodii Engl.	Burseraceae	Minor	
22	Dacryodes buettneri (Engl.) H.J.Lam	Burseraceae	Major	Received
23	Dacryodes klaineana (Pierre) H.J.Lam	Burseraceae	Minor	
24	Calophyllum inophyllum L.	Clusiaceae	Major	Finished
25	Calophyllum chapelieri Drake	Clusiaceae	Mention	Finished
26	Calophyllum drouhardii H.Perrier	Clusiaceae	Mention	Finished
27	Calophyllum fibrosum P.F.Stevens	Clusiaceae	Mention	Finished
28	Calophyllum lingulatum P.F.Stevens	Clusiaceae	Mention	Finished
29	Calophyllum milvum P.F.Stevens	Clusiaceae	Mention	Finished
30	Calophyllum milvum P.F.Stevens	Clusiaceae	Mention	Finished
31	Calophyllum recedens Jum. & H.Perrier	Clusiaceae	Mention	Finished
32	Calophyllum verticillatum P.F.Stevens	Clusiaceae	Mention	Finished
33	Garcinia volkensii Engl.	Clusiaceae	Minor	
34	Mammea africana Sabine	Clusiaceae	Major	
35	Mammea odorata (Raf.) Kosterm.	Clusiaceae	Minor	
36	Symphonia globulifera L.f.	Clusiaceae	Major	Finished
37	Combretum elaeagnoides Klotzsch	Combretaceae	Minor	
38	Combretum engleri Schinz	Combretaceae	Minor	
39	Combretum erythrophyllum (Burch.) Sond.	Combretaceae	Minor	
40	Combretum exalatum Engl.	Combretaceae	Minor	
41	Combretum imberbe Wawra	Combretaceae	Major	

42	Combretum kraussii Hochst.	Combretaceae	Minor	
43	Combretum schumannii Engl.	Combretaceae	Major	
44	Combretum zeyheri Sond.	Combretaceae	Minor	
45	Terminalia bentzoe (L.) L.f.	Combretaceae	Minor	
46	Terminalia brachystemma Welw. ex Hiern	Combretaceae	Minor	
47	Terminalia brevipes Pamp.	Combretaceae	Minor	
48	Terminalia brownii Fresen.	Combretaceae	Minor	
49	Terminalia ivorensis A.Chev.	Combretaceae	Major	Received
50	Terminalia kilimandscharica Engl.	Combretaceae	Minor	
51	Terminalia macroptera Guill. & Perr.	Combretaceae	Minor	
52	Terminalia orbicularis Engl. & Diels	Combretaceae	Minor	
53	Terminalia prunioides C.Lawson	Combretaceae	Minor	
54	Terminalia randii Baker f.	Combretaceae	Minor	
55	Terminalia sambesiaca Engl. & Diels	Combretaceae	Minor	
56	Terminalia sericea Burch. ex DC.	Combretaceae	Minor	
57	Terminalia spinosa Engl.	Combretaceae	Minor	
58	Terminalia stuhlmannii Engl.	Combretaceae	Minor	
59	Terminalia superba Engl. & Diels	Combretaceae	Major	Received
60	Terminalia tetrandra (Danguy ex Lecomte) Capuron	Combretaceae	Major	
61	Cupressus lusitanica Mill.	Cupressaceae	Major	Finished
62	Cupressus macrocarpa Hartw. ex Gordon	Cupressaceae	Mention	Finished
63	Cupressus sempervirens L.	Cupressaceae	Mention	Finished
64	Cupressus torulosa	Cupressaceae	Mention	Finished
65	Juniperus bermudiana L.	Cupressaceae	Minor	Finished
66	Juniperus procera Hochst. ex Endl.	Cupressaceae	Major	Finished
67	Widdringtonia whytei Rendle	Cupressaceae	Major	Finished
68	Widdringtonia nodiflora (L.) Powrie	Cupressaceae	Mention	Finished
69	Beilschmiedia congolana Robyns et Wilczek	Lauraceae	Mention	Finished
70	Beilschmiedia corbisieri (Robyns) Robyns et Wilczek	Lauraceae	Minor	Finished
71	Beilschmiedia diversiflora Pierre ex Robyns & R.Wilczek	Lauraceae	Minor	Finished
72	Beilschmiedia gaboonensis (Meisn.) Benth. & Hook.f.	Lauraceae	Mention	Finished
73	Beilschmiedia insularum Robyns et Wilczek	Lauraceae	Mention	Finished
74	Beilschmiedia kweo (Mildbr.) Robyns & R.Wilczek	Lauraceae	Minor	Finished
75	Beilschmiedia lebrunii Robyns & R.Wilczek	Lauraceae	Mention	Finished
76	Beilschmiedia letouzeyi Robyns & Wilczek	Lauraceae	Mention	Finished
77	Beilschmiedia louisii Robyns & Wilczek	Lauraceae	Minor	Finished
78	Beilschmiedia mannii (Meisn.) Benth. & Hook.f.	Lauraceae	Major	Finished
79	Beilschmiedia nitida Engl.	Lauraceae	Mention	Finished
80	Beilschmiedia oblongifolia Robyns et Wilczek	Lauraceae	Minor	Finished
81	Beilschmiedia ugandensis Rendle	Lauraceae	Minor	Finished
82	Beilschmiedia variabilis Robyns & R.Wilczek	Lauraceae	Mention	Finished
83	Beilschmiedia velutina (Kosterm.) Kosterm.	Lauraceae	Minor	Finished
84	Beilschmiedia zenkeri Engl.	Lauraceae	Mention	Finished
85	Hypodaphnis zenkeri (Engl.) Stapf	Lauraceae	Minor	Finished
86	Ocotea bullata (Burch.) Baill.	Lauraceae	Major	
87	Ocotea kenyensis (Chiov.) Robyns & R.Wilczek	Lauraceae	Major	
88	Ocotea usambarensis Engl.	Lauraceae	Major	
89	Hibiscus lasiococcus Baill.	Malvaceae	Major	
90	Thespesia acutiloba Baker f.	Malvaceae	Mention	Finished
91	Thespesia danis Oliv.	Malvaceae	Mention	Finished
92	Thespesia populnea (L.) Sol. ex Corr.	Malvaceae	Major	Finished
93	Chukrasia tabularis A.Juss.	Meliaceae	Major	Finished
94	Ekebergia capensis Sparrm.	Meliaceae	Major	
95	Entandrophragma angolense (Welw.) C.DC.	Meliaceae	Major	Received
96	Entandrophragma candollei Harms	Meliaceae	Major	Received
97	Entandrophragma caudatum (Sprague) Sprague	Meliaceae	Minor	
98	Entandrophragma cylindricum (Sprague) Sprague	Meliaceae	Major	
99	Entandrophragma excelsum (Dawe & Sprague) Sprague	Meliaceae	Minor	
100	Entandrophragma utile (Dawe & Sprague) Sprague	Meliaceae	Major	Received
101	Guarea cedrata (A.Chev.) Pellegr.	Meliaceae	Major	Received
102	Guarea glomerulata Harms	Meliaceae	Minor	
103	Guarea thompsonii Sprague & Hutch.	Meliaceae	Major	
104	Heckeldora staudtii (Harms) Staner	Meliaceae	Minor	
105	Khaya anthotheca (Welw.) C.DC.	Meliaceae	Major	Received
106	Khaya grandifoliola C.DC.	Meliaceae	Major	Received
107	Khaya ivorensis A.Chev.	Meliaceae	Major	
108	Khaya senegalensis (Desr.) A.Juss.	Meliaceae	Major	
109	Lepidotrichilia volkensii (Gürke) J.-F.Leroy	Meliaceae	Minor	
110	Lovoa swynnertonii Baker f.	Meliaceae	Minor	
111	Lovoa trichilioides Harms	Meliaceae	Major	Received
112	Pseudobersama mossambicensis (Sim) Verdc.	Meliaceae	Minor	
113	Pseudocedrela kotschyi (Schweinf.) Harms	Meliaceae	Major	
114	Quivisianthe papinae Baill.	Meliaceae	Minor	
115	Swietenia humilis Zucc.	Meliaceae	Mention	Finished
116	Swietenia macrophylla King	Meliaceae	Major	Finished
117	Swietenia mahagoni (L.) Jacq.	Meliaceae	Minor	Finished
118	Toona ciliata M.Roem.	Meliaceae	Minor	
119	Trichilia djalonis A.Chev.	Meliaceae	Mention	
120	Trichilia monadelpha (Thonn.) J.J.de Wilde	Meliaceae	Minor	
121	Trichilia retusa Oliv.	Meliaceae	Minor	
122	Trichilia tessmannii Harms	Meliaceae	Minor	
123	Turraeanthus africanus (Welw. ex C.DC.) Pellegr.	Meliaceae	Major	Received

124	Acacia caffra (Thunb.) Willd.	Mimosaceae	Minor	Finished
125	Acacia burkei Benth.	Mimosaceae	Mention	Finished
126	Acacia galpinii Burtt Davy	Mimosaceae	Major	Finished
127	Acacia goetzei Harms	Mimosaceae	Mention	Finished
128	Acacia heterophylla Hook. & Arn.	Mimosaceae	Minor	Finished
129	Acacia melanoxylon R.Br.	Mimosaceae	Minor	Finished
130	Acacia nigrescens Oliv.	Mimosaceae	Minor	Finished
131	Acacia robusta Burch.	Mimosaceae	Minor	Finished
132	Acacia rovumae Oliv.	Mimosaceae	Minor	Finished
133	Acacia xanthophloea Benth.	Mimosaceae	Major	Finished
134	Adenanthera mantaroa Villiers	Mimosaceae	Minor	Finished
135	Alantsilodendron villosum (R.Vig.) Villiers	Mimosaceae	Minor	Finished
136	Albizia adianthifolia (Schumach.) W.Wight	Mimosaceae	Major	Finished
137	Albizia altissima Hook.f.	Mimosaceae	Minor	Finished
138	Albizia amara (Roxb.) Boivin	Mimosaceae	Mention	Finished
139	Albizia antunesiana Harms	Mimosaceae	Minor	Finished
140	Albizia arenicola R.Vig.	Mimosaceae	Minor	Finished
141	Albizia aurisparsa (Drake) R.Vig.	Mimosaceae	Mention	Finished
142	Albizia aylmeri Hutch. ex Broun & Massey	Mimosaceae	Minor	Finished
143	Albizia bernieri E.Fourn. Ex Villiers	Mimosaceae	Minor	Finished
144	Albizia boinensis R.Vig.	Mimosaceae	Mention	Finished
145	Albizia boivinii E.Fourn.	Mimosaceae	Minor	Finished
146	Albizia coriaria Welw. ex Oliv.	Mimosaceae	Mention	Finished
147	Albizia ferruginea (Guill. & Perr.) Benth.	Mimosaceae	Major	Finished
148	Albizia forbesii Benth.	Mimosaceae	Mention	Finished
149	Albizia glaberrima (Schumach. & Thonn.) Benth.	Mimosaceae	Minor	Finished
150	Albizia grandibracteata Taub.	Mimosaceae	Mention	Finished
151	Albizia greveana (Baill.) R.Baron	Mimosaceae	Mention	Finished
152	Albizia gummifera (J.F.Gmel.) C.A.Sm.	Mimosaceae	Major	Finished
153	Albizia harveyi E.Fourn.	Mimosaceae	Mention	Finished
154	Albizia mahalao Capuron	Mimosaceae	Mention	Finished
155	Albizia mainaea Villiers	Mimosaceae	Mention	Finished
156	Albizia malacophylla (A.Rich.) Walp.	Mimosaceae	Mention	Finished
157	Albizia masikororum R.Vig.	Mimosaceae	Mention	Finished
158	Albizia odorata R.Vig.	Mimosaceae	Mention	Finished
159	Albizia polyphylla E.Fourn.	Mimosaceae	Mention	Finished
160	Albizia rhombifolia Benth.	Mimosaceae	Mention	Finished
161	Albizia schimperiana Oliv.	Mimosaceae	Minor	Finished
162	Albizia tanganyicensis Baker f.	Mimosaceae	Mention	Finished
163	Albizia tulearensis R.Vig.	Mimosaceae	Mention	Finished
164	Albizia versicolor Welw. ex Oliv.	Mimosaceae	Minor	Finished
165	Albizia viridis E.Fourn.	Mimosaceae	Mention	Finished
166	Albizia zygia (DC.) J.F.Macbr.	Mimosaceae	Major	Finished
167	Amblygonocarpus andongensis (Welw. ex Oliv.) Exell & Torre	Mimosaceae	Minor	Finished
168	Aubrevillea kerstingii (Harms) Pellegr.	Mimosaceae	Mention	Finished
169	Aubrevillea platycarpa Pellegr.	Mimosaceae	Minor	Finished
170	Calpocalyx aubrevillei Pellegr.	Mimosaceae	Mention	Finished
171	Calpocalyx brevibracteatus Harms	Mimosaceae	Minor	Finished
172	Calpocalyx dinklagei Harms	Mimosaceae	Mention	Finished
173	Calpocalyx heitzii Pellegr.	Mimosaceae	Major	Finished
174	Calpocalyx klainei Pierre ex Harms	Mimosaceae	Mention	Finished
175	Cylicodiscus gabunensis Harms	Mimosaceae	Major	Finished
176	Dichrostachys myriophylla Baker	Mimosaceae	Minor	Finished
177	Entada chrysostachys (Benth.) Drake	Mimosaceae	Mention	Finished
178	Entada louvelii (R.Vig.) Brenan	Mimosaceae	Mention	Finished
179	Entada pervillei (Vatke) R.Vig.	Mimosaceae	Minor	Finished
180	Fillaeopsis discophora Harms	Mimosaceae	Minor	Finished
181	Newtonia aubrevillei (Pellegr.) Keay	Mimosaceae	Minor	
182	Newtonia buchananii (Baker f.) Gilbert & Boutique	Mimosaceae	Major	
183	Newtonia duparquetiana (Baill.) Keay	Mimosaceae	Minor	
184	Newtonia elliotii (Harms) Keay	Mimosaceae	Mention	
185	Newtonia erlangeri (Harms) Brenan	Mimosaceae	Minor	
186	Newtonia hildebrandtii (Vatke) Torre	Mimosaceae	Minor	
187	Newtonia paucijuga (Harms) Brenan	Mimosaceae	Minor	
188	Parkia bicolor A.Chev.	Mimosaceae	Major	Finished
189	Parkia filicoidea Welw. ex Oliv.	Mimosaceae	Minor	Finished
190	Parkia madagascariensis R.Vig.	Mimosaceae	Mention	Finished
191	Parkia timoriana (DC.) Merr.	Mimosaceae	Mention	Finished
192	Piptadeniastrum africanum (Hook.f.) Brenan	Mimosaceae	Major	Received
193	Viguieranthus kony (R.Vig.) Villiers	Mimosaceae	Minor	Finished
194	Viguieranthus cylindricostachys Villiers	Mimosaceae	Mention	Finished
195	Viguieranthus longiracemosus Villiers	Mimosaceae	Mention	Finished
196	Viguieranthus pervillei (Drake) Villiers	Mimosaceae	Mention	Finished
197	Xylia evansii Hutch.	Mimosaceae	Minor	Finished
198	Xylia hoffmannii (Vatke) Drake	Mimosaceae	Mention	Finished
199	Xylia xylocarpa (Roxb.) Taub.	Mimosaceae	Mention	Finished
200	Antiaris toxicaria Lesch.	Moraceae	Major	Finished
201	Broussonetia greveana (Baill.) C.C.Berg	Moraceae	Major	
202	Ficus sur Forssk.	Moraceae	Major	Received
203	Ficus vogeliana (Miq.) Miq.	Moraceae	Minor	
204	Milicia excelsa (Welw.) C.C.Berg	Moraceae	Major	Finished
205	Milicia regia (A.Chev.) C.C.Berg	Moraceae	Major	Finished

206	Morus mesozygia Stapf ex A.Chev.	Moraceae	Major	
207	Streblus dimepate (Bureau) C.C.Berg	Moraceae	Major	
208	Eucalyptus alba Reinw. ex Blume	Myrtaceae	Minor	
209	Eucalyptus camaldulensis Dehnh.	Myrtaceae	Major	
210	Eucalyptus citriodora Hook.	Myrtaceae	Minor	
211	Eucalyptus deglupta Blume	Myrtaceae	Minor	
212	Eucalyptus diversicolor F.Muell.	Myrtaceae	Minor	
213	Eucalyptus globulus Labill.	Myrtaceae	Major	
214	Eucalyptus grandis Hill ex Maiden	Myrtaceae	Major	
215	Eucalyptus gummifera (Sol. ex Gaertn.) Hochr.	Myrtaceae	Minor	
216	Eucalyptus kirtoniana F.Muell.	Myrtaceae	Minor	
217	Eucalyptus microcorys F.Muell.	Myrtaceae	Minor	
218	Eucalyptus propinqua Deane & Maiden	Myrtaceae	Mention	
219	Eucalyptus robusta Sm.	Myrtaceae	Major	
220	Eucalyptus tereticornis J.E.Sm.	Myrtaceae	Minor	
221	Eucalyptus torelliana F.Muell.	Myrtaceae	Minor	
222	Eucalyptus viminalis Labill.	Myrtaceae	Minor	
223	Syzygium cordatum Hochst. ex Sond.	Myrtaceae	Minor	
224	Syzygium guineense (Willd.) DC.	Myrtaceae	Major	Received
225	Syzygium sclerophyllum Brenan	Myrtaceae	Minor	
226	Aeschynomene crassicaulis Harms	Papilionaceae	Mention	Finished
227	Aeschynomene cristata Vatke	Papilionaceae	Mention	Finished
228	Aeschynomene elaphroxylon (Guill. & Perr.) Taub.	Papilionaceae	Minor	Finished
229	Aeschynomene pfundii Taub.	Papilionaceae	Mention	Finished
230	Amphimas ferrugineus Pierre ex Pellegr.	Papilionaceae	Minor	Finished
231	Amphimas pterocarpoides Harms	Papilionaceae	Major	Finished
232	Baphia capparidifolia Baker	Papilionaceae	Mention	Finished
233	Baphia kirkii Baker	Papilionaceae	Minor	Finished
234	Baphia laurifolia Baill.	Papilionaceae	Mention	Finished
235	Bolusanthes speciosus (Bolus) Harms	Papilionaceae	Minor	Finished
236	Dalbergia abrahamii Bosser & R.Rabev.	Papilionaceae	Mention	Finished
237	Dalbergia baronii Baker	Papilionaceae	Major	Finished
238	Dalbergia bathiei R.Vig.	Papilionaceae	Mention	Finished
239	Dalbergia chapelieri Baill.	Papilionaceae	Minor	Finished
240	Dalbergia chlorocarpa R.Vig.	Papilionaceae	Minor	Finished
241	Dalbergia davidii Bosser & R.Rabev.	Papilionaceae	Mention	Finished
242	Dalbergia delphinensis Bosser & R.Rabev.	Papilionaceae	Mention	Finished
243	Dalbergia ealaensis De Wild.	Papilionaceae	Mention	Finished
244	Dalbergia emirnensis Benth.	Papilionaceae	Mention	Finished
245	Dalbergia erubescens Bosser & R.Rabev.	Papilionaceae	Mention	Finished
246	Dalbergia glaberrima Bosser & R.Rabev.	Papilionaceae	Mention	Finished
247	Dalbergia glaucocarpa Bosser & R.Rabev.	Papilionaceae	Mention	Finished
248	Dalbergia greveana Baill.	Papilionaceae	Major	Finished
249	Dalbergia hildebrandtii Vatke	Papilionaceae	Minor	Finished
250	Dalbergia hostilis Benth.	Papilionaceae	Mention	Finished
251	Dalbergia humbertii R.Vig.	Papilionaceae	Mention	Finished
252	Dalbergia latifolia Roxb.	Papilionaceae	Minor	Finished
253	Dalbergia lemurica Bosser & R.Rabev.	Papilionaceae	Mention	Finished
254	Dalbergia louvelii R.Vig.	Papilionaceae	Major	Finished
255	Dalbergia madagascariensis Vatke	Papilionaceae	Minor	Finished
256	Dalbergia maritima R.Vig.	Papilionaceae	Mention	Finished
257	Dalbergia melanoxylon Guill. & Perr.	Papilionaceae	Major	Finished
258	Dalbergia microphylla Chiov.	Papilionaceae	Mention	Finished
259	Dalbergia mollis Bosser & R.Rabev.	Papilionaceae	Minor	Finished
260	Dalbergia monticola Bosser & R.Rabev.	Papilionaceae	Major	Finished
261	Dalbergia neoperrieri Bosser & R.Rabev.	Papilionaceae	Mention	Finished
262	Dalbergia nitidula Baker	Papilionaceae	Minor	Finished
263	Dalbergia normandii Bosser & R.Rabev.	Papilionaceae	Mention	Finished
264	Dalbergia oblongifolia G.Don	Papilionaceae	Mention	Finished
265	Dalbergia obovata E.Mey.	Papilionaceae	Mention	Finished
266	Dalbergia orientalis Bosser & R.Rabev.	Papilionaceae	Mention	Finished
267	Dalbergia peltieri Bosser & R.Rabev.	Papilionaceae	Mention	Finished
268	Dalbergia pervillei Vatke	Papilionaceae	Mention	Finished
269	Dalbergia pseudobaronii R.Vig.	Papilionaceae	Mention	Finished
270	Dalbergia purpurascens Baill.	Papilionaceae	Minor	Finished
271	Dalbergia sissoo Roxb. ex DC.	Papilionaceae	Major	Finished
272	Dalbergia suaresensis Baill.	Papilionaceae	Mention	Finished
273	Dalbergia trichocarpa Baker	Papilionaceae	Major	Finished
274	Dalbergia tricolor Drake	Papilionaceae	Mention	Finished
275	Dalbergia tsaratananensis Bosser & R.Rabev.	Papilionaceae	Mention	Finished
276	Dalbergia tsiandalana R.Vig.	Papilionaceae	Mention	Finished
277	Dalbergia urschii Bosser & R.Rabev.	Papilionaceae	Mention	Finished
278	Dalbergia xerophila Bosser & R.Rabev.	Papilionaceae	Mention	Finished
279	Dicraeopetalum capuronianum (M.Peltier) Yakovlev	Papilionaceae	Mention	Finished
280	Dicraeopetalum mahafaliense (M.Peltier) Yakovlev	Papilionaceae	Minor	Finished
281	Erythrina abyssinica Lam. ex DC.	Papilionaceae	Major	Finished
282	Erythrina addisoniae Hutch. & Dalziel	Papilionaceae	Mention	Finished
283	Erythrina burtii Baker f.	Papilionaceae	Mention	Finished
284	Erythrina excelsa Baker	Papilionaceae	Minor	Finished
285	Erythrina latissima E.Mey.	Papilionaceae	Mention	Finished
286	Erythrina melanacantha Harms	Papilionaceae	Mention	Finished
287	Erythrina sacleuxii Hua	Papilionaceae	Mention	Finished

288	Erythrina tholloniana Hua	Papilionaceae	Mention	Finished
289	Erythrina vogelii Hook.f.	Papilionaceae	Minor	Finished
290	Haplormosia monophylla (Harms) Harms	Papilionaceae	Major	
291	Millettia aurea (R.Vig.) Du Puy & Labat	Papilionaceae	Mention	Finished
292	Millettia chrysophylla Dunn	Papilionaceae	Mention	Finished
293	Millettia grandis (E.Mey.) Skeels	Papilionaceae	Minor	Finished
294	Millettia hitsika Du Puy & Labat	Papilionaceae	Mention	Finished
295	Millettia lane-poolei Dunn	Papilionaceae	Mention	Finished
296	Millettia laurentii De Wild.	Papilionaceae	Major	Finished
297	Millettia pallens Stapf	Papilionaceae	Mention	Finished
298	Millettia rhodantha Baill.	Papilionaceae	Minor	Finished
299	Millettia richardiana (Baill.) Du Puy & Labat	Papilionaceae	Minor	Finished
300	Millettia stuhlmannii Taub.	Papilionaceae	Major	Finished
301	Millettia versicolor Welw. ex Baker	Papilionaceae	Minor	Finished
302	Neoharmsia baronii (Drake) R.Vig. ex M.Peltier	Papilionaceae	Minor	Finished
303	Ormocarpopsis itremoensis Du Puy & Labat	Papilionaceae	Minor	Finished
304	Pericopsis angolensis (Baker) Meeuwen	Papilionaceae	Major	Received
305	Pericopsis elata (Harms) Meeuwen	Papilionaceae	Major	
306	Pericopsis laxiflora (Benth.) Meeuwen	Papilionaceae	Minor	
307	Phylloxylon arenicola Du Puy, Labat & Schrire	Papilionaceae	Minor	
308	Phylloxylon perrieri Drake	Papilionaceae	Major	
309	Phylloxylon xylophylloides (Baker) Du Puy, Labat & Schrire	Papilionaceae	Minor	
310	Platysepalum violaceum Welw. ex Baker	Papilionaceae	Minor	Finished
311	Pongamiopsis amygdalina (Baill.) R.Vig.	Papilionaceae	Mention	Finished
312	Pongamiopsis pervilleana (Baill.) R.Vig.	Papilionaceae	Minor	Finished
313	Pterocarpus angolensis DC.	Papilionaceae	Major	Finished
314	Pterocarpus dalbergioides Roxb. ex DC.	Papilionaceae	Minor	
315	Pterocarpus erinaceus Poir.	Papilionaceae	Major	Finished
316	Pterocarpus indicus Willd.	Papilionaceae	Minor	
317	Pterocarpus lucens Lepr.	Papilionaceae	Minor	Finished
318	Pterocarpus osun Craib	Papilionaceae	Minor	
319	Pterocarpus rotundifolius (Sond.) Druce	Papilionaceae	Minor	
320	Pterocarpus santalinoides DC.	Papilionaceae	Minor	Finished
321	Pterocarpus soyauxii Taub.	Papilionaceae	Major	Finished
322	Pterocarpus tinctorius Welw.	Papilionaceae	Minor	Finished
323	Pyranthus alasoa Du Puy & Labat	Papilionaceae	Minor	Finished
324	Pyranthus lucens (R.Vig.) Du Puy & Labat	Papilionaceae	Mention	Finished
325	Sakoanala madagascariensis R.Vig.	Papilionaceae	Minor	Finished
326	Vaughania cloiselii (Drake) Du Puy, Labat & Schrire	Papilionaceae	Mention	Finished
327	Vaughania dionaeifolia S.Moore	Papilionaceae	Minor	Finished
328	Vaughania interrrupta Du Puy, Labat & Schrire	Papilionaceae	Mention	Finished
329	Xanthocercis madagascariensis Baill.	Papilionaceae	Minor	Finished
330	Xeroderris stuhlmannii (Taub.) Mendon‡a & E.C.Sousa	Papilionaceae	Minor	Finished
331	Pinus caribaea Morelet	Pinaceae	Major	
332	Pinus elliottii Engelm.	Pinaceae	Minor	
333	Pinus kesiya Royle ex Gordon	Pinaceae	Major	
334	Pinus oocarpa Schiede ex Schltdl.	Pinaceae	Minor	
335	Pinus patula Schltdl. & Cham.	Pinaceae	Major	Received
336	Pinus radiata D.Don	Pinaceae	Minor	
337	Bambusa bambos (L.) Voss	Poaceae	Mention	Finished
338	Bambusa vulgaris Schrad. ex J.C.Wendl.	Poaceae	Major	Finished
339	Cathariostachys madagascariensis (A.Camus) S.Dransf.	Poaceae	Minor	Finished
340	Dendrocalamus asper (Schult. & Schult.f.) Backer ex K.Heyne	Poaceae	Mention	Finished
341	Dendrocalamus giganteus Wall. ex Munro	Poaceae	Minor	Finished
342	Oreobambos buchwaldii K.Schum.	Poaceae	Minor	Finished
343	Oxytenanthera abyssinica (A.Rich.) Munro	Poaceae	Major	Finished
344	Sinarundinaria alpina (K.Schum.) C.S.Chao & Renvoize	Poaceae	Major	Finished
345	Valiha diffusa S.Dransf.	Poaceae	Minor	Finished
346	Podocarpus falcatus Mirb.	Podocarpaceae	Major	Received
347	Podocarpus latifolius (Thunb.) Mirb.	Podocarpaceae	Major	
348	Podocarpus madagascariensis Baker	Podocarpaceae	Minor	
349	Podocarpus mannii Hook.f.	Podocarpaceae	Minor	
350	Podocarpus usumbarensis Pilg.	Podocarpaceae	Minor	
351	Carallia brachiata (Lour.) Merr.	Rhizophoraceae	Minor	Finished
352	Cassipourea afzelii (Oliv.) Alston	Rhizophoraceae	Minor	Finished
353	Cassipourea euryoides Alston	Rhizophoraceae	Minor	Finished
354	Cassipourea firestoneana Hutch. & Dalziel	Rhizophoraceae	Mention	Finished
355	Cassipourea gummiflua Tul.	Rhizophoraceae	Minor	Finished
356	Cassipourea malosana (Baker) Alston	Rhizophoraceae	Major	Finished
357	Cassipourea ndando Léonard ex Floret	Rhizophoraceae	Mention	Finished
358	Cassipourea nialatou Aubrév, & Pellegr.	Rhizophoraceae	Mention	Finished
359	Cassipourea ruwensoriensis (Engl.) Alston	Rhizophoraceae	Minor	Finished
360	Calodendrum capense (L.f.) Thunb.	Rutaceae	Minor	
361	Cedrelopsis grevei Baill.	Rutaceae	Major	
362	Cedrelopsis microfoliolata J.F.Leroy	Rutaceae	Minor	
363	Cedrelopsis trivalvis J.F.Leroy	Rutaceae	Minor	
364	Chloroxylon faho Capuron	Rutaceae	Major	
365	Chloroxylon falcatum Capuron	Rutaceae	Minor	
366	Chloroxylon swietenia (Roxb.) DC.	Rutaceae	Minor	
367	Fagaropsis angolensis (Engl.) Dale	Rutaceae	Minor	
368	Fagaropsis hildebrandtii (Engl.) Milne-Redh.	Rutaceae	Mention	
369	Flindersia brayleyana F.Muell.	Rutaceae	Minor	

370	Ptaeroxylon obliquum (Thunb.) Radlk.	Rutaceae	Minor	
371	Vepris dainellii (Pic.Serm.) Kokwaro	Rutaceae	Minor	
372	Vepris glandulosa (Hoyle & Leaky) Kokwaro	Rutaceae	Minor	
373	Vepris lanceolata (Lam.) G.Don	Rutaceae	Minor	
374	Vepris nobilis (Delile) Mziray	Rutaceae	Minor	
375	Vepris simplicifolia (Verd.) Mziray	Rutaceae	Minor	
376	Vepris tabouensis (Aubr,v. & Pellegr.) Mziray	Rutaceae	Minor	
377	Vepris verdoorniana (Exell & Mendon‡a) Mziray	Rutaceae	Minor	
378	Zanthoxylum daveyi (Verd.) P.G.Waterman	Rutaceae	Minor	
379	Zanthoxylum gilletii (De Wild.) P.G.Waterman	Rutaceae	Major	Received
380	Zanthoxylum heitzii (Aubr,v. & Pellegr.) P.G.Waterman	Rutaceae	Major	Received
381	Zanthoxylum leprieurii Guill. & Perr.	Rutaceae	Minor	
382	Zanthoxylum rubescens Hook.f.	Rutaceae	Minor	
383	Zanthoxylum usambarense (Engl.) Kokwaro	Rutaceae	Minor	
384	Autranella congolensis (De Wild.) A.Chev.	Sapotaceae	Major	Finished
385	Baillonella toxisperma Pierre	Sapotaceae	Major	Finished
386	Chrysophyllum africanum A.DC.	Sapotaceae	Minor	Finished
387	Chrysophyllum boivinianum (Pierre) Baehni	Sapotaceae	Minor	Finished
388	Chrysophyllum giganteum A.Chev.	Sapotaceae	Minor	Finished
389	Chrysophyllum gorungosanum Engl.	Sapotaceae	Mention	Finished
390	Chrysophyllum lacourtianum De Wild.	Sapotaceae	Major	Finished
391	Chrysophyllum perpulchrum Mildbr.	Sapotaceae	Minor	Finished
392	Chrysophyllum pruniforme Pierre ex Engl.	Sapotaceae	Minor	Finished
393	Chrysophyllum subnudum Baker	Sapotaceae	Minor	Finished
394	Lecomtedoxa klaineana (Pierre ex Engl.) Dubard	Sapotaceae	Major	Finished
395	Lecomtedoxa nogo (A.Chev.) Aubrév.	Sapotaceae	Mention	Finished
396	Letestua durissima (A.Chev.) Lecomte	Sapotaceae	Minor	Finished
397	Manilkara butugii Chiov.	Sapotaceae	Minor	
398	Manilkara dawei (Stapf) Chiov.	Sapotaceae	Minor	
399	Manilkara obovata (Sabine & G.Don) J.H.Hemsl.	Sapotaceae	Major	
400	Manilkara sansibarensis (Engl.) Dubard	Sapotaceae	Minor	
401	Manilkara sulcata (Engl.) Dubard	Sapotaceae	Minor	
402	Mimusops andongensis Hiern	Sapotaceae	Minor	Finished
403	Mimusops caffra E.Mey. ex A.DC.	Sapotaceae	Minor	Finished
404	Mimusops elengi L.	Sapotaceae	Major	Finished
405	Mimusops kummel Bruce ex A.DC.	Sapotaceae	Minor	Finished
406	Mimusops laurifolia (Forssk.) Friis	Sapotaceae	Mention	Finished
407	Mimusops maxima (Poir.) R.E.Vaughan	Sapotaceae	Minor	Finished
408	Mimusops obovata Nees ex Sond.	Sapotaceae	Mention	Finished
409	Mimusops obtusifolia Lam.	Sapotaceae	Mention	Finished
410	Mimusops zeyheri Sond.	Sapotaceae	Minor	Finished
411	Neolemonniera clitandrifolia (A.Chev.) Heine	Sapotaceae	Minor	Finished
412	Omphalocarpum ahia A.Chev.	Sapotaceae	Mention	Finished
413	Omphalocarpum elatum Miers	Sapotaceae	Minor	Finished
414	Pouteria adolfi-friedericii (Engl.) A.Meeuse	Sapotaceae	Major	Finished
415	Pouteria alnifolia (Baker) Roberty	Sapotaceae	Minor	Finished
416	Pouteria altissima (A.Chev.) Baehni	Sapotaceae	Major	Finished
417	Pouteria aningeri Baehni	Sapotaceae	Major	Finished
418	Pouteria pseudoracemosa (J.H.Hemsl.) L.Gaut.	Sapotaceae	Mention	Finished
419	Pouteria superba (Vermoesen) L.Gautier	Sapotaceae	Mention	Finished
420	Sideroxylon inerme L.	Sapotaceae	Minor	Finished
421	Sideroxylon puberulum DC	Sapotaceae	Mention	Finished
422	Sideroxylon sessiliflorum (Poiret) Capuron	Sapotaceae	Mention	Finished
423	Synsepalum afzelii (Engl.) T.D.Penn.	Sapotaceae	Minor	Finished
424	Synsepalum brevipes (Baker) T.D.Penn.	Sapotaceae	Minor	Finished
425	Synsepalum pobeguinianum (Pierre ex Lecomte) Aké Assi & L.Gaut.	Sapotaceae	Mention	Finished
426	Synsepalum stipulatum (Radlk.) Engl.	Sapotaceae	Mention	Finished
427	Tieghemella africana Pierre	Sapotaceae	Major	Finished
428	Tieghemella heckelii Pierre ex A.Chev.	Sapotaceae	Major	Finished
429	Kirkia acuminata Oliv.	Simaroubaceae	Minor	Finished
430	Nothospondias staudtii Engl.	Simaroubaceae	Minor	Finished
431	Odyendyea gabonensis (Pierre) Engl.	Simaroubaceae	Minor	Finished
432	Quassia undulata (Guill. & Perr.) D.Dietr.	Simaroubaceae	Major	
433	Chlamydocola chlamydantha (K.Schum.) M.Bodard	Sterculiaceae	Minor	Finished
434	Cola bruneelii De Wild.	Sterculiaceae	Mention	Finished
435	Cola buntingii Baker f.	Sterculiaceae	Mention	Finished
436	Cola cauliflora Mast.	Sterculiaceae	Minor	Finished
437	Cola clavata Mast.	Sterculiaceae	Minor	Finished
438	Cola discoglypremnophylla Brenan & Jones	Sterculiaceae	Mention	Finished
439	Cola greenwayi Brenan	Sterculiaceae	Minor	Finished
440	Cola lateritia K.Schum.	Sterculiaceae	Minor	Finished
441	Cola laurifolia Mast.	Sterculiaceae	Minor	Finished
442	Cola lukei Cheek	Sterculiaceae	Mention	Finished
443	Cola ululoma Brenan	Sterculiaceae	Mention	Finished
444	Cola usambarensis Engl.	Sterculiaceae	Mention	Finished
445	Dombeya cymosa Harv.	Sterculiaceae	Mention	Finished
446	Dombeya kirkii Mast.	Sterculiaceae	Mention	Finished
447	Dombeya rotundifolia (Hochst.) Planch.	Sterculiaceae	Minor	Finished
448	Dombeya torrida (J.F.Gmel.) Bamps	Sterculiaceae	Minor	Finished
449	Eribroma oblonga (Mast.) M.Bodard ex Hall,	Sterculiaceae	Major	
450	Heritiera densiflora (Pellegr.) Kosterm.	Sterculiaceae	Minor	Finished
451	Heritiera littoralis Aiton	Sterculiaceae	Minor	Finished

452	Heritiera utilis (Sprague) Sprague	Sterculiaceae	Major	Finished
453	Hildegardia erythrosiphon (Baill.) Kosterm.	Sterculiaceae	Minor	Finished
454	Mansonia altissima (A.Chev.) A.Chev.	Sterculiaceae	Major	
455	Nesogordonia holtzii (Engl.) Capuron	Sterculiaceae	Minor	Finished
456	Nesogordonia kabingaensis (K.Schum.) Capuron ex R.Germ.	Sterculiaceae	Major	Finished
457	Octolobus spectabilis Welw.	Sterculiaceae	Minor	Finished
458	Pterygota macrocarpa K.Schum.	Sterculiaceae	Major	
459	Pterygota mildbraedii Engl.	Sterculiaceae	Minor	
460	Sterculia appendiculata K.Schum.	Sterculiaceae	Minor	
461	Sterculia foetida L.	Sterculiaceae	Minor	
462	Sterculia quinqueloba (Garcke) K.Schum.	Sterculiaceae	Minor	
463	Sterculia rhinopetala K.Schum.	Sterculiaceae	Major	
464	Triplochiton scleroxylon K.Schum.	Sterculiaceae	Major	Finished
465	Berrya cordifolia Roxb.	Tiliaceae	Minor	Finished
466	Carpodiptera africana Mast.	Tiliaceae	Minor	Finished
467	Christiana africana DC.	Tiliaceae	Minor	Finished
468	Duboscia macrocarpa Bocq.	Tiliaceae	Minor	Finished
469	Duboscia polyantha Pierre ex A.Chev.	Tiliaceae	Mention	Finished
470	Duboscia viridiflora (K.Schum.) Mildbr.	Tiliaceae	Mention	Finished
471	Grewia bicolor Juss.	Tiliaceae	Minor	Finished
472	Grewia ferruginea Hochst. ex A.Rich.	Tiliaceae	Mention	Finished
473	Grewia louisii R.Wilczek	Tiliaceae	Mention	Finished
474	Grewia microthyrsa K.Schum. ex Burret	Tiliaceae	Mention	Finished
475	Grewia mollis Juss.	Tiliaceae	Minor	Finished
476	Grewia pinnatifida Mast.	Tiliaceae	Mention	Finished
477	Grewia plagiophylla K.Schum.	Tiliaceae	Mention	Finished
478	Gmelina arborea Roxb.	Verbenaceae	Major	Finished
479	Premna angolensis Gürke	Verbenaceae	Minor	Finished
480	Premna hildebrandtii Gürke	Verbenaceae	Mention	Finished
481	Premna maxima T.C.E.Fr.	Verbenaceae	Minor	Finished
482	Premna mooiensis (H.Pearson) Piep.	Verbenaceae	Mention	Finished
483	Premna schliebenii Werderm.	Verbenaceae	Mention	Finished
484	Tectona grandis L.f.	Verbenaceae	Major	Finished
485	Vitex doniana Sweet	Verbenaceae	Major	Received
486	Vitex ferruginea Schumach. & Thonn.	Verbenaceae	Minor	
487	Vitex grandifolia Gürke	Verbenaceae	Minor	
488	Vitex keniensis Turrill	Verbenaceae	Major	Received
489	Vitex micrantha Gürke	Verbenaceae	Minor	
490	Vitex oxycuspis Baker	Verbenaceae	Minor	
491	Vitex pachyphylla Baker	Verbenaceae	Minor	
492	Vitex phaeotricha Mildbr. ex Piep.	Verbenaceae	Minor	

Annex 5. Tentative List of species for PROTA 7(2): 'Timbers 2' (16/07/2007)

The 566 species are listed alphabetically and are tentatively classified as 'Majors' and 'Minors'.
They belong to the following 64 families:

Family	Number of Genera	Number of 'Major'species	Number of 'Minor'species	Total Species
Alangiaceae	1	0	2	2
Anacardiaceae	7	4	21	25
Anisophylleaceae	3	1	3	4
Annonaceae	12	2	18	20
Aquifoliaceae	1	0	1	1
Araliaceae	3	1	8	9
Asteraceae	1	1	1	2
Bignoniaceae	2	1	3	4
Boraginaceae	2	3	7	10
Buddlejaceae	1	0	2	2
Caesalpiniaceae	58	29	120	149
Capparaceae	4	1	6	7
Caricaceae	1	0	1	1
Cecropiaceae	1	1	0	1
Celastraceae	3	1	7	8
Chrysobalanaceae	4	1	7	8
Cornaceae	2	0	2	2
Ctenolophonaceae	1	0	1	1
Dichapetalaceae	1	0	1	1
Dilleniaceae	1	1	0	1
Dipterocarpaceae	2	0	3	3
Ebenaceae	2	1	21	22
Elaeocarpaceae	2	1	2	3
Erythroxylaceae	2	0	3	3
Euphorbiaceae	25	7	47	54
Flacourtiaceae	11	1	20	21
Hamamelidaceae	1	0	1	1
Hernandiaceae	1	1	0	1
Heteropyxidaceae	1	0	1	1
Hippocrateaceae	1	0	1	1
Hoplestigmataceae	1	0	1	1
Hymenocardiaceae	1	0	1	1
Icacinaceae	2	1	1	2
Irvingiaceae	2	0	2	2
Lecythidaceae	3	2	3	5
Linaceae	1	0	1	1
Loganiaceae	3	0	6	6
Lythraceae	1	0	1	1
Malpighiaceae	1	0	1	1
Medusandraceae	2	0	2	2
Melastomataceae	2	0	3	3
Monimiaceae	2	0	2	2
Myristicaceae	4	2	5	7
Myrsinaceae	1	1	0	1
Ochnaceae	5	1	10	11
Octoknemataceae	1	0	1	1
Olacaceae	6	1	8	9
Oleaceae	3	1	3	4
Pittosporaceae	1	0	1	1
Polygalaceae	2	1	2	3
Proteaceae	3	0	4	4
Rhamnaceae	2	0	3	3
Rubiaceae	34	13	54	67
Salicaceae	1	2	1	3
Sapindaceae	18	5	29	34
Scrophulariaceae	1	0	1	1
Scytopetalaceae	3	0	3	3
Sonneratiaceae	1	1	0	1
Tamaricaceae	1	1	1	2
Thymelaeaceae	1	0	1	1
Ulmaceae	3	4	4	8
Violaceae	1	0	5	5
Vochysiaceae	1	0	1	1
Zygophyllaceae	1	1	0	1
Total	**272**	**95**	**471**	**566**

Species	Family	Major/Minor
Alangium chinense (Lour.) Harms	Alangiaceae	Minor
Alangium salviifolium (L.f.) Wangerin	Alangiaceae	Minor
Antrocaryon klaineanum Pierre	Anacardiaceae	Major
Antrocaryon micraster A.Chev. & Guill.	Anacardiaceae	Major
Anthrocaryon nannanii De Wild.	Anacardiaceae	Major
Lannea humilis (Oliv.) Engl.	Anacardiaceae	Minor
Lannea welwitschii (Hiern) Engl.	Anacardiaceae	Major
Ozoroa schinzii (Engl.) R. & A. Fernandes	Anacardiaceae	Minor
Poupartia chapelieri (Guillaumin) H.Perrier	Anacardiaceae	Minor
Poupartia silvatica H.Perrier	Anacardiaceae	Minor
Rhus chirindensis Baker f.	Anacardiaceae	Minor
Rhus glutinosa Hochst. ex A.Rich.	Anacardiaceae	Minor
Rhus grandidieri (Engl.) Baill.	Anacardiaceae	Minor
Rhus gueinzii Sond.	Anacardiaceae	Minor
Rhus lucida L.	Anacardiaceae	Minor
Rhus taratana (Baker) H.Perrier	Anacardiaceae	Minor
Rhus viminalis Vahl	Anacardiaceae	Minor
Sorindeia claessensii De Wild.	Anacardiaceae	Minor
Sorindeia gilletii De Wild.	Anacardiaceae	Minor
Sorindeia submontana Van der Veken	Anacardiaceae	Minor
Trichoscypha arborea (A.Chev.) A.Chev.	Anacardiaceae	Minor
Trichoscypha beguei Aubr,v. & Pellegr.	Anacardiaceae	Minor
Trichoscypha cavalliensis Aubr,v. & Pellegr.	Anacardiaceae	Minor
Trichoscypha ealaensis Van der Veken	Anacardiaceae	Minor
Trichoscypha longifolia (Hook.f.) Engl.	Anacardiaceae	Minor
Trichoscypha oba Aubr,v. & Pellegr.	Anacardiaceae	Minor
Trichoscypha yapoensis Aubr,v. & Pellegr.	Anacardiaceae	Minor
Anisophyllea laurina R.Br. ex Sabine	Anisophylleaceae	Minor
Anisophyllea meniaudi Aubr,v. & Pellegr.	Anisophylleaceae	Minor
Anopyxis klaineana (Pierre) Engl.	Anisophylleaceae	Minor
Poga oleosa Pierre	Anisophylleaceae	Major
Annickia chlorantha (Oliv.) Setten & Maas	Annonaceae	Major
Annickia polycarpa (DC.) Setten & Maas	Annonaceae	Major
Asteranthe asterias (S.Moore) Engl. & Diels	Annonaceae	Minor
Hexalobus crispiflorus A.Rich.	Annonaceae	Minor
Hexalobus monopetalus (A.Rich.) Engl. & Diels	Annonaceae	Minor
Isolona thonneri (De Wild. & T.Durand) Engl. & Diels	Annonaceae	Minor
Meiocarpidium lepidotum Engl. & Diels	Annonaceae	Minor
Mischogyne elliotianum (Engl. & Diels) R.E.Fr.	Annonaceae	Minor
Pachypodanthium staudtii (Engl. & Diels) Engl. & Diels	Annonaceae	Minor
Polyalthia oliveri Engl.	Annonaceae	Minor
Polyalthia suaveolens Engl. & Diels	Annonaceae	Minor
Uvariastrum pierreanum Engl.	Annonaceae	Minor
Uvariodendron anisatum Verdc.	Annonaceae	Minor
Uvariopsis congensis Robyns & Ghesq.	Annonaceae	Minor
Xylopia letestui Pellegr.	Annonaceae	Minor
Xylopia pynaertii De Wild.	Annonaceae	Minor
Xylopia quintasii Engl. & Diels	Annonaceae	Minor
Xylopia rubescens Oliv.	Annonaceae	Minor
Xylopia staudtii Engl. & Diels	Annonaceae	Minor
Xylopia villosa Chipp	Annonaceae	Minor
Ilex mitis (L.) Radlk.	Aquifoliaceae	Minor
Cussonia arborea Hochst. ex A.Rich.	Araliaceae	Major
Cussonia bancoensis Aubr,v. & Pellegr.	Araliaceae	Minor
Cussonia holstii Harms ex Engl.	Araliaceae	Minor
Cussonia spicata Thunb.	Araliaceae	Minor
Cussonia zimmermannii Harms	Araliaceae	Minor
Polyscias fulva (Hiern) Harms	Araliaceae	Minor
Polyscias kikuyensis Summerh.	Araliaceae	Minor
Schefflera abyssinica (Hochst. ex A.Rich.) Harms	Araliaceae	Minor
Schefflera umbellifera (Sond.) Baill.	Araliaceae	Minor
Brachylaena huillensis O.Hoffm.	Asteraceae	Major
Brachylaena ramiflora (DC.) Humbert	Asteraceae	Minor
Markhamia lutea (Benth.) K.Schum.	Bignoniaceae	Major
Markhamia obtusifolia (Baker) Sprague	Bignoniaceae	Minor
Markhamia zanzibarica (Bojer ex DC.) K.Schum.	Bignoniaceae	Minor
Phyllarthron madagascariense K.Schum.	Bignoniaceae	Minor
Cordia africana Lam.	Boraginaceae	Major
Cordia caffra Sond.	Boraginaceae	Minor
Cordia millenii Baker	Boraginaceae	Minor
Cordia platythyrsa Baker	Boraginaceae	Major

Cordia senegalensis Juss.	Boraginaceae	Minor
Cordia subcordata Lam.	Boraginaceae	Major
Ehretia amoena Klotzsch	Boraginaceae	Minor
Ehretia cymosa Thonn.	Boraginaceae	Minor
Ehretia rigida (Thunb.) Druce	Boraginaceae	Minor
Ehretia trachyphylla C.H.Wright	Boraginaceae	Minor
Buddleja saligna Willd.	Buddlejaceae	Minor
Buddleja salviifolia (L.) Lam.	Buddlejaceae	Minor
Acrocarpus fraxinifolius Arn.	Caesalpiniaceae	Major
Afzelia africana Sm. ex Pers.	Caesalpiniaceae	Major
Afzelia bella Harms	Caesalpiniaceae	Major
Afzelia bipindensis Harms	Caesalpiniaceae	Minor
Afzelia pachyloba Harms	Caesalpiniaceae	Minor
Afzelia parviflora (Vahl) Hepper	Caesalpiniaceae	Minor
Afzelia quanzensis Welw.	Caesalpiniaceae	Major
Anthonotha crassifolia (Baill.) J.L,onard	Caesalpiniaceae	Minor
Anthonotha fragrans (Baker f.) Exell & Hillcoat	Caesalpiniaceae	Minor
Anthonotha macrophylla P.Beauv.	Caesalpiniaceae	Minor
Anthonotha obanensis (Baker f.) J.Léonard	Caesalpiniaceae	Minor
Baikiaea plurijuga Harms	Caesalpiniaceae	Major
Baphiopsis parviflora Baker	Caesalpiniaceae	Minor
Baudouinia fluggeiformis Baill.	Caesalpiniaceae	Minor
Baudouinia louvelii R.Vig.	Caesalpiniaceae	Minor
Baudouinia rouxevillei H.Perrier	Caesalpiniaceae	Minor
Bauhinia grandidieri Baill.	Caesalpiniaceae	Minor
Bauhinia hildebrandtii Vatke	Caesalpiniaceae	Minor
Bauhinia madagascariensis Desv.	Caesalpiniaceae	Minor
Bauhinia morondavensis Du Puy & R.Rabev.	Caesalpiniaceae	Minor
Bauhinia podopetala Baker	Caesalpiniaceae	Minor
Berlinia bracteosa Benth.	Caesalpiniaceae	Major
Berlinia confusa Hoyle	Caesalpiniaceae	Minor
Berlinia congolensis (Baker f.) Keay	Caesalpiniaceae	Minor
Berlinia craibiana Baker f.	Caesalpiniaceae	Minor
Berlinia grandiflora (Vahl) Hutch. & Dalziel	Caesalpiniaceae	Major
Berlinia occidentalis Keay	Caesalpiniaceae	Minor
Bobgunnia fistuloides (Harms) J.H.Kirkbr. & Wiersema	Caesalpiniaceae	Minor
Bobgunnia madagascariensis (Desv.) J.H.Kirkbr. & Wiersema	Caesalpiniaceae	Major
Brachystegia eurycoma Harms	Caesalpiniaceae	Major
Brachystegia glaucescens Burtt Davy & Hutch.	Caesalpiniaceae	Minor
Brachystegia kennedyi Hoyle	Caesalpiniaceae	Minor
Brachystegia laurentii (De Wild.) Louis ex Hoyle	Caesalpiniaceae	Minor
Brachystegia leonensis Burtt Davy & Hutch.	Caesalpiniaceae	Minor
Brachystegia mildbraedii Harms	Caesalpiniaceae	Minor
Brachystegia nigerica Hoyle & A.P.D.Jones	Caesalpiniaceae	Minor
Brachystegia spiciformis Benth.	Caesalpiniaceae	Major
Brachystegia tamarindoides Benth.	Caesalpiniaceae	Minor
Brandzeia filicifolia Baill.	Caesalpiniaceae	Minor
Burkea africana Hook.	Caesalpiniaceae	Major
Bussea massaiensis (Taub.) Harms	Caesalpiniaceae	Minor
Bussea occidentalis Hutch.	Caesalpiniaceae	Minor
Bussea perrieri R.Vig.	Caesalpiniaceae	Minor
Bussea sakalava Du Puy & R.Rabev.	Caesalpiniaceae	Minor
Caesalpinia insolita (Harms) Brenan & Gillett	Caesalpiniaceae	Minor
Cassia hippophallus Capuron	Caesalpiniaceae	Minor
Chidlowia sanguinea Hoyle	Caesalpiniaceae	Minor
Colophospermum mopane (Benth.) J.L,onard	Caesalpiniaceae	Major
Colvillea racemosa Bojer ex Hook.	Caesalpiniaceae	Minor
Copaifera religiosa J.L,onard	Caesalpiniaceae	Minor
Cordyla africana Lour.	Caesalpiniaceae	Major
Cordyla densiflora Milne-Redh.	Caesalpiniaceae	Minor
Cordyla haraka Capuron	Caesalpiniaceae	Minor
Cordyla madagascariensis R.Vig.	Caesalpiniaceae	Minor
Crudia gabonensis Pierre ex Harms	Caesalpiniaceae	Minor
Cryptosepalum staudtii Harms	Caesalpiniaceae	Minor
Cryptosepalum tetraphyllum (Hook.f.) Benth.	Caesalpiniaceae	Minor
Cynometra abrahamii Du Puy & R.Rabev.	Caesalpiniaceae	Minor
Cynometra alexandri C.H.Wright	Caesalpiniaceae	Major
Cynometra ananta Hutch. & Dalziel	Caesalpiniaceae	Minor
Cynometra aurita R.Vig.	Caesalpiniaceae	Minor
Cynometra commersoniana (DC.) Baill.	Caesalpiniaceae	Minor
Cynometra dauphinensis Du Puy & R.Rabev.	Caesalpiniaceae	Minor
Cynometra hankei Harms	Caesalpiniaceae	Minor
Cynometra madagascariensis Baill.	Caesalpiniaceae	Minor
Cynometra mannii Oliv.	Caesalpiniaceae	Minor
Cynometra megalophylla Harms	Caesalpiniaceae	Minor
Cynometra sakalava Du Puy & R.Rabrev.	Caesalpiniaceae	Minor

Cynometra suaheliensis (Taub.) Baker f.	Caesalpiniaceae	Minor
Cynometra vogelii Hook.f.	Caesalpiniaceae	Minor
Cynometra webberi Baker f.	Caesalpiniaceae	Minor
Daniellia klainei Pierre ex A.Chev.	Caesalpiniaceae	Minor
Daniellia oblonga Oliv.	Caesalpiniaceae	Minor
Daniellia soyauxii (Harms) Rolfe	Caesalpiniaceae	Minor
Daniellia thurifera Benn.	Caesalpiniaceae	Major
Delonix boiviniana (Baill.) Capuron	Caesalpiniaceae	Minor
Detarium macrocarpum Harms	Caesalpiniaceae	Minor
Detarium senegalense J.F.Gmel.	Caesalpiniaceae	Major
Dialium aubrevillei Pellegr.	Caesalpiniaceae	Minor
Dialium guineense Willd.	Caesalpiniaceae	Major
Dialium madagascariense Baill.	Caesalpiniaceae	Minor
Dialium occidentale (Capuron) Du Puy & R.Rabev.	Caesalpiniaceae	Minor
Dialium orientale Baker f.	Caesalpiniaceae	Minor
Dialium pachyphyllum Harms	Caesalpiniaceae	Minor
Dialium unifoliolatum Capuron	Caesalpiniaceae	Minor
Didelotia africana Baill.	Caesalpiniaceae	Minor
Didelotia afzelii Taub.	Caesalpiniaceae	Minor
Didelotia brevipaniculata J.L,onard	Caesalpiniaceae	Minor
Didelotia idae J.L,onard, Oldeman & de Wit	Caesalpiniaceae	Minor
Didelotia minutiflora (A.Chev.) J.L,onard	Caesalpiniaceae	Minor
Distemonanthus benthamianus Baill.	Caesalpiniaceae	Major
Eurypetalum batesii Baker f.	Caesalpiniaceae	Minor
Eurypetalum unijugum Harms	Caesalpiniaceae	Minor
Gilbertiodendron bilineatum (Hutch. & Dalziel) J.L,onard	Caesalpiniaceae	Minor
Gilbertiodendron brachystegioides (Harms) J.L,onard	Caesalpiniaceae	Minor
Gilbertiodendron dewevrei (De Wild.) J.L,onard	Caesalpiniaceae	Major
Gilbertiodendron grandiflorum (De Wild.) J.L,onard	Caesalpiniaceae	Minor
Gilbertiodendron ivorense (A.Chev.) J.L,onard	Caesalpiniaceae	Minor
Gilbertiodendron limba (Scott-Elliot) J.L,onard	Caesalpiniaceae	Minor
Gilbertiodendron preussii (Harms) J.L,onard	Caesalpiniaceae	Minor
Gilbertiodendron splendidum (A.Chev. ex Hutch. & Dalziel) J.L	Caesalpiniaceae	Minor
Gilletiodendron kisantuense (Vermoesen ex De Wild.) J.L,onard	Caesalpiniaceae	Minor
Gilletiodendron pierreanum (Harms) J.L,onard	Caesalpiniaceae	Minor
Gossweilerodendron balsamiferum (Vermoesen) Harms	Caesalpiniaceae	Major
Guibourtia arnoldiana (De Wild. & T.Durand) J.L,onard	Caesalpiniaceae	Major
Guibourtia coleosperma (Benth.) J.L,onard	Caesalpiniaceae	Major
Guibourtia conjugata (Bolle) J.L,onard	Caesalpiniaceae	Minor
Guibourtia ehie (A.Chev.) J.L,onard	Caesalpiniaceae	Major
Guibourtia leonensis J.L,onard	Caesalpiniaceae	Minor
Guibourtia tessmannii (Harms) J.L,onard	Caesalpiniaceae	Minor
Hylodendron gabunense Taub.	Caesalpiniaceae	Minor
Intsia bijuga (Colebr.) Kuntze	Caesalpiniaceae	Major
Isoberlinia angolensis (Benth.) Hoyle & Brenan	Caesalpiniaceae	Minor
Isoberlinia doka Craib & Stapf	Caesalpiniaceae	Major
Isoberlinia tomentosa (Harms) Craib & Stapf	Caesalpiniaceae	Minor
Julbernardia pellegriniana Troupin	Caesalpiniaceae	Minor
Julbernardia seretii (De Wild.) Troupin	Caesalpiniaceae	Minor
Mendorovia dumaziana Capuron	Caesalpiniaceae	Minor
Microberlinia bisulcata A.Chev.	Caesalpiniaceae	Minor
Microberlinia brazzavillensis A.Chev.	Caesalpiniaceae	Major
Mildbraediodendron excelsum Harms	Caesalpiniaceae	Minor
Monopetalanthus heitzii Pellegr.	Caesalpiniaceae	Minor
Monopetalanthus pteridophyllus Harms	Caesalpiniaceae	Minor
Normandiodendron romii (De Wild.) J.Léonard	Caesalpiniaceae	Minor
Oxystigma buchholzii Harms	Caesalpiniaceae	Minor
Oxystigma mannii (Baill.) Harms	Caesalpiniaceae	Minor
Oxystigma msoo Harms	Caesalpiniaceae	Minor
Oxystigma oxyphyllum (Harms) J.L,onard	Caesalpiniaceae	Major
Paramacrolobium coeruleum (Taub.) J.L,onard	Caesalpiniaceae	Minor
Parkinsonia anacantha Brenan	Caesalpiniaceae	Minor
Pellegriniodendron diphyllum (Harms) J.L,onard	Caesalpiniaceae	Minor
Plagiosiphon emarginatus (Hutch. & Dalziel) J.L,onard	Caesalpiniaceae	Minor
Schotia brachypetala Sond.	Caesalpiniaceae	Minor
Schotia latifolia Jacq.	Caesalpiniaceae	Minor
Scorodophloeus fischeri (Taub.) J.L,onard	Caesalpiniaceae	Minor
Senna lactea (Vatke) Du Puy	Caesalpiniaceae	Minor
Senna meridionalis (R.Vig.) Du Puy	Caesalpiniaceae	Minor
Senna perrieri (R.Vig.) Du Puy	Caesalpiniaceae	Minor
Senna viguirella (Ghesq.) Du Puy	Caesalpiniaceae	Minor
Sindora klaineana Pierre ex Pellegr.	Caesalpiniaceae	Minor
Stemonocoleus micranthus Harms	Caesalpiniaceae	Minor
Talbotiella gentii Hutch. & Greenway	Caesalpiniaceae	Minor
Tessmannia africana Harms	Caesalpiniaceae	Major
Tessmannia baikiaoides Hutch. & Dalziel	Caesalpiniaceae	Minor

Tetraberlinia bifoliolata (Harms) Hauman	Caesalpiniaceae	Major
Tetraberlinia polyphylla (Harms) J.Léonard	Caesalpiniaceae	Minor
Tetraberlinia tubmaniana J.L.,onard	Caesalpiniaceae	Minor
Tetrapterocarpon geayi Humbert	Caesalpiniaceae	Minor
Triplisomeris explicans (Baill.) Aubr,v. & Pellegr.	Caesalpiniaceae	Minor
Boscia angustifolia A.Rich.	Capparaceae	Minor
Boscia coriacea Pax	Capparaceae	Minor
Boscia mazzocchii (Chiov.) S.Fici & Kers	Capparaceae	Minor
Buchholzia coriacea Engl.	Capparaceae	Minor
Maerua crassifolia Forssk.	Capparaceae	Major
Maerua duchesnei (De Wild.) F.White	Capparaceae	Minor
Ritchiea albersii Gilg	Capparaceae	Minor
Cylicomorpha solmsii (Urb.) Urb.	Caricaceae	Minor
Musanga cecropioides R.Br.	Cecropiaceae	Major
Cassine transvaalensis (Burtt Davy) Codd	Celastraceae	Minor
Elaeodendron buchananii (Loes.) Loes.	Celastraceae	Minor
Elaeodendron matabelicum Loes.	Celastraceae	Minor
Elaeodendron orientale J.Jacq.	Celastraceae	Minor
Maytenus acuminata (L.f.) Loes.	Celastraceae	Minor
Maytenus leptopus (Tul.) N.Robson	Celastraceae	Minor
Maytenus senegalensis (Lam.) Exell	Celastraceae	Major
Maytenus undata Blakelock	Celastraceae	Minor
Dactyladenia scabrifolia (Hua) Prance & F.White	Chrysobalanaceae	Minor
Magnistipula cupheiflora Mildbr.	Chrysobalanaceae	Minor
Maranthes chrysophylla (Oliv.) Prance	Chrysobalanaceae	Minor
Maranthes glabra (Oliv.) Prance	Chrysobalanaceae	Minor
Maranthes goetzeniana (Engl.) Prance	Chrysobalanaceae	Minor
Maranthes robusta (Oliv.) Prance	Chrysobalanaceae	Minor
Parinari congensis Didr.	Chrysobalanaceae	Minor
Parinari excelsa Sabine	Chrysobalanaceae	Major
Afrocrania volkensii (Harms) Hutch.	Cornaceae	Minor
Curtisia dentata (Burm.f.) C.A.Sm.	Cornaceae	Minor
Ctenolophon englerianus Mildbr.	Ctenolophonaceae	Minor
Tapura fischeri Engl.	Dichapetalaceae	Minor
Dillenia indica L.	Dilleniaceae	Major
Monotes engleri Gilg	Dipterocarpaceae	Minor
Monotes glaber Sprague	Dipterocarpaceae	Minor
Vateria seychellarum (Dyer) Heim	Dipterocarpaceae	Minor
Diospyros abyssinica (Hiern) F.White	Ebenaceae	Minor
Diospyros barteri Hiern	Ebenaceae	Minor
Diospyros bipindensis Gürke	Ebenaceae	Minor
Diospyros cooperi (Hutch. & Dalziel) F.White	Ebenaceae	Minor
Diospyros crassiflora Hiern	Ebenaceae	Major
Diospyros dendo Hiern	Ebenaceae	Minor
Diospyros ebenum J.K"nig	Ebenaceae	Minor
Diospyros elliotii (Hiern) F.White	Ebenaceae	Minor
Diospyros ferrea (Willd.) Bakh.	Ebenaceae	Minor
Diospyros greenwayi F.White	Ebenaceae	Minor
Diospyros kamerunensis Gürke	Ebenaceae	Minor
Diospyros mannii Hiern	Ebenaceae	Minor
Diospyros monbuttensis Gürke	Ebenaceae	Minor
Diospyros quiloensis (Hiern) F.White	Ebenaceae	Minor
Diospyros sanza-minika A.Chev.	Ebenaceae	Minor
Diospyros scabra (Chiov.) Cufod.	Ebenaceae	Minor
Diospyros senensis Klotzsch	Ebenaceae	Minor
Diospyros squarrosa Klotzsch	Ebenaceae	Minor
Diospyros thomasii Hutch. & Dalziel	Ebenaceae	Minor
Diospyros tricolor (Schumach. & Thonn.) Hiern	Ebenaceae	Minor
Euclea pseudebenus E.Mey. ex A.DC.	Ebenaceae	Minor
Euclea undulata Thunb.	Ebenaceae	Minor
Elaeocarpus angustifolius Blume	Elaeocarpaceae	Major
Elaeocarpus floribundus Blume	Elaeocarpaceae	Minor
Sloanea rhodantha (Baker) Capuron	Elaeocarpaceae	Minor
Erythroxylum mannii Oliv.	Erythroxylaceae	Minor
Erythroxylum retusum Baill. ex O.E.Schulz	Erythroxylaceae	Minor
Nectaropetalum kaessneri Engl.	Erythroxylaceae	Minor
Acalypha glabrata Thunb.	Euphorbiaceae	Minor
Androstachys johnsonii Prain	Euphorbiaceae	Major
Anthostema madagascariensis Baill.	Euphorbiaceae	Minor
Bischofia javanica Blume	Euphorbiaceae	Major
Bridelia micrantha (Hochst.) Baill.	Euphorbiaceae	Major
Bridelia ndellensis Beille	Euphorbiaceae	Minor
Bridelia tulasneana Baill.	Euphorbiaceae	Minor
Cavacoa quintasii (Pax & K.Hoffm.) J.Léonard	Euphorbiaceae	Minor
Cleistanthus mildbraedii Jabl.	Euphorbiaceae	Minor
Cleistanthus schlechteri (Pax) Hutch.	Euphorbiaceae	Minor

Croton brieyi De Wild.	Euphorbiaceae	Minor
Croton cotoneaster Müll.Arg.	Euphorbiaceae	Minor
Croton dichogamus Pax	Euphorbiaceae	Minor
Croton longiracemosus Hutch.	Euphorbiaceae	Minor
Croton megalobotrys Müll.Arg.	Euphorbiaceae	Minor
Croton megalocarpus Hutch.	Euphorbiaceae	Major
Croton mongue Baill.	Euphorbiaceae	Minor
Croton muricatus Vahl	Euphorbiaceae	Minor
Croton pyrifolius Müll.Arg.	Euphorbiaceae	Minor
Croton wellensii De Wild.	Euphorbiaceae	Minor
Cyrtogonone argentea (Pax) Prain	Euphorbiaceae	Minor
Drypetes aubrevillei Leandri	Euphorbiaceae	Minor
Drypetes aylmeri Hutch. & Dalziel	Euphorbiaceae	Minor
Drypetes bathiei Capuron & Leandri	Euphorbiaceae	Minor
Drypetes caustica (Frapp. ex Cordem.) Airy Shaw	Euphorbiaceae	Minor
Drypetes floribunda (Müll.Arg.) Hutch.	Euphorbiaceae	Minor
Drypetes gerrardii Hutch.	Euphorbiaceae	Minor
Drypetes parvifolia (Müll.Arg.) Pax & K.Hoffm.	Euphorbiaceae	Minor
Drypetes roxburghii (Wall.) Hurus.	Euphorbiaceae	Minor
Euphorbia abyssinica J.F.Gmel.	Euphorbiaceae	Minor
Euphorbia candelabrum Kotschy	Euphorbiaceae	Major
Givotia madagascariensis Baill.	Euphorbiaceae	Minor
Heywoodia lucens Sim	Euphorbiaceae	Minor
Hippomane mancinella L.	Euphorbiaceae	Minor
Keayodendron bridelioides Leandri	Euphorbiaceae	Minor
Klaineanthus gaboniae Pierre ex Prain	Euphorbiaceae	Minor
Macaranga alnifolia Baker	Euphorbiaceae	Minor
Macaranga capensis (Baill.) Sim	Euphorbiaceae	Minor
Macaranga vermoesenii De Wild.	Euphorbiaceae	Minor
Margaritaria discoidea (Baill.) Webster	Euphorbiaceae	Minor
Necepsia afzelii Prain	Euphorbiaceae	Minor
Neoboutonia macrocalyx Pax	Euphorbiaceae	Minor
Neoboutonia mannii Benth.	Euphorbiaceae	Minor
Neoboutonia melleri (Müll.Arg.) Prain	Euphorbiaceae	Minor
Oldfieldia africana Benth. & Hook.f.	Euphorbiaceae	Major
Oldfieldia somalensis (Chiov.) Milne-Redh.	Euphorbiaceae	Minor
Phyllanthus sepialis Müll.Arg.	Euphorbiaceae	Minor
Protomegabaria stapfiana (Beille) Hutch.	Euphorbiaceae	Minor
Spirostachys africana Sond.	Euphorbiaceae	Major
Spirostachys venenifera (Pax) Pax	Euphorbiaceae	Minor
Uapaca acuminata (Hutch.) Pax & K.Hoffm.	Euphorbiaceae	Minor
Uapaca heudelotii Baill.	Euphorbiaceae	Minor
Uapaca letestuana A.Chev.	Euphorbiaceae	Minor
Uapaca staudtii Pax	Euphorbiaceae	Minor
Bivinia jalbertii Tul.	Flacourtiaceae	Minor
Caloncoba brevipes (Stapf) Gilg	Flacourtiaceae	Minor
Caloncoba gilgiana (Sprague) Gilg	Flacourtiaceae	Minor
Casearia battiscombei R.E.Fr.	Flacourtiaceae	Minor
Casearia gladiiformis Mast.	Flacourtiaceae	Minor
Homalium africanum (Hook.f.) Benth.	Flacourtiaceae	Minor
Homalium dentatum (Harv.) Warb.	Flacourtiaceae	Minor
Homalium letestui Pellegr.	Flacourtiaceae	Minor
Homalium longistylum Mast.	Flacourtiaceae	Minor
Homalium planifolium Baill.	Flacourtiaceae	Minor
Homalium smythei Hutch. & Dalziel	Flacourtiaceae	Minor
Kiggelaria africana L.	Flacourtiaceae	Minor
Oncoba spinosa Forssk.	Flacourtiaceae	Minor
Ophiobotrys zenkeri Gilg	Flacourtiaceae	Minor
Rawsonia lucida Harv. ex Sond.	Flacourtiaceae	Minor
Samyda coriacea (Vent.) Poir.	Flacourtiaceae	Minor
Scolopia heterophylla (Lam.) Sleumer	Flacourtiaceae	Minor
Scolopia mundii (Eckl. & Zeyh.) Warb.	Flacourtiaceae	Minor
Scolopia rhamniphylla Gilg	Flacourtiaceae	Minor
Scolopia zeyheri (Nees) Harv.	Flacourtiaceae	Minor
Scottellia klaineana Pierre	Flacourtiaceae	Major
Trichocladus ellipticus Eckl. & Zeyh.	Hamamelidaceae	Minor
Hernandia nymphaeifolia (C.Presl) Kubitzki	Hernandiaceae	Major
Heteropyxis natalensis Harv.	Heteropyxidaceae	Minor
Salacia lehmbachii Loes.	Hippocrateaceae	Minor
Hoplestigma kleineanum Pierre	Hoplestigmataceae	Minor
Hymenocardia ulmoides Oliv.	Hymenocardiaceae	Minor
Apodytes dimidiata E.Mey. ex Arn.	Icacinaceae	Major
Desmostachys vogelii (Miers) Stapf	Icacinaceae	Minor
Klainedoxa gabonensis Pierre ex Engl.	Irvingiaceae	Minor
Phyllocosmus africanus (Hook.f.) Klotzsch	Irvingiaceae	Minor
Barringtonia asiatica (L.) Kurz	Lecythidaceae	Major

Foetidia asymetrica H.Perrier	Lecythidaceae	Minor
Foetidia mauritiana Lam.	Lecythidaceae	Minor
Foetidia rodriguesiana Friedmann	Lecythidaceae	Minor
Petersianthus macrocarpus (P.Beauv.) Liben	Lecythidaceae	Major
Hugonia spicata Oliv.	Linaceae	Minor
Anthocleista grandiflora Gilg	Loganiaceae	Minor
Nuxia floribunda Benth.	Loganiaceae	Minor
Nuxia oppositifolia (Hochst.) Benth.	Loganiaceae	Minor
Nuxia verticillata Lam.	Loganiaceae	Minor
Strychnos decussata (Pappe) Gilg	Loganiaceae	Minor
Strychnos mitis S.Moore	Loganiaceae	Minor
Pemphis acidula J.R.Forst. & G.Forst.	Lythraceae	Minor
Heteropteris leona (Cav.) Exell	Malpighiaceae	Minor
Medusandra richardsiana Brenan	Medusandraceae	Minor
Soyauxia grandifolia Gilg & Stapf	Medusandraceae	Minor
Memecylon polyanthemos Hook.f.	Melastomataceae	Minor
Memecylon ramosum Jacq.-F,l.	Melastomataceae	Minor
Warneckea memecyloides (Benth.) Jacq.-F,l.	Melastomataceae	Minor
Ephippiandra madagascariensis (Danguy) Lorence	Monimiaceae	Minor
Xymalos monospora (Harv.) Baill.	Monimiaceae	Minor
Cephalosphaera usambarensis (Warb.) Warb.	Myristicaceae	Major
Coelocaryon klainei Pierre ex Heckel	Myristicaceae	Minor
Coelocaryon oxycarpum Stapf	Myristicaceae	Minor
Coelocaryon preussii Warb.	Myristicaceae	Minor
Coelocaryon sphaerocarpum Fouilloy	Myristicaceae	Minor
Scyphocephalium mannii (Benth. & Hook.f.) Warb.	Myristicaceae	Minor
Staudtia kamerunensis Warb.	Myristicaceae	Major
Rapanea melanophloeos (L.) Mez	Myrsinaceae	Major
Campylospermum amplectens (Stapf) Farron	Ochnaceae	Minor
Campylospermum flavum (Schumach. & Thonn. ex Stapf) Farron	Ochnaceae	Minor
Lophira alata Banks ex P.Gaertn.	Ochnaceae	Major
Ochna afzelii R.Br. ex Oliv.	Ochnaceae	Minor
Ochna arborea Burch. ex DC.	Ochnaceae	Minor
Ochna holstii Engl.	Ochnaceae	Minor
Ochna ovata F.Hoffm.	Ochnaceae	Minor
Ochna pulchra Hook.f.	Ochnaceae	Minor
Ochna thomasiana Engl. & Gilg	Ochnaceae	Minor
Rhabdophyllum calophyllum (Hook.f.) Tiegh.	Ochnaceae	Minor
Testulea gabonensis Pellegr.	Ochnaceae	Minor
Octoknema borealis Hutch. & Dalziel	Octoknemataceae	Minor
Aptandra zenkeri Engl.	Olacaceae	Minor
Heisteria parvifolia Sm.	Olacaceae	Minor
Heisteria zimmereri Engl.	Olacaceae	Minor
Olax latifolia Engl.	Olacaceae	Minor
Ongokea gore (Hua) Pierre	Olacaceae	Minor
Strombosia grandifolia Hook.f.	Olacaceae	Minor
Strombosia pustulata Oliv.	Olacaceae	Minor
Strombosia scheffleri Engl.	Olacaceae	Major
Strombosiopsis tetrandra Engl.	Olacaceae	Minor
Chionanthus foveolata (E.Mey.) Stearn	Oleaceae	Minor
Olea capensis L.	Oleaceae	Major
Schrebera alata (Hochst.) Welw.	Oleaceae	Minor
Schrebera arborea A.Chev.	Oleaceae	Minor
Pittosporum ferrugineum Dryand. ex Aiton	Pittosporaceae	Minor
Carpolobia alba G.Don	Polygalaceae	Minor
Carpolobia lutea G.Don	Polygalaceae	Major
Polygala ruwenzoriensis Chodat	Polygalaceae	Minor
Dilobeia thouarsii Roem. & Schult.	Proteaceae	Minor
Faurea rochetiana (A.Rich.) Pic.Serm.	Proteaceae	Minor
Faurea saligna Harv.	Proteaceae	Minor
Protea madiensis Oliv.	Proteaceae	Minor
Colubrina arborescens (Mill.) Sarg.	Rhamnaceae	Minor
Colubrina faralaotra (H.Perrier) Capuron	Rhamnaceae	Minor
Lasiodiscus mannii Hook.f.	Rhamnaceae	Minor
Aidia genipiflora (DC.) Dandy	Rubiaceae	Minor
Aulacocalyx jasminiflora Hook.f.	Rubiaceae	Minor
Brenania brieyi (De Wild.) Petit	Rubiaceae	Minor
Breonadia salicina (Vahl) Hepper & J.R.I.Wood	Rubiaceae	Minor
Canthium dyschriton Bullock	Rubiaceae	Minor
Canthium inerme (L.f.) Kuntze	Rubiaceae	Minor
Canthium mombazense Baill.	Rubiaceae	Minor
Canthium mundianum Cham. & Schltdl.	Rubiaceae	Minor
Crossopteryx febrifuga (G.Don) Benth.	Rubiaceae	Major
Cuviera acutiflora DC.	Rubiaceae	Minor
Cuviera macroura K.Schum.	Rubiaceae	Minor
Dictyandra arborescens Hook.f.	Rubiaceae	Minor

Gaertnera liberiensis Petit	Rubiaceae	Minor
Gaertnera paniculata Benth.	Rubiaceae	Minor
Gardenia aqualla Stapf & Hutch.	Rubiaceae	Minor
Gardenia erubescens Stapf & Hutch.	Rubiaceae	Major
Gardenia fiorii Chiov.	Rubiaceae	Minor
Gardenia resiniflua Hiern	Rubiaceae	Minor
Gardenia ternifolia Schumach. & Thonn.	Rubiaceae	Major
Gardenia volkensii K.Schum.	Rubiaceae	Minor
Guettarda speciosa L.	Rubiaceae	Major
Haldina cordifolia (Roxb.) Ridsdale	Rubiaceae	Minor
Hallea ledermannii (K.Krause) Verdc.	Rubiaceae	Major
Hallea rubrostipulata (K.Schum.) J.-F.Leroy	Rubiaceae	Minor
Hallea stipulosa (DC.) J.-F.Leroy	Rubiaceae	Major
Ixora foliosa Hiern	Rubiaceae	Minor
Ixora laxiflora Sm.	Rubiaceae	Minor
Ixora narcissodora K.Schum.	Rubiaceae	Minor
Keetia cornelia (Cham. & Schlecht.) Bridson	Rubiaceae	Minor
Lasianthus kilimandscharicus K. Schum.	Rubiaceae	Minor
Leptactina senegambica Hook.f.	Rubiaceae	Minor
Massularia acuminata (G.Don) Bullock	Rubiaceae	Major
Mitragyna inermis (Willd.) Kuntze	Rubiaceae	Major
Morelia senegalensis A.Rich.	Rubiaceae	Minor
Morinda geminata DC.	Rubiaceae	Major
Morinda titanophylla Petit	Rubiaceae	Minor
Nauclea diderrichii (De Wild. & T.Durand) Merr.	Rubiaceae	Major
Nauclea vanderguchtii (De Wild.) Petit	Rubiaceae	Minor
Oxyanthus zanguebaricus (Hiern) Bridson	Rubiaceae	Minor
Pauridiantha callicarpoides (Hiern) Bremek.	Rubiaceae	Minor
Pauridiantha hirtella (Benth.) Bremek.	Rubiaceae	Minor
Pauridiantha paucinervis (Hiern) Bremek.	Rubiaceae	Minor
Pausinystalia johimbe (K.Schum.) Pierre ex Dupuy & Beille	Rubiaceae	Major
Pausinystalia lane-poolei (Hutch.) Hutch. ex Lane-Poole	Rubiaceae	Minor
Pausinystalia macroceras (K.Schum.) Pierre	Rubiaceae	Minor
Pausinystalia talbotii Wernham	Rubiaceae	Minor
Pouchetia parviflora Benth.	Rubiaceae	Minor
Psychotria avakubiensis De Wild.	Rubiaceae	Minor
Psychotria bagshawei Petit	Rubiaceae	Minor
Psychotria gabonica Hiern	Rubiaceae	Minor
Psychotria succulenta (Hiern) Petit	Rubiaceae	Minor
Psydrax faulknerae Bridson	Rubiaceae	Minor
Psydrax horizontalis (Thonn. ex K.Schum.) Bridson	Rubiaceae	Minor
Psydrax livida (Hiern) Bridson	Rubiaceae	Minor
Psydrax obovata (Klotzsch ex Eckl. & Zeyh.) Bridson	Rubiaceae	Minor
Psydrax parviflora (Afzel.) Bridson	Rubiaceae	Minor
Psydrax schimperiana (A.Rich.) Bridson	Rubiaceae	Minor
Pyrostria bibracteata (Baker) Cavaco	Rubiaceae	Minor
Rothmannia fischeri (K.Schum.) Bullock	Rubiaceae	Minor
Rothmannia globosa (Hochst.) Keay	Rubiaceae	Minor
Rytigynia canthioides (Benth.) Robyns	Rubiaceae	Minor
Rytigynia senegalensis Blume	Rubiaceae	Minor
Rytigynia uhligii (K.Schum. & K.Krause) Robyns	Rubiaceae	Minor
Sarcocephalus madagascariensis (A. Rich. ex DC.) Baill.	Rubiaceae	Minor
Sarcocephalus pobeguinii Pob,g. ex Pellegr.	Rubiaceae	Major
Schumanniophyton magnificum (K.Schum.) Harms	Rubiaceae	Major
Timonius flavescens (Jack) Baker	Rubiaceae	Minor
Populus alba L.	Salicaceae	Major
Populus deltoides Marshall	Salicaceae	Major
Populus ilicifolia (Engl.) Rouleau	Salicaceae	Minor
Allophylus abyssinicus (Hochst.) Radlk.	Sapindaceae	Minor
Allophylus africanus P.Beauv.	Sapindaceae	Major
Allophylus kiwuensis Gilg.	Sapindaceae	Minor
Allophylus pervillei Blume	Sapindaceae	Minor
Allophylus subcoriaceus Baker f.	Sapindaceae	Minor
Aphania senegalensis (Juss. ex Poir.) Radlk.	Sapindaceae	Major
Aporrhiza urophylla Gilg	Sapindaceae	Minor
Blighia unijugata Baker	Sapindaceae	Major
Blighia welwitschii (Hiern) Radlk.	Sapindaceae	Major
Chytranthus cauliflorus (Hutch. & Dalziel) Wickens	Sapindaceae	Minor
Deinbollia cuneifolia Baker	Sapindaceae	Minor
Deinbollia grandifolia Hook.f.	Sapindaceae	Minor
Deinbollia molliuscula Radlk.	Sapindaceae	Minor
Eriocoelum kerstingii Gilg ex Engl.	Sapindaceae	Minor
Eriocoelum microspermum Radlk. ex De wild.	Sapindaceae	Minor
Eriocoelum pungens Radlk. ex Engl.	Sapindaceae	Minor
Ganophyllum giganteum (A.Chev.) Hauman	Sapindaceae	Minor
Haplocoelum foliolosum (Hiern) Bullock	Sapindaceae	Minor

Lecaniodiscus fraxinifolius Baker	Sapindaceae	Minor
Lychnodiscus cerospermum Radlk.	Sapindaceae	Minor
Lychnodiscus multinervus Radlk.	Sapindaceae	Minor
Lychnodiscus reticulatus Radlk.	Sapindaceae	Minor
Majidea fosteri (Sprague) Radlk.	Sapindaceae	Minor
Pancovia harmsiana Gilg	Sapindaceae	Minor
Pancovia pedicellaris Radlk. & Gilg	Sapindaceae	Minor
Placodiscus boya Aubr,v. & Pellegr.	Sapindaceae	Minor
Placodiscus glandulosus Radlk.	Sapindaceae	Minor
Placodiscus paniculatus Hauman	Sapindaceae	Minor
Placodiscus pseudostipularis Radlk.	Sapindaceae	Minor
Placodiscus riparius Keay	Sapindaceae	Minor
Radlkofera calodendron Gilg	Sapindaceae	Minor
Sapindus trifoliatus L.	Sapindaceae	Major
Stadmania oppositifolia Poir.	Sapindaceae	Minor
Zanha golungensis Hiern	Sapindaceae	Minor
Halleria lucida L.	Scrophulariaceae	Minor
Brazzeia congoensis Baill.	Scytopetalaceae	Minor
Oubanguia africana Baill.	Scytopetalaceae	Minor
Scytopetalum tieghemii (A.Chev.) Hutch. & Dalziel	Scytopetalaceae	Minor
Sonneratia alba Sm.	Sonneratiaceae	Major
Tamarix nilotica (Ehrenb.) Bunge	Tamaricaceae	Major
Tamarix senegalensis DC.	Tamaricaceae	Minor
Dicranolepis grandiflora Engl.	Thymelaeaceae	Minor
Celtis adolfi-fridericii Engl.	Ulmaceae	Minor
Celtis africana Burm.f.	Ulmaceae	Major
Celtis gomphophylla Baker	Ulmaceae	Minor
Celtis mildbraedii Engl.	Ulmaceae	Major
Celtis philippensis Blanco	Ulmaceae	Minor
Celtis zenkeri Engl.	Ulmaceae	Major
Chaetacme aristata E.Mey. ex Planch.	Ulmaceae	Minor
Holoptelea grandis (Hutch.) Mildbr.	Ulmaceae	Major
Rinorea arborea (Thouars) Baill.	Violaceae	Minor
Rinorea aylmeri Chipp	Violaceae	Minor
Rinorea brachypetala (Turcz.) Kuntze	Violaceae	Minor
Rinorea ilicifolia (Oliv.) Kuntze	Violaceae	Minor
Rinorea oblongifolia (C.H.Wright) Marquand ex Chipp	Violaceae	Minor
Erismadelphus exsul Mildbr.	Vochysiaceae	Minor
Guaiacum officinale L.	Zygophyllaceae	Major

APPENDIX A

APPENDIX A. Recommendations and Modifications by 35th Expert Panel

Recommendations	Modifications PD 479/07 (M)
1) Include stakeholder identification and involvement in problem analysis.	1) Part I, Section 3, Page 3 Part II, Section 2.1, Page 4 Part II, Section 2.2, Page 6 Part II, Section 2.4, Page 8 Part II, Section 3.1, Page 10 Part II, Section 4.3 & 4.8 & 4.9, Page 11 PROTA's continuous work on the Target Group Address (TGA) database has been included in the project (at no extra cost). It shows that stakeholder identification and interaction is a key element for the programme for all commodity groups. The results obtained under project PD 264/04 (more than 700 intermediate target organizations with an interest in 'Timbers') will be further developed under this project.
2) Enhance problem analysis with the aid of a problem tree.	2) Part II, Section 2.1, Page 5 Problem tree added.
3) Elaborate and strengthen project strategy.	3) Part II, Section 2.3, Page 7 Paragraphs added summarizing the way in which the project through a collective effort will influence decision-making in forestry by making use of PROTA's extensive network.
4) Improve the logical framework consistent with the ITTO format.	4) Part II, Section 5, Page 13 Logical framework improved (adding column with important assumptions) and made consistent with ITTO format.
5) Review and reduce the overall budget of the proposal.	5) Part III, Section 7, Page 16 Part II, Section 2.9, Page 9 Explanations have been added that under the present circumstances (financial situation PROTA Foundation, USD/EURO exchange rate) it is impossible for the implementing agency to substantially lower the project costs. Part III, Section 7, Page 18 Cover The amount for ITTO Monitoring and Review Costs has been increased.

6)	Consider increased counterpart funding from PROTA and other sources.	6)	Part III, Section 7, Page 16 Part III, Section 7, Page 18 Explanations have been added that under the present circumstances (financial situation PROTA Foundation, USD/EURO exchange rate) it is difficult for the implementing agency to increase counterpart funding and lower the request to ITTO. Nevertheless, the PROTA contribution has been increased by US$ 25,000 (French translation costs), the ITTO contribution lowered with nearly US$ 30,000.
7)	Formulate terms of reference for each of the key positions within the project team and annex these to the proposal.	7)	Part III, Section 1, Page 27 Annex 6 Brief CVs of 6 structural project staff and TOR of 2 specific project staff have been added to the proposal in Annex 6.
8)	Include measures taken to ensure the protection of intellectual property rights.	8)	Part II, Section 2.3, Page 7 Part II, Section 2.9, Page 9 Paragraph added on PROTA's policy on Traditional Knowledge and Intellectual Property Rights. Policy documents are added in Annex 1 and Annex 2.
9)	Provide assurance of acknowledgement of ITTO's contribution to PROTA and prominent display of ITTO logo in the outputs of the proposal.	9)	Part III, Section 2, Page 31 All 'Timbers 2' output will bear clear witness of the financial support by ITTO through a specific statement and inclusion of the ITTO logo.
10)	Provide an Appendix showing the recommendations of the Thirty-fifth Expert Panel and the respective modifications in tabular form. Modifications should be highlighted (bold and underline) in the text.	10)	Appendix A Modifications in tabular form (Appendix A-1) addressing the recommendations of the Thirty-Fifth Expert Panel (Appendix A-2).

PD 479/07 (M) **Timbers of Tropical Africa Part 2: Group 7(2) within the PROTA Programme (Ghana)**

Assessment by the Thirty-fifth Panel

A) Overall Assessment

The Panel noted that the proposal constituted Part 2 of PROTA Group 7 – Timbers, one of the sixteen commodity groups being developed under PROTA, which would be a continuation of Part 1 being implemented under ITTO project PD 264/04 Rev.3 (M,I) and scheduled to be completed at the end of 2008.

In its assessment of the proposal, the Panel noted that stakeholder identification, involvement and analysis was not reflected adequately in the problem analysis which itself was lacking as evidenced by the absence of a problem tree. Consequently, the project strategy was found to be in need of refinement to address the challenges of implementing this regional project that would be reliant not only on effective communication, collaboration, coordination and networking within Africa but also with PROTA offices in Europe. The Panel also found that the logical framework used and presented in the proposal was not in conformity with the ITTO format.

In its evaluation of the inputs and budget of the proposal, the Panel noted that project personnel, duty travel and sub-contracts constituted the bulk of the budgeted items which contributed to the size of the overall budget. The high costs for French translation and the inadequate provision for ITTO monitoring and review indicated the variability in the costing of the proposal. While duly noting that the overall budget for the proposal was far less than that of PD 264/04 Rev.3 (M,I), the Panel found that the counterpart funding from the Government of the Netherlands that featured in PD 264/04 Rev.3 (M,I) was conspicuously missing in the proposal, thereby resulting in an increase in the share of ITTO financial contribution in comparison with its share under PD 264/04 Rev.3 (M,I). The Panel further noted that the share of ITTO funding which the proposal was seeking was higher than the counterpart funding to be provided by PROTA whereas the share of PROTA's contribution to PD 264/04 Rev.3 (M,I) was greater than that of ITTO.

With regards to management aspects, the Panel felt that the terms of reference for the key positions within the project team should be provided and annexed to the proposal. The proposal should also ensure that the issue of intellectual property rights be adequately addressed and that the ITTO contributions and logo be accordingly acknowledged and prominently displayed in the tangible outputs of the proposal.

B) Specific Recommendations

To further enhance the proposal, the Panel recommended that the following essential modifications be made:

1. Include stakeholder identification and involvement in problem analysis;
2. Enhance problem analysis with the aid of a problem tree;
3. Elaborate and strengthen project strategy;
4. Improve the logical framework consistent with the ITTO format;
5. Review and reduce the overall budget of the proposal;
6. Consider increased counterpart funding from PROTA and other sources;
7. Formulate terms of reference for each of the key positions within the project team and annex these to the proposal;
8. Include measures taken to ensure the protection of intellectual property rights;
9. Provide assurance of acknowledgement of ITTO's contribution to PROTA and prominent display of ITTO logo in the outputs of the proposal;
10. Provide an Annex showing the recommendations of the Thirty-fifth Expert Panel and the respective modifications made in tabular form. Modifications should be highlighted (bold and underline) in the text.

C) Conclusion

Category 2 (New system): The Panel concluded that the proposal requires essential modifications and will be returned to the proponent. The Panel will need to assess the revised proposal before it can commend it to the Committee.

APPENDIX B

APPENDIX B. Recommendations and Modifications by 36th Expert Panel

Recommendations		Modifications PD 479/07 Rev. 1 (M)	
1)	Name and briefly describe the target groups and beneficiaries mentioned in the proposal.	1)	Part II, Section 2.4, page 8 Target beneficiaries briefly characterized, their relative number in the TGA database mentioned, and their role in the information chain indicated.
2)	Refine the problem tree and link it clearly with the objectives and outputs.	2)	Part II, Section 2.1, page 5 Textbox added in the Problem tree on how the project tackles the Core problem in forestry information services through its output as indicated in the objectives.
3)	Refine the logical framework by quantifying the indicators and providing assumptions for specific objectives 2 and 3 as well as the corresponding outputs.	3)	Part II, Section 5, page 13 Output indicators have been quantified and assumptions added.
4)	Add a column to the workplan indicating the parties responsible for the execution of the work.	4)	Part II, Section 6, page 14 Column on parties responsible added to the Workplan.
5)	Delete the reference to cooperating governments on the proposal's cover.	5)	Cover Line on 'Cooperating governments' removed.
6)	Provide an Annex showing the recommendtaions of the the Thirty-sixth Expert Panel and the respective modifictaions made in tabular form. Modofocations should be highlighted (bold and underlined) in the text. .	6)	Appendix B Modifications in tabular form (Appendix B-1) addressing the recommendations of the Thirty-sixth Expert Panel (Appendix B-2).

PD 479/07 Rev.1 (M) **Timbers of Tropical Africa Part 2: Group 7(2) within the PROTA Programme (Ghana)**

Assessment by the Thirty-sixth Panel

A) Overall Assessment

The Panel considered the modifications contained in the revised proposal in response to the comments and specific recommendations made by the Thirty-fifth Expert Panel. It was the opinion of the Panel that most of these comments and recommendations had been adequately addressed in the revised proposal and had contributed to its overall improvement.

However, the Panel felt that the revised proposal could still benefit from further refinement. Although target groups and beneficiaries had been mentioned in the context of stakeholder identification and involvement, these were not identified and adequately described. The inclusion of the problem tree did contribute to the enhancement of the problem analysis but the structure of the tree should be linked more clearly with the development and specific objectives as well as the outputs. While the logical framework had been improved and made consistent with the ITTO format, it could still be enhanced by making the indicators more quantitative and providing assumptions for specific objectives 2 and 3 as well as the corresponding outputs. The workplan should also be refined by adding a column indicating the parties responsible for the execution of the work. The inclusion of cooperating governments other than the Government of Ghana in the proposal's cover might give rise to the need to secure written proofs of their agreement to cooperate and should, therefore be reconsidered. The Panel reiterated the importance of ensuring appropriate acknowledgement of ITTO's contribution to PROTA and prominent display of ITTO logo in all of the outputs of the proposal.

B) Specific Recommendations

To further enhance the proposal, the Panel recommended that the following modifications be made:

1. Name and briefly describe the target groups and beneficiaries mentioned in the proposal;
2. Refine the problem tree and link it clearly with the objectives and outputs;
3. Refine the logical framework by quantifying the indicators and providing assumptions for specific objectives 2 and 3 as well as the corresponding outputs;
4. Add a column in the workplan indicating the parties responsible for the execution of the work;
5. Delete the reference to cooperating governments on the proposal's cover;
6. Provide an Annex showing the recommendations of the Thirty-sixth Expert Panel and the respective modifications made in tabular form. Modifications should be highlighted (bold and underlined) in the text.

C) Conclusion

Category 1 (New system): The Panel concluded that the proposal could be commended to the Committee with incorporation of amendments. In the view of the Panel, this project proposal is eligible for consideration for financing from the Bali Partnership Fund in accordance with Decision 8 (XXV).