# AFRICA

## *Afzelia africana*

Afzelia; Doussie

**Distribution**
This widespread species occurs in Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda and Zaire.

**Habitat**
In Ghana, this species is found in dry forest, especially in the forest-savanna borders. It tends to be scattered in areas with rocky soils (Hawthorne, 1995a**).**

**Vegetation types according to White (1983)**

**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones. *Afzelia africana* is absent from the wetter forest types and is a distinguishing feature of the `fire-zone' between Guinea-Congolian rain forest and savanna.
**2. Guineo-Congolian transition woodland**
**3. Guineo-Congolian secondary grassland and wooded grassland**
**4. Sudanian woodland**
**5. The Coastal Plain of Basse Casamance**
N.B. In the Guinea-Congolia/Sudania regional transition zone phytochoria.

**Population Status and Trends**
*A. africana* is common in Ghana (Hawthorne, 1995a). This species is also common in Nigeria and Cameroon (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**
No information.

**Threats**
This species is under pressure from exploitation in Ghana (Hawthorne, 1995a).

**Utilisation**
Timber of *Afzelia* spp. in general is used for exterior joinery, flooring, heavy construction, furniture, vats and tanks. The seeds are used as a thickening agent (African Regional Workshop, 1996).

**Trade**
*A. africana* was exported from Ghana as sawnwood in 1994; 2550 $m^3$ of air dried sawnwood was exported at an average price of US$572.00/$m^3$ and kiln dried sawnwood sold for an average price of US$630.00/$m^3$ (ITTO, 1995a).

**Conservation Status**
IUCN Threat Category and Criteria: VU (A1d) (African Regional Workshop, 1996)
*A. africana* has been given a red star in Ghana meaning it is common but under pressure from exploitation and conservation measures are necessary (Hawthorne, 1995a). This species is considered Vulnerable according to the 1994 IUCN threat categories (Hawthorne, 1995b).

**Conservation Measures**
Protected by law in Côte d'Ivoire. FAO selected this species for conservation action in Cameroon because of the heavy utilisation pressures on the species (Palmberg, 1987).
This species can be vegetatively propagated by budding (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
Hawthorne, W.D., 1995(a). *Ecological profiles of Ghanaian forest trees.* Oxford Forestry Institute:Oxford. pp.345.
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ITTO, 1995(a). Elements for the annual review and assessment of the world tropical timber situation. Draft Document.
Palmberg, C., 1987**.** *Conservation of genetic resources of woody species*. Paper prepared for Simposio sobre silvicultura y mejoraniento genetico. CIEF, Buenos Aires, 1987. (NOT SEEN)

# *Afzelia bipindensis*

Afzelia; (Red) Doussié

**Distribution**

*A. bipindensis* is found mostly in the Guineo-Congolian regional centre of endemism, but also extends into the Zambezian region (White, 1983). This species occurs in Angola, Central African Republic, Cameroon, Congo, Gabon, Nigeria, Uganda and Zaire.

**Habitat**

This is a rainforest species.

**Population Status and Trends**

There are reportedly only a few seed trees distributed in a narrow range (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**

No information.

**Threats**

This species is heavily exploited throughout its range (African Regional Workshop, 1996).

**Utilisation**

Timber of *Afzelia* spp. in general is used for exterior joinery, flooring, heavy construction, furniture, vats and tanks.

**Trade**

5000$m^3$ of *A. bipidensis* sawnwood was exported from Cameroon in 1994 at an average price of US$1000.00/$m^3$ and the Congo exported 33$m^3$ in 1994 (ITTO, 1995 a). In 1987, Gabon exported 2,595$m^3$ of Doussie from Owendo (IUCN, 1990). Gabon exported 5,302.258 $m^3$ of Doussie in 1994 and 7,560.274 $m^3$ in 1995 (DIAF, 1996).

**Conservation Status**

IUCN Threat Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)

**Conservation Measures**

FAO selected this species for conservation action in Cameroon because of the heavy utilisation pressures it faces (Palmberg, 1987). Vegetative propagation by budding/grafting could be feasible (African Regional Workshop, 1996).

**References**

African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.

DIAF, 1996. Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.

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Palmberg, C., 1987**.** *Conservation of genetic resources of woody species*. Paper prepared for Simposio sobre silvicultura y mejoraniento genetico. CIEF, Buenos Aires, 1987. (NOT SEEN)

White F., 1983. *The Vegetation of Africa.* A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

# *Afzelia pachyloba*
Afzelia

**Distribution**
This species occurs in Angola, Cameroon, Congo, Gabon, Nigeria and Zaire.

**Habitat**
*A. pachyloba* is a rainforest species.

**Population Status and Trends**
There are only a few seed trees throughout its range (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**
No information.

**Threats**
This species is heavily exploited.

**Utilisation**
Timber of *Afzelia* spp. in general is used for exterior joinery, flooring, heavy construction, furniture, vats and tanks.

**Trade**
*A. pachyloba* is an important commercial species in Cameroon, Nigeria and Congo (African Regional Workshop, 1996).

**Conservation Status**
IUCN Category and Criteria: VU (A1d) (African Regional Workshop, 1996)

**Conservation Measures**
FAO has selected this species for conservation action in Cameroon because of the heavy utilisation pressures on the species (Palmberg, 1987).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
Palmberg, C., 1987. *Conservation of genetic resources of woody species*. Paper prepared for Simposio sobre silvicultura y mejoraniento genetico. CIEF, Buenos Aires, 1987. (NOT SEEN)

## *Allanblackia stuhlmannii*
Guttiferae

**Distribution**
Tanzania

**Habitat**
A species of moist closed forest up to 1600m.

**Population status and trends**
This tall tree may be found in some abundance in remaining areas of moist upland forest only in eastern Tanzania, such as the Usambara Mts.

**Role of species in the ecosystem**

**Threats**

**Utilisation**
The seeds produce an edible oil, mkani fat. The timber is also used.

**Trade**
The oil is used locally and traded.

**IUCN Conservation category**
VU B1+2c according to Lovett, J. & P. Clarke (Lovett, 1996).

**Conservation measures**

**Forest management and silviculture**
The forests on the Usambaras are under a degree of protection as catchment forests.

**References**
Knox, Eric B. 1995. The List of East African Plants (LEAP): An electronic database (Draft). 72pp.
Lovett, Jon. 1996. Completed data collection forms of restricted range trees of Tanzania.
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WWF & IUCN. 1994. Centres of plant diversity. A guide and strategy for their conservation. 3 volumes. Cambridge: IUCN Publications Unit

# *Antrocaryon micraster*

Anacardiaceae

akoua, antrocaryon, aprokuma, bougongi, ifa okete, onzabili

**Distribution**
Cameroon, Côte d'Ivoire, DR Congo, Ghana, Nigeria, Sierra Leone, Uganda

**Habitat**
This species is found in lowland tropical rainforest.

**Population status and trends**
This emergent species is heavily exploited for its timber, regeneration is less succesful in burnt or heavily disturbed forests. Saplings do not compete well with weeds (Hawthorn, 1995).

**Role of species in the ecosystem**
It regenerates in canopy gaps and its fruit provides an important food source to the mammal community. Dispersal/Pollination is aided by Mammals. Seeds of *Antrocaryon* have been found in 2% (rainy season) to 37% (Dry season) of piles of elephant dung in Bia South Game Production Reserve, Ghana (Hawthorn, 1995).

**Threats**
The main threats are clear-felling/logging of the habitat.

**Utilisation**
This species is used for food, locally for fuel and the stem of the tree is traded internationally.

**Trade**
The species is reported in exports of plywood from Ghana, selling at an average price of US$400/m$^3$ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd  according to Hawthorne, W.

**Conservation measures**

**Forest management and silviculture**

**References**
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Erfurth, T. & H. Rusche. 1976. The marketing of tropical wood. Rome: FAO. 60pp.
Hutchinson, J., J.M. Dalziel, & F.N. Hepper. 1927. Flora of West Tropical Africa. Published by the English Ministry of State for the Colonies.
ITTO. 1997. Annual review and assessment of the world tropical timber situation 1996. International Tropical Timber Organization.
Katende, A.B. 1993. Annotations to: TPU conservation status report for Uganda dated 29 Jun 1993. 33pp.
Songwe, C. 1990. Revised preliminary list of timbers of Cameroon with conservation categories.
Hawthorne, W.D. 1995, Ecological Profiles of Ghanaian Forest Trees, Oxford Forestry institute

# *Aucoumea klaineana*
Okoumé

**Distribution**
Okoumé is restricted to west and central Gabon and a few small areas in Equatorial Guinea, Congo and Cameroon. In Cameroon

**Habitat**
It is found between sea level and 700 m in lowland broadleaf forests (White, 1996).

Vegetation types according to White (1983)
1. Guineo-Congolian rain forest
Hygrophilous coastal evergreen Guineo-Congolian rain forest. *Aucoumea klaineana* is one of the most abundant species in this forest type especially in old secondary forest on well-drained sites.

**Population Status and Trends**
In Gabon the species remains widespread and abundant, and is common in secondary forest; the population is more or less stable (Wilks *in litt.*, 1992).

**Regeneration**
Oukomé trees flower only once in every 7 - 15 years (Anon, 1994). This light-demanding species is gregarious in secondary forests (N'Sosso *in litt*, 1995). It regenerates naturally where the recuperation period between logging cycles is sufficient (Wilks *in litt*, 1990). However, according to White, *in litt.* 1996, Okoumé is not regenerate regenerating. It is a light lover which only regenerates in old farms and unburnt savannas. Few tree below 30cm dbh are now seen (White, *in litt.*).

**Role of Species in its Ecosystem**
No information.

**Threats**
Repeated logging particularly in the Première zone (near coast) restricts regeneration, although it is considered by Wilks *in litt.*, 1992, that the logging is probably sustainable in Gabon. In contrast experts at the Regional Workshop for the *Conservation and Sustainable Management of Trees* project considered that the restricted range of this species and the destruction of its ecosystem puts the future survival of this species in danger (African Regional Workshop, 1996).

**Utilisation**
Okoumé is considered an excellent timber for veneer and plywood and also produces good quality sawn timber.

**Trade**
This species is Gabon's most important commercial timber and contributes about 90% of annual production. At present international market forces regulate Okoumé logging in Gabon and state controls are considered ineffective (Wilks, *in litt.*, 1990). France is the main importer of Okoumé. Italy, Japan and Israel are also important importers. This species is traditionally absent from UK markets.(WCMC, 1991). Disappointing oil revenues have resulted in the export of Okoumé timber to Western Europe and Japan becoming increasingly important to the Gabonese economy (Anon, 1994).

Congo exported 53,188$m^3$ of Okoumé logs and 23 665$m^3$ of veneer in 1994 (ITTO, 1995). In 1987, Gabon exported 603,740$m^3$ of *A. klaineana* from Owendo (IUCN, 1990). An unknown volume of logs was exported by Gabon for an average price of US$239.59/$m^3$ (ITTO, 1995a). In addition Gabon exported 371$m^3$ of Okoumé as sawnwood for an average price of US$287.77/$m^3$, 2,106$m^3$ of veneer at an average price of US$97.16/$m^3$, and 10,225$m^3$ of plywood at an average price of US$300.32/$m^3$ (ITTO, 1995a). Total export of Okoumé from Gabon in 1994 was 1,327,957.181 $m^3$ and in 1995 the total export was 1,573,702.100 $m^3$ (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996). The gene pool of Okoumé has been seriously deteriorated by decades of selective harvesting (Anon, 1992).

**Conservation Measures**
*A. klaineana* is considered a priority species for *in situ* conservation by FAO (1984).
More than 29,000 ha have been planted with Okoumé in Gabon but reforestation does not compensate for felling in natural forests. Introduction of this species west of Kribi in Cameroon has been discontinued because of its poor form (African Regional Workshop, 1996).

Minimum logging diameter in Gabon is 70 cm in forest reserves, although this restriction is not enforced (Wilks, *in litt.*, 1990).

A project "Biology of Okoumé", has been funded by ITTO and implemented by the government of Gabon, through the Ministère des Eaux et Fôrets. Scientific and technical support is provided by the Tropenbos Foundation. The aim of this project is to improve understanding of species specific characteristics of Okoumé, with the objective of realizing high yielding plantations that at least can keep track of the current logging rate. The establishment of such plantations will help reduce the pressure on Gabon's forest area and its biological diversity. (Anon, 1994). The first phase of the project ended in December 1995.

**References**
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Anon, 1994**.** Biology of Okoumé: an ecophysiological reforestation project in Gabon. *Tropenbos Newsletter* 6:8-10
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Wilks, C., 1990. *in litt*. to Richard Luxmoore.
Wilks, C., 1992. *in litt*. to Pete Atkinson.
WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species.* pp. 58.

## *Autranella congolensis*
Mukulungu

**Distribution**
This species occurs in Cameroon, Congo, Gabon and Nigeria.

**Habitat**
This species is found in dense forest (N'Sosso *in litt*, 1995).

**Population Status and Trends**
This species is fairly rare (African Regional Workshop, 1996).

**Regeneration**
This is a recalcitrant species (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**
No information.

**Threats**
*A. congolensis* is heavily exploited for timber (African Regional Worshop, 1996).

**Utilisation**
The timber is used for heavy construction, flooring, furniture and cabinet-making, acid vats, turnery and joinery. Locally the seeds are used and traded as rattlers for dancers (African Regional Workshop, 1996).

**Trade**
Gabon reported export of 51.2 $m^3$ of Mukulungu in 1995 and reported no export of this species in 1994 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: CR (A1c,d) (African Regional Workshop, 1996)

**Conservation Measures**
None.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
DIAF, 1996. Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.
N'Sosso, D., 1995. *in litt*. N'Sosso contributions to *the Conservation and Sustainable Management of Trees* project for the Congo.

# *Baikiaea plurijuga*

Zambezi Teak; Zambezi Redwood

**Distribution**
This species occurs in Angola, Botswana, Namibia, Zambia and Zimbabwe.

**Habitat**
This species is confined to lowland tropical forest on the Kalahari sands. *Baikiaea plurijuga* is the dominant component of the *Baikiaea* forest canopy (White, 1983). *Baikiaea* forest is the most extensive deciduous forest on the Kalahari Sand in the south of the Upper Zambezi basin and *B. plurijuga* is essentially limited to this area (White, 1983). In Zimbabwe, *B. plurijuga* is found in higher areas of thicket on Kalahari sands of the Lupane and Nkayi districts and in higher areas of woodland thicket on colluvium in the Binga district (Timberlake *et al*, 1991).

Vegetation type according to White (1983)
1. Zambezian dry deciduous forest and scrub forest (Zambezian Kalahari woodland)

**Population Status and Trends**
Precise limits of individual populations of the species are not known but *B. pluijuga* is the dominant species in the Zambesi teak forests the area of which has been measured. In the early 1980s, Zambesi teak forests were reported to cover an area of 700,000 ha (Mubiti, 1984 in draft CITES proposal, 1986). More recent surveys have shown that 800,000 ha exist in forest commissioned land in Zimbabwe (African Regional Workshop, 1996).

In Zambia this forest type formerly covered almost all of the Western Province, the North-Western Province and the western area of the Southern Province (CITES draft proposal, 1986). The increased logging activities of the last fifty years have led to changes in the ecology of the forest; gaps in the canopy allow for thicket species to develop (this is especially a problem in Zambia). It is thought that these changes might inhibit the re-establishment of the Zambezi teak forests (CITES draft proposal, 1986). These forests are expected to disappear within 50 years and to be irretrievably diminshed much sooner (WCMC, 1991). Populations of older individuals (about 500 years old) have now completely disappeared (African Regional Workshop, 1996).

Although the Zambesi teak forests are threatened, the range of *B. plurijuga* has only been fractionally reduced (African Regional Workshop, 1996). Grassland quickly replaces the Zambesi teak forests once they have been cleared, making grassland a more common habitat for *B. plurijuga* (African Regional Workshop, 1996). Populations in fallow fields and national parks are regenerating well (African Regional Workshop, 1996).

There are thought to be intact populations in forests in Botswana and Zambia, where levels of exploitation are less well known (African Regional Workshop, 1996).

**Regeneration**
This species coppices well (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**
*B. plurijuga* is associated with *Entandrophragma caudatum*, *Pterocarpus antunesii* and *Combretum collinum* (Huckabay, 1986).

**Threats**
This species is exploited for its timber. The Zambesi teak forest as a habitat type is undeniably threatened, however, the *Baikiaea* thickets that grow on grassland are still fairly widespread and timber from these thickets can be utilised (African Regional Workshop, 1996).

**Utilisation**
The timber is mainly used in flooring. Locally the species is used for medicinal purposes and for tanning. *B. plurijuga* is not locally exploited for its wood because it is too hard to cut.

**Trade**
Sales values in Zambia over recent years have been around US$1 million annually, 80% in the domestic market and 20% from exports. It is one of the two major commercial timber species of Botswana (WCMC, 1991).

**Conservation Status**
IUCN Threat Category and Criteria: LR:lc (African Regional Workshop, 1996)

**Conservation Measures**
This species is considered to be a priority for *in situ* conservation by FAO, 1984. *In situ* conservation stands have been established in Zambia. The Forest Reserves in Botswana contain *B. plurijuga* (African Regional Workshop, 1996).

This species is not suitable for a plantation programme because of its slow growth and fire sensitivity (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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Timberlake, J., Nobanda, N., Mapaure, I, and Mhlanga, L., 1991**.** *Sites of interest for conservation in various communal lands of N. & W. Zimbabwe. Vegetation survey of communal lands. Report No.1*.
WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.
White F., 1983**.** *The Vegetation of Africa*. A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

## *Baillonella toxisperma*
Moabi

**Distribution**
Moabi occurs mainly in Cameroon, Gabon and Nigeria, and is also found in Angola, Congo and Equatorial Guinea.

**Habitat**
The monotypic genus *Baillonella* is endemic to the Guineo-Congolian region (White, 1983). *B. toxisperma* is limited to dense primary evergreen rain forests. It requires shade for regeneration to occur (Wilks *in litt*, 1990).

**Population Status and Trends**
If this species continues to be over-exploited it will most likely vanish from large areas of its distribution (Schneemann, 1995). In areas of Cameroon that have been logged for several decades (i.e. Central, South, South-West and the Littoral provinces) there is a decrease and in some cases disappearance of Moabi (Schneemann, 1995). Moabi still remains in East Cameroon where there has been no logging.

**Role of Species in its Ecosystem**
Elephants play a part in regeneration and dispersal of Moabi as they eat the fruits and deposit the seeds elsewhere (Schneemann, 1995). Wild pigs and porcupines eat the seeds.

**Threats**
Moabi is heavily exploited in West Africa. This species is further threatened by its restricted regeneration (Wilks *in litt.*, 1990). It takes between 50 and 70 years before *B.toxisperma* starts to flower and regular fruit production doesn't occur until the tree is 90-100 years old (Schneemann, 1995).

**Utilisation**
The timber is used for furniture, cabinet work, decorative flooring, turnery and carving, decorative veneers, joinery, and stove fittings.

The edible oil (huile de karité) that is extracted from the seeds is of great importance to the local people. The oil can fetch high prices at the local markets in Cameroon; in the larger cities the oil can be worth as much as US$12/litre (Schneemann, 1995). The pulp of the fruit is eaten. The bark is used for medicinal purposes and has ethnobotanical uses (e.g. the Baka pygmies use the bark to become invisible for elephant hunting) (Schneemann, 1995).

**Trade**
Strong demand for Moabi timber comes from Southern Europe (Schneemann, 1995)

Moabi is an important commercial timber in Cameroon and is a major species in the export trade. Production of *B. toxisperma* in Cameroon has almost doubled since 1989/1990 (Schneemann, 1995). It is also commercially important to Congo (exports in 1988 of 4,517$m^3$) and Gabon where it is the second most important wood in terms of export earnings (Wilks *in litt*, 1990). Gabon exported 55,884$m^3$ in 1987 (IUCN, 1990) and 59,891$m^3$ in 1989.

According to ITTO (1995a) 25,000 $m^3$ of *B. toxisperma* logs were exported from Cameroon in 1994 at an average price of US$385/$m^3$, and 10,000 $m^3$ of sawn timber were also exported at an average price of US$700.00/$m^3$. While Gabon exported Moabi logs at an average price of US$70.40/$m^3$ and exported 82$m^3$ of sawnwood at US$63.13/$m^3$ (ITTO, 1995a). In 1994, Gabon exported a total of 32,572.065 $m^3$ of Moabi and 44,390.331 $m^3$ in 1995 (DIAF, 1996).

There is some concern about illegal trade from some of the Moabi producing countries (Draft CITES Proposal, 1991).

**Conservation Status**
IUCN Category and Criteria: VU (A1d) (African Regional Workshop, 1996)

**Conservation Measures**
The minimum exploitable diameter of Moabi in Cameroon is 1m and in both Gabon and Congo the minimum exploitable diameter is decreed to be 0.8m. *B.toxisperma* is found in several protected areas in Cameroon (i.e. Forêt de Nki, Forêt de Boumba Bek and Reserve de Faune du Dja). This species is also represented in the Sibang Arboretum, Libreville, Gabon. (Draft CITES Proposal, 1991). Cameroon has planted 389 ha of this species (African Regional Workshop, 1996).

**References**
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Wilks, C., 1990. *in litt*. to Richard Luxmoore.

## *Beilschmiedia ugandensis*
Lauraceae

**Distribution**
DR Congo, Sudan, Tanzania, Uganda

**Habitat**
The species is found in forests around lake Victoria, also in lower montane forest, swamps and damp places

**Population status and trends**
A species well known for its timber. It is also used in mine shafts and as a fuelwood. The levels of exploitation, notably in Uganda, as well as a general decline in the extent or condition of the habitat, are major threats.

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use

**Utilisation**
The tree is felled to make dugout canoes. It is also used in mines and for charcoal. The fruit is edible.

**Trade**
The trade in the wood occurs at a subnational level.

**IUCN Conservation category**
VU A2d according to MUIENR (Okullo *et al.*, 1997)

**Conservation measures**
The species has been raised *ex situ* by tree planting projects in Masaka.

**Forest management and silviculture**

**References**
Okullo, J.B. *et al.* 1997. Completed data collection forms for woody plants of Uganda.

## *Boswellia sacra*

Burseraceae

luban, megerot, mugereh, shajerat alluban, olibanum, mogar, mohor, frankincense, (sheehaz and beyo refer to the resin)

**Distribution**
Oman, Somalia, Yemen (Former South Yemen), also likely to occur in Ethiopia

**Habitat**
A tree of dry, sparsely vegetated areas and the lower slopes of wadis.

**Population status and trends**
The largest and most widespread occurrence of the species is in northern Somalia. It is also a dominant component of desert-woodland on the escarpment mountains in Dhofar in Oman, extending into Yemen. In Oman the tree is so heavily browsed that it rarely flowers or sets seed. Several trees appear to be dying and regeneration is poor. (Ghazanfar, 1995) In Somalia wild stands belong to local families who extract the resin and take care not to damage or overexploit the trees. It appears to be impossible, however, to prevent overgrazing, especially in times of drought, which in itself affects the trees directly by slowing down growth, hampering regeneration and reducing yields of resin. Tapping is generally confined to two periods of 3-4 months depending on the extent and onset of the rains. It is believed that the size of the natural resource and its productivity significantly outweighs demand for the product (Coppen, 1995).

**Role of species in the ecosystem**

**Threats**
Grazing/damage by feral/exotic animals, local use.

**Utilisation**
The resinous exudate is used for burning in religious ceremonies. It is also distilled to yield odorous volatile oils for use in the perfumery industry and various forms of the resin and extracts are used as fixatives in perfumes. In China the main use of olibanum is in traditional medicine. The leaves are an important animal fodder, especially in times of drought.

**Trade**
The international trade in *B. sacra* is very difficult to separate from that in other gums, resins and balsams. It is generally known as the Somalian or Middle Eastern olibanum. *B. frereana* (Somalia), *B. serrata* (India) and *B. papyrifera* (Ethiopia) are also major sources of olibanum. Much unofficial trading also occurs across the borders of producing countries. The demand today is believed to be less than that in the late 1970s and early 1980s. Production is also believed to have declined because of severe droughts.

Major consumers are China and the Middle East. China imported over 1000 tonnes of olibanum and myrrh in 1984. Significantly smaller amounts (50 tonnes) are used in the production of essential oils and extracts in Europe. The Ethiopian olibanum is exported for use as incense in Orthodox and Roman Catholic Churches in Europe and Latin America and the chewing grade olibanum from *B. frereana* is exported in substantial amounts to North Africa and the Middle East.

Somalia and Ethiopia are the biggest producers of olibanum. The botanical source for the Ethiopian olibanum is likely to be *B. papyrifera* as *B. sacra* is only suspected to occur in Harerge. *B. sacra* in Somalia produces a higher grade olibanum known as 'beyo' but the highest chewing grade is believed to come from *B. frereana*. World trade in beyo was reported in 1987 to be 200 tonnes.

**Exports of incense gum from Somalia and their destinations, 1975-1980 (tonnes)**

| **Destinations** | **1975** | **1976** | **1977** | **1978** | **1979** | **1980** |
|---|---|---|---|---|---|---|
| Saudi Arabia | na | 156 | - | 11 | 67 | na |
| United Arab Emirates | na | - | 70 | - | 22 | na |
| China | na | - | - | 60 | - | na |
| Djibouti | na | - | 16 | - | 29 | na |
| France | na | 16 | - | - | - | na |
| Italy | na | na | - | 11 | - | na |
| **Total** | 684 | 173 | 86 | 81 | 118 | 373 |

Source: Frankincense and Gums Trading Agency, Somalia in Coppen, 1995.

**IUCN Conservation category**
LR/nt according to Thulin (1997).

**Conservation measures**
The species is in cultivation at the Sultan Qaboos University Botanic Garden in Oman. Otherwise the only studies on its domestication were carried out by a Swedish Aid project in the 1980s.

**Forest management and silviculture**

**References**
Coppen, J.J.W. 1995. *Flavours and fragrances of plant origin*. Non-Wood Forest Products 1. Food and Agriculture Organization of the United Nations.

Ghazanfar, S. A. 1995. Plant conservation in Oman. Part 1. (unpublished). Compiled with Anthony G. Miller, Ian McLeish, Tom A. Cope, Phil Cribb and Salim H. Al Rawahi. 62pp.

Thulin, Mats. 1997. Comments on the draft species summaries of trees occurring in Somalia.

# *Brachylaena huillensis*

Synonym: *Brachylaena hutchisonii*
Muhuhu

**Distribution**
This species occurs in Angola, Kenya, Mozambique, Tanzania, Transvaal and Uganda.

**Habitat**
In Kenya, *B. huillensis* occurs in the highlands, the coastal belt and in forest remnants (WCMC, 1991). It is found in upland semi-deciduous forest and lowland dry forest or thicket (Beentje, 1994).

It is found in the Usambara steppe and coastal lowland of Tanzania and Uganda (WCMC, 1991). This species is dominant in evergreen bush, is common in dry coastal forests and can be found in lowland dry forests and semi-deciduous dry upland forests (1500m-2000m) (FAO, 1986).

**Vegetation type according to White (1983)**
**1. Somalia-Masai scrub forest**
*Brachylaena huillensis* occurs on the steep northern slopes of the Western Usambara mountains between 700 and 960 m.
**2. Zanzibar-Inhambane undifferentiated forest**
This species is found in the drier forests of this region.

**Population Status and Trends**
The distribution of this species is patchy (Marshall & Jenkins, 1994).
*B. huillensis* is locally common in Kenya (Beentje, 1994).

**Role of Species in its Ecosystem**

**Threats**
The species is subject to heavy exploitation in Tanzania. In Kenya, much of the habitat of this species has been lost and the remaining trees are subject to increasingly heavy felling (WCMC, 1991). It is also suffering from habitat loss due to settlement and cultivation (FAO, 1986)

**Utilisation**
This species has been used for sleepers, flooring blocks, furniture, carving and turnery. Its main use internationally is now for wood carvings. It is commonly used in Tanzania for building posts. In Kenya, this species is only used in the carving industry and not for sawn wood (Marshall & Jenkins, 1994).

Perfumed oil can be distilled from the wood (FAO, 1986).

**Trade**

**Conservation Status**
This species is considered Rare in Uganda (Katende, 1995).

**Conservation Measures**
It is considered a priority for *in situ* conservation by FAO, 1984.
*B. huillensis* is found in the Arabuko-Sokoke Forest Reserve and the Shimba Hills Forest Reserve of Kenya. However in both of these areas this species is being collected. In the Arabuko-Sokoko Forest Reserve licences are issued for collection of dead wood but most of the trees removed are either newly dead (possibly ring-barked trees) or illegally cut trees (Marshall & Jenkins, 1994). It is also collected in the Lamu district and transported to Mombasa for the carving industry (Marshall & Jenkins, 1994).

There are 69 ha of this species in plantations in Kenya (Marshall & Jenkins, 1994).

**References**
Beentje, H.J., 1994. *Kenya Trees, Shrubs and Lianas*. National Museums of Kenya:Nairobi, Kenya. pp. 722.
FAO, 1986. *Some medicinal forest plants of Africa and Latin America*. FAO Paper 67. pp. 252.
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Marshall, N.T. and Jenkins, M, 1994. *Hard Times for Hardwood: Indigenous Timber and the Timber Trade in Kenya.* Traffic International:Cambridge, U.K. pp. 53.
WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.
White F., 1983**.** *The Vegetation of Africa*. A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

## *Copaifera salikounda*

Etimoe; Bubinga

**Distribution**
This species occurs in Côte d'Ivoire, Ghana, Guinea, Liberia and Sierra Leone.

**Habitat**
This species is most abundant in evergreen forests, although most large trees are found in wet, flat, disturbed areas. It is not limited to the above habitat types; it does, however, prefer moist to wet habitats (Hawthorne, 1995a).

**Population Status and Trends**
*C. salikouna* is common in Ghana although there is a low density of larger trees. There appears to be a lot of regeneration, especially around mother trees. It is a shade tolerant tree (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
The seeds of this species are probably dispersed by birds, although many fall to the ground beneath the parent tree (Hawthorne, 1995a).

**Threats**
In Ghana this species is threatened by over-exploitation (Hawthorne, 1995a).

**Utilisation**

**Trade**
This species is available from specialist timber traders in the UK. It is also recorded in trade with German and the USA.

**Conservation Status**
IUCN Category and Criteria: VU (A1d) (African Regional Workshop, 1996)
Hawthorne (1995a) has given this species a red star, which means it is common in Ghana but under pressure from exploitation and conservation measures are necessary. This species is considered Vulnerable under the new (1994) IUCN threat categories (Hawthorne, 1995b).

**Conservation Measures**
No information.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
Hawthorne, W.D., 1995(a). *Ecological profiles of Ghanaian forest trees.* Oxford Forestry Institute:Oxford. pp.345.
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## *Cordeauxia edulis*

Leguminosae
yeheb, yicib, ye-eb

**Distribution**
Ethiopia, Somalia

**Habitat**
The species occurs in semi-arid scrub and is intolerant of waterlogging, growing in areas of 250-400mm annual rainfall.

**Population status and trends**
An important shrub or small tree confined to semi-desert bushland from eastern Ogaden to central Somalia. In 1929 it was reported to constitute up to half the woody vegetation in many areas, but its populations are now much reduced and further threatened by regional droughts and war (Anon, 1979).The seeds are highly nourishing and are exploited at such levels that regeneration may be hampered. High demand and free access to fruiting plants often result in the fruit being collected before they are mature (Wickens, 1995).

**Role of species in the ecosystem**

**Threats**
Local use, grazing/damage by feral/exotic animals

**Utilisation**
The seeds have a delicious chestnut flavour and may be eaten raw, roasted or boiled as a vegetable. They may also be boiled for a sweet liquor. Rich in protein and with twice the energy value of carob, the seeds can provide the only source of food in times of famine. Leaves may be brewed into a tea. They are also browsed by sheep, goats and camels, which apparently causes the bones to become pink with cordeauxiaquinone. This compound is unique in the plant kingdom, producing an insoluble brilliant red dye used as a mordant in dyeing factories. The wood is used for firewood.

**Trade**
Seeds are marketed locally, serving as a staple to the poorer people when in season. Production is less than demand.

**IUCN Conservation category**
VU A2cd according to WCMC

**Conservation measures**

**Forest management and silviculture**
The species has only recently been brought into domestication. It has been introduced on an experimental scale in Israel, Kenya, Tanzania, Sudan, Yemen and USA. Early aerial growth is slow while the massive root system is establishing. The seedlings develop a tough tap root which makes nursery-rearing complicated. Plants bear fruit in 3-4 years, each yielding about 5kg of seeds. The species has great potential for development as a food resource for the semi-arid regions and as a dessert crop, and possibly for export.

**References**
Anon. 1979. *Tropical Legumes: Resources for the Future*. National Academy of Sciences, Washington DC.

Hedberg, Inga & Sue Edwards (eds.). 1989. *Flora of Ethiopia. Volume 3. Pittosporaceae to Araliaceae. Ethiopia & Sweden*: The National Herbarium, Addis Ababa & The Department of Systematic Botany, Uppsala. 659pp.

Thulin, Mats. 1996. Annotations to: the conservation listing for trees of Somalia.

Wickens, G.E. 1995. *Edible nuts. Non-Wood Forest Products 5*. Food and Agriculture Organization of the United Nations.

# *Cordia millenii*
Omo

**Distribution**
Widespread in tropical Africa, this species occurs in Angola, Cameroon, Central African Republic, Côte d'Ivoire, Gabon, Ghana, Guinea, Kenya, Nigeria, Sudan, Tanzania, Uganda and Zaire.

**Habitat**
*C. millenii* grows in closed forests and old secondary formations.

Larger trees of this species (considering *C. millenii* and *C. platythyrsa* together) prefer undisturbed, well-drained areas while the smaller trees are more commonly found in disturbed forest (Hawthorne, 1995a).

**Vegetation types according to White (1983)**
**1. Transitional rain forest** of the Lake Victoria regional mosaic
The Kakamega forest in Kenya has several Guineo-Congolian lowland rain forest species including *Cordia millenii*.

**Population Status and Trends**
In Ghana, this species is common (Hawthorne, 1995a). It is only known from a few locations in Kenya and in these areas the populations are declining due to habitat loss (FAO, 1986).

**Regeneration**
This is a light-demanding species, as regeneration and large trees are doubled in density in forest where there has been disturbance (ie. logged or burnt) when compared to undisturbed forest (Hawthorne, 1995a)

**Role of Species in its Ecosystem**
In Uganda the fruits are probably dispersed by frugivorous primates (Plumptree *et al*, 1994 in Hawthorne, 1995a).

**Threats**
This species is threatened by habitat loss (FAO, 1986)

**Utilisation**
The wood is thought to be impenetrable to termites and is, therefore, used for furniture, joinery, roof shingles, canoes, household utensils and other decorative work. It is used for making musical instruments in Uganda (FAO, 1986). It is also used as firewood. Locally this species is used as a shade tree. A decoction of leaves are used to treat roundworm, ground up seeds mixed with palm oil are taken against ringworm, and the dried leaves are smoked in Nigeria for asthma, coughs and colds.

**Trade**
No information.

**Conservation Status**
IUCN Category and Criteria: LR (lc) (African Regional Workshop, 1996)
According to Hawthorne (1995a) this species is not of particular conservation concern in Ghana and has been awarded a green star in his star categorization system.

**Conservation Measures**
This species is considered a priority species for *in situ* conservation by FAO, 1984.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
FAO, 1984**.** Report of the Fifth Session of the FAO Panel of Experts on Forest Gene Resources Information No 14:32-49.
Hawthorne, W.D., 1995(a). *Ecological profiles of Ghanaian forest trees.* Oxford Forestry Institute:Oxford. pp.345.
N'Sosso, D., 1995**.** *in litt*. D. N'Sosso contributions to *the Conservation and Sustainable Management of Trees* project for the Congo.
WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.

## *Cordia platythyrsa*
Mukumari

**Distribution**
This species occurs in Cameroon, Ghana, Côte d'Ivoire, Liberia and Sierra Leone.

**Habitat**
It is found in closed forests and in old secondary formations and is a common pioneer species. Larger trees of these species (considering *C. millenii* and *C. platythyrsa* together) prefer undisturbed, well-drained areas while the smaller trees are more commonly found in disturbed forest.

**Population Status and Trends**

**Regeneration**
*C. platythyrsa* is a light demanding species, as regeneration and large trees are doubled in density in forest where there has been disturbance (ie. logged or burnt) when compared to undisturbed forest The species is regenerating well in Ghana, especially along new logging roads (Hawthorne, 1995a).

*C. platythyrsa* can reach a height of 23m or dbh of 23cm after four years of growth in open areas (Hawthorne, 1995a). In Sierra Leone, the mean annual increments vary between 3.3 and 6.3 cm for the first 18 years (Saville & Fox, 1967 in Hawthorne, 1995a).

**Role of Species in its Ecosystem**
The fruits (fleshy drupes) of this species are probably dispersed by animals, including elephants (Hawthorne, 1995a).

**Threats**
This species suffers from some exploitation (Hawthorne, 1995a&b).

**Utilisation**
The timber is used for furniture, joinery, and other decorative work.

**Trade**
No information.

**Conservation Status**
IUCN Category and Criteria: VU (A1d) (African Regional Workshop, 1996)
Under Hawthorne's (1995) star categorization system, *C. platythyrsa* scores a pink star which indicates that it is common and moderately exploited in Ghana. Hawthorne (1995b) considers this species Least Concern (or systematically Vulnerable) under the new (1994) IUCN threat categories.

**Conservation Measures**
This species is planted in a limited scale by the Forest Research Institute of Nigeria (FRIN) (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
Hawthorne, W.D., 1995(a). *Ecological profiles of Ghanaian forest trees.* Oxford Forestry Institute:Oxford. pp.345.
Hawthorne, W.D., 1995(b). Categories of conservation priority and Ghanaian tree species. Working Document 4 (prepared for the November 1995 Conservation and Sustainable Management of Trees - Technical Workshop in Wageningen, Holland).

## *Cupressus dupreziana*

Saharan Cypress

**Distribution**
This species is restricted to the Tassili N'Ajjer Massif in Algeria.

**Habitat**
*Cupressus dupreziana* is found in dry sparsely vegetated areas between 1700 and 1900m.

**Population Status and Trends**
There are 153 individuals remaining within an area of 200km². There is no longer regeneration in the wild probably due to a water shortage as a result only the larger trees can reach the water table. The trees are producing viable seeds that can withstand climatic extremes (SSC Conifer Specialist Group, 1996).

**Role of Species in its Ecosystem**
This species is associated with *Rhus tripartitum*, *Pituranthos chloranthos*, *Olea laperrini*, *Lavendula pubescens*, *Myrtus rivellii*, *Nerium oleander* and *Tamarix articulata*.

**Threats**
Grazing has been reported to destroy any regeneration of this species (Lucas and Synge, 1978)

**Utilisation**
Previously a major source of timber for local use, *C. dupreziana* also used to be cut for firewood, but is now too rare to support any form of utilisation. It has been suggested that this species could be valuable for planting in arid areas (Lucas and Synge, 1978).

**Trade**
No current trade.

**Conservation Status**

**Conservation Measures**
The majority of this species is contained in the popular tourist site, the Tassili N'Agger National Park valley, which has been designated a World Heritage Site. The trees are guarded against cutting in this area (SSC Conifer Specialist Group, 1996). This species is cultivated on a small scale. It can be cultivated quite easily in Algiers and in Britain (SSC Conifer Specialist Group, 1996).

**References**
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# *Dalbergia baronii*

Leguminosae

voamboana, hazovola, sovoka, sovodrano, hitsika, tsiandalana, palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
The species is mainly found in evergreen humid rainforest at low altitudes, along streams, rivers, in marshy areas and the back of mangrove stands.

**Population status and trends**
A widespread species confined to the lowland plains of eastern Madagascar. These forests have been greatly reduced. Large individuals are rare because of overexploitation. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat, expansion of human settlement and agriculture.

**Utilisation**
The timber is used in fine furniture-making, flooring, interiors etc. The species is also a useful source of fuelwood.

**Trade**
The timber is present in international trade. Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea received annual imports of 60m³of rough rosewood, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
VU A1cd+2cd according to Du Puy (1997).

**Conservation measures**

**Forest management and silviculture**
The species is in cultivation and its silvicultural properties are under study. Growth is slow (Blaser, 1993).

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.

Anon. 1979. VI Luxury timbers. pp. 211-238. *In Tropical legumes: Resources for the future.* Washington, D.C.: National Academy of Sciences.

Blaser, Jürgen. *et al.* 1993. *Akon'ny ala. Numeros 12 et 13.* Département Des Eaux et Forêts. 166pp.

Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.

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Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia chapelieri*

Leguminosae
rosewood, palissandre

**Distribution**
Madagascar

**Habitat**
This species occurs in humid, evergreen forest up to 1000m altitude.

**Population status and trends**
Although widespread, the species occurs mainly in lowland forest which has been and continues to be extensively cleared. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat, extensive agriculture
**Utilisation**
The timber is valuable as a rosewood and the species is also used as a source of fuelwood.

**Trade**
The species is traded on a minor scale internationally and also in local markets. Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
VU A1cd+2cd according to Du Puy (1997).

**Conservation measures**

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia chlorocarpa*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
A Madagascan endemic occurring in lowland seasonally dry deciduous forest.

**Population status and trends**
The species is fairly widespread in western Madagascar, but the primary vegetation in the area has been and continues to be extensively destroyed. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat, expansion of human settlement and agriculture.

**Utilisation**
The timber is valuable as a rosewood and the species is also used as a source of fuelwood.

**Trade**
This species is selectively felled for timber and fuel for export. Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
VU A1acd+2cd according to Du Puy (1997).

**Conservation measures**
Populations are protected in Ankarafantsika Strict Nature Reserve, Namoroka Reserve and Bemaraha Reserve.

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia davidii*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
A species of deciduous, seasonally dry forest.

**Population status and trends**
Only known from a single locality, this tree occurs in lowland, seasonally dry, deciduous forest, where selective felling of this rosewood species occurs for the export market. Logging activities take place despite the locality being contained in Ankarafantsika Strict Nature Reserve. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial and local use

**Utilisation**
The timber is valuable as a rosewood.

**Trade**
Rosewood is reported in sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
EN B1+2de, C1 according to Du Puy (1997).

**Conservation measures**
The population is contained within Ankarafantsika Strict Nature Reserve.

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia delphinensis*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
This species occurs in lowland, evergreen, humid forest

**Population status and trends**
Confined to the south-east of Madagascar, near Taolanaro, the species is threatened throughout its range by selective felling and the decline and fragmentation of its habitat. The location is also under threat of being developed for titanium mining. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, mining/exploration

**Utilisation**
The timber is valuable as a rosewood.

**Trade**
Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
EN A2cd, B1+2bcde according to Du Puy (1997).

**Conservation measures**

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia greveana*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
This species occurs in deciduous, seasonally dry forest and woodland up to an altitude of 800m.

**Population status and trends**
Widespread in western Madagascar, the species is sought after and selectively felled for its high quality wood which has formed the bulk of the timber exports from western Madagascar. Population numbers have declined over the entire range. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat

**Utilisation**
The timber is valuable as a rosewood and the species is also used as a source of fuelwood.

**Trade**
Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
LR/nt according to Du Puy (1997).

**Conservation measures**
Some localities are protected in Ankarafantsika Strict Nature Reserve and in Ankarana Special Reserve.

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia louvelii*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
A species of lowland, humid forest in eastern Madagascar.

**Population status and trends**
A species confined to the drastically reduced lowland, humid forests of eastern Madagascar. Populations are now severely fragmented and trees continue to be selectively felled for the export market. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat, extensive agriculture

**Utilisation**
The timber is valuable as a rosewood.

**Trade**
Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
EN A1cd+2cd according to Du Puy (1997).

**Conservation measures**

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia maritima*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
A lowland tree restricted to humid, evergreen, coastal forest

**Population status and trends**
The species' habitat has almost been completely destroyed. The remaining forests are seriously threatened by exploitation, clearing and also by titanium mining. Trees continue to be selectively felled for export and populations are severely fragmented. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat, mining/exploration

**Utilisation**
The timber is valuable as a rosewood.

**Trade**
Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
EN A1cd+2cd according to Du Puy (1997).

**Conservation measures**

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

# *Dalbergia purpurascens*

Leguminosae
Palissandre, rosewood

**Distribution**
Madagascar

**Habitat**
A species of deciduous, seasonally dry forest up to 1000m.

**Population status and trends**
A widespread and locally common species of east, west and south-west Madagascar. The selective felling of trees has resulted in the serious reduction of population numbers. A questionnaire on national forest genetic resources sent out by the FAO and completed by the Departement des Recherces Forestieres et Piscicoles in Madagascar indicated that all *Dalbergia* species are threatened by deforestation and overexploitation (Andrianasolo Rabevohitra, 1993).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, clear-felling/logging of the habitat

**Utilisation**
fuel (stem, national or subnational trade), timber (stem, minor International trade)

**Trade**
Rosewood is reported in annual sawnwood exports to Japan, which together with other sawnwoods amounted to between 200 and 800m³ between 1992 and 1995. In 1991 and 1992 South Korea imported 60m³of rough rosewood annually, costing US$0.1million. Rosewood is also recorded in exports of statuettes and other ornaments, veneer and plywood, wood chips and as rough wood to the European Union (Hewitt, 1997).

**IUCN Conservation category**
VU A1cd+2cd according to Du Puy (1997).

**Conservation measures**
Some localities occur in the protected areas at Ankarana, Namoroka, and Bemaraha.

**Forest management and silviculture**

**References**
Andrianasolo Rabevohitra, M.R. 1993. Completed questionnaire on national forest genetic resources in Madagascar returned to the Division of Forest Resources, Food and Agriculture Organization of the United Nations.
Du Puy, D. 1997. Completed data collection forms on Madagascan *Dalbergia* species.
Hewitt, J. 1997. Timber imports from Madagascar. (Unpublished report).

## *Diospyros celebica*

Maccassar Ebony; Black Ebony

**Distribution**
This species is endemic to Sulawesi.

**Habitat**
This species is found in rain and monsoon forests; however, *D. celebica* can grow in both humid conditions and in seasonal climates. It can survive on a variety of soils (e.g. latosols, calcareous, and podzolic soils) (PROSEA, 1995). It occurs in undulating areas upto 600m above sea level (Sidiyasa, *in litt.*, 1994).

**Population Status and Trends**
Once a widespread species in Sulawesi, it is now comparatively rare, especially in the south (PROSEA, 1995). When present in a forest it tends to be scattered irregularly (PROSEA, 1995).

**Regeneration**
Flowering and fruiting occurs at the age of 5-7 years in *D. celebica* (PROSEA, 1995). The seeds remain viable for only a short time.

**Role of Species in its Ecosystem**
Seeds are dispersed by bats, birds and monkeys (PROSEA, 1995). It is often found with *Homalium celebicum* (PROSEA, 1995).

**Threats**
*D. celebica* is threatened by heavy exploitation since it is an important source of streaked ebony (PROSEA, 1995).

**Utilisation**
The timber is used for turnery, piano keys, carving, brush backs, inlaying, parts of stringed instruments and marquetry.

**Trade**
This species has been exported from Sulawesi since the 18th century. Export of this wood peaked in 1973 at 26,000 $m^3$, since then export has significantly decreased because few trees remain (PROSEA, 1995).

Japan is the primary market for this species, but it is also exported to Europe and the U.S..

Illegal logging and trade has been reported (Draft CITES Proposal, 1994).

**Conservation Status**
This species has an old IUCN global threat status of Rare in the WCMC Plants Database. The new IUCN threat categories have not yet been applied to this species.

**Conservation Measures**
In Sulawesi, *D. celebica* is protected and there is a quota system in place (CITES Proposal, 1994). The Indonesian Government has already started a planting programme of *D. celebica*; it has not, however, been planted on a large commercial scale (Sidiyasa, *in litt.*, 1994).

**References**
CITES Proposal, 1994. Proposal to include *Diospyros celebica* in Appendix II of CITES.

Lemmens, R.H.M.J., Soerianegara, I. and W.C. Wong (Eds.), 1995. Plant Resources of South-East Asia (PROSEA) No. 5(2) *Timber Trees:Minor commercial timbers*. Backhuys Publishers, Leiden. 655 pp.

Sidiyasa, K., 1994. Letter to Sara Oldfield re: *Diospyros celebica, Intsia bijuga, Intsia palembanica*. Dated 28th April, 1994.

## *Diospyros crassiflora*
African Ebony

**Distribution**
This species occurs in Cameroon, Central African Republic, Congo, Gabon, Nigeria, and Zaire.

**Habitat**
*D. crassiflora* is a lowland rainforest species.

**Population Status and Trends**
Virtually all big trees of the species have been marketed except in remote areas and the species is considered to be threatened in several countries such as Cameroon and Congo (WCMC, 1991a). Few large trees of the species remain in Nigeria (WCMC, 1991b).

**Role of Species in its Ecosystem**
No information.

**Threats**
According to White (*pers. comm.*, 1990 in WCMC, 1991b), this species is at risk as a commercial source of Ebony.

**Utilisation**
A speciality wood used for small parts of musical instruments, carvings and items of turnery.

**Trade**
Until recently, European demand for this species was limited as it is not considered a fashionable timber (WCMC, 1991), but this situation may now be changing. Zaire is the main exporter of this species. It is also of commercial importance in Congo, Cameroon, and Gabon. In the 1960s around 70 tonnes of wood were exported annually from Cameroon (WCMC, 1991). In 1994, Gabon exported 35 cu m (ITTO, 1995b).

**Conservation Status**
IUCN Category and Criteria: EN (A1d) (African Regional Workshop, 1996)

**Conservation Measures**
Special permission is required for utilization in Cameroon.
Regeneration measures are required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabwe, July, 1996.
ITTO, 1995b. Results of the 1995 forecasting and statistical enquiry for the Annual Review. ITTC(XIX)/4
WCMC, 1991a. *Pre-project study on the conservation status of tropical timbers in trade.* Volume 1. ITTO Report PPR 23/91 (M)
WCMC, 1991b. *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.

## *Diospyros hemiteles*
Ebenaceae

**Distribution**
Mauritius

**Habitat**
A species of lowland, dry, seasonal, broadleaved, closed forest up to 350m.

**Population status and trends**
A species, probably used as a timber in the distant past, now confined to a few sites of lowland evergreen forest in the south-west and also recently recorded on the east coast at Mt. Briseé. The total population is estimated to contain fewer than 60 individuals, although only 42 trees are known at present. No regeneration is apparent.

**Role of species in the ecosystem**

**Threats**
Grazing/damage by feral/exotic animals, invasive plants, poor regeneration, clear-felling/logging of the habitat

**IUCN Conservation category**
CR C2a, D1 according to Page (1997).

**Conservation measures**
There are plans to plant trees from cultivation into managed reserves.

**Forest management and silviculture**

**References**
Bosser, J., Th. Cadet, H.R. Julien, & W. Marais. 1976. *Flore des Mascareignes: La Réunion, Maurice, Rodrigues*. The Sugar Research Institute, Mauritius; ORSTOM, Paris; Royal Botanic Gardens, Kew.

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Page, Wayne. 1997. Data collection forms completed on the threatened tree species of Mauritius.

Strahm, W.A. 1993. *The conservation and restoration of the flora of Mauritius and Rodrigues*. (unpublished). PhD Thesis (2 vol.), Reading Uni. U.K.

# *Entandrophragma angolense*

Meliaceae

African mahogany, gedu nohor, edinam, dilolo, livouti, ndianoni, thiouabid, tiama

**Distribution**
Angola, Cameroon, Central African Republic, Congo, Côte d'Ivoire, DR Congo, Equatorial Guinea (Bioko), Gabon, Ghana, Guinea, Kenya, Liberia, Nigeria, Sierra Leone, Sudan, Tanzania, Uganda

**Habitat**
The species grows in various types of moist forest and rainforest, particularly in better drained sites, along forest edges, in thickets and gallery forest.

**Population status and trends**
The commercial exploitation of this timber species has resulted in the large-scale extraction of mature individuals throughout its range. Significant genetic erosion has been reported in some countries although no actual data are available. Although the species is common and widespread in forest in West Africa, populations in the east are very small, e.g. the species is rare and confined to Kakamega forest in Kenya (Beentje, 1995). Overharvesting and encroaching agriculture and settlement has led to the near extinction of the species in Uganda (Okullo *et al.*, 1997).

**Role of species in the ecosystem**

**Threats**
Commercial use, clear-felling/logging of the habitat

**Utilisation**
One of the main sources of African mahogany, used for exterior and interior construction, furniture-making, flooring.

**Trade**
Ghana exported *Entandrophragma* spp. in plywood exports in 1995, selling at an average price of US$334/m³. It also recorded the export of *E. angolense* in 1000m³ of sliced veneer, selling at an average price of US$732/m³, as jointed veneer, selling at an average price of US$1365/m³, in 4000m³ of sawnwood, selling at an average price of US$472/m³ (ITTO, 1997).

In the same year DR Congo exported 1000m³ as sawnwood, selling at an average price of US$245/m³, and 8000m³ of logs, selling at an average price of US$130/m³. Gabon exported 169,000m³ of logs at an average price of US$22/m³. Cameroon exported 4000m³ of logs at an average price of US$170/m³ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**
There are protected populations and felling restrictions in various countries.

**Forest management and silviculture**
Regeneration is relatively good after logging damage but not after burning. The seed does not appear to disperse great distances and regeneration is poor away from parent trees. A slow-growing species. Successful plantations are established in Côte d'Ivoire.

**References**

Ake Assi, L. 1990. Annotated WCMC list of timber species for the Ivory Coast. (Côte d'Ivoire).
Alder, D. 1989. Natural forest increment, growth and yield. pp. 47-52. Wong, J.L.G. (ed.), *Forest Inventory Project, Seminar Proceedings, 29-30 March 1989*, Accra.
Beentje, Henk Jaap. 1994. Kenya trees, shrubs and lianas. Nairobi, Kenya: National Museums of Kenya. 722pp.
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Hecketsweiler, P.H. 1990. Incomplete list of the commercially exploited timber species of Congo (Brazzaville).
Hutchinson, J., J.M. Dalziel, & F.N. Hepper. 1927. *Flora of West Tropical Africa*. Published by the English Ministry of State for the Colonies.
ITTO. 1997. *Annual review and assessment of the world tropical timber situation 1996.* International Tropical Timber Organization.
IUCN. 1990. *La conservation des ecosystèmes forestiers du Gabon*. IUCN, Tropical Forest Programne Series.
Katende, A.B. 1995. Annotations to: WCMC printout of Trees of Uganda dated 23 Nov. 1995. 137pp.
Keay, R.W.J. 1996. Letter to WCMC concerning threatened and endemic tree species in Nigeria. 1pp.
Knox, Eric B. 1995. *The List of East African Plants (LEAP):* An electronic database (Draft). 72pp.
Okullo, J.B. *et al*. 1997. Completed data collection forms for woody plants of Uganda.
Songwe, C. 1990. Revised preliminary list of timbers of Cameroon with conservation categories.

# *Entandrophragma candollei*

Meliaceae

African mahogany, omu, penkwa-akoa, cedar kokoti, sipo, kosipo, candollei

**Distribution**
Angola, Cameroon, Congo, Côte d'Ivoire, DR Congo, Gabon, Ghana, Guinea, Liberia, Nigeria

**Habitat**
A large tree of lowland rainforest.

**Population status and trends**
Although slightly rarer than other members of the genus, the species is still widespread and heavily exploited throughout its range.

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, clear-felling/logging of the habitat

**Utilisation**
One of the major sources of African mahogany, used for flooring and furniture-making.

**Trade**
In 1995 *Entandrophragma* spp. were listed in plywood exports from Ghana, selling at an average price of US$334/m³. *E. candollei* is also recorded in exports of sliced veneer, selling at an average price of US$914/m³, and of jointed veneer, selling at an average price of US$1072/m³.

The species was exported from Côte d'Ivoire as plywood, selling at an average price of US$666/m³ as veneer, selling at an average price of US$655/m³.

Exports of this species from Cameroon included a consignment of plywood, selling at an average price of US$1005/m³, 28,000m³ of veneer, selling at an average price of US$800/m³, 13,000m³ of sawnwood, selling at an average price of US$565/m³, and 5000m³ of logs, selling at an average price of US$180/m³.

Congo exported 11,000m³ of logs.

DR Congo exported an unrecorded amount of veneer, sawnwood and 1000m³ of logs, selling at an average price of US$379/m³, US$234/m³ and US$120/m³ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**
There are protected populations and felling restrictions in place in various countries.

**Forest management and silviculture**
Population densities are comparatively low and seed production more erratic but regeneration appears to be good where parent trees remain and may also occur to some degree after burning.

**References**
Ake Assi, L. 1990. Annotated WCMC list of timber species for the Ivory Coast. (Côte d'Ivoire).
Erfurth, T. & H. Rusche. 1976. *The marketing of tropical wood*. Rome: FAO. 60pp.
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Hecketsweiler, P.H. 1990. *Incomplete list of the commercially exploited timber species of Congo (Brazzaville)*.
Hutchinson, J., J.M. Dalziel, & F.N. Hepper. 1927. *Flora of West Tropical Africa*. Published by the English Ministry of State for the Colonies.
ITTO. 1997. *Annual review and assessment of the world tropical timber situation 1996*. International Tropical Timber Organization.
N'Sosso, Dominique. 1995. Contribution de N'Sosso Dominique au projet *Conservation and sustainable management of trees*. (unpublished). 24pp.
Songwe, C. 1990. Revised preliminary list of timbers of Cameroon with conservation categories.

## *Entandrophragma caudatum*

Meliaceae

Mountain mahogany, wooden banana tree, jungamtave, mpapama, mupingiri, umsikili, umzomondo

**Distribution**
Swaziland, Zambia, Zimbabwe

**Habitat**
A large tree of scattered occurrence occurring in river valleys and open woodland on rocky slopes or kopjes and deep kalahari sands.

**Population status and trends**
Unlike other members of the genus, which provide a commercial source of mahogany, this species is too rare for more than limited exploitation.

**Role of species in the ecosystem**

**Threats**

**Utilisation**
The timber is used at a local level, mainly for furniture making.

**Trade**
The species is not present in international trade.

**IUCN Conservation category**
LR/lc according to WCMC

**Conservation measures**

**Forest management and silviculture**

**References**
Gelderblom, Caroline. 1994. Letter from Caroline Gelderblom to Dr Kerry Walter concerning lists of threatened plants in Southern Africa dated 7 March 1994. 10pp.

Goldsmith, B. & D.T. Carter. 1981. *The indigenous timbers of Zimbabwe*. The Zimbabwe Bulletin of Forestry Research No. 9. Forestry Commission.

Kemp, E.S. 1979. Swaziland. Part of appendix to: Possibilities and needs for conservation of plant species and vegetation in Africa. pp. 101-103. *In* Hedberg, I. (ed.). *Systematic botany, plant utilization and biosphere conservation.* Stockholm, Almqvist & Wiksell International. Stockholm: Almqvist & Wiksell International.

# *Entandrophragma cylindricum*

Meliaceae

African mahogany, aboudikro, penkwa, sapele, sapelli, mboyo, kilouka, essie

**Distribution**
Angola, Cameroon, Congo, Côte d'Ivoire, DR Congo, Gabon, Ghana, Nigeria, Sierra Leone, Togo, Uganda

**Habitat**
A species of lowland forest and woodland types.

**Population status and trends**
A relatively common species, although less common than *E. angolense.* It is exploited heavily throughout its range. Genetic erosion caused by the large-scale depletion of mature individuals from populations has occurred in some countries. In comparison with other species of *Entandrophragma* this species can occur in drier habitats, including abandoned fields. Populations in Congo are localised (N'Sosso, 1995). The Ugandan distribution is confined to forests at Budongo, Mabira, Bungoma and West Mengo (Okullo *et al*., 1997)

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, clear-felling/logging of the habitat, expansion of human settlement and agriculture.

**Utilisation**
A major source of African mahogany. It is also a source of veneer, charcoal and firewood.

**Trade**
In 1995 Ghana exported the species as plywood, selling at an average price of US$242/m³, and in mixed *Entandrophragma* consignments of plywood, selling at US$334/m³, as 1000m³ of veneer, selling at an average price of US$978/m³, as 3000m³ of sawnwood, selling at an average price of US$592/m³.

Côte d'Ivoire exported the species as plywood, selling at an average price of US$472/³, as sliced and rotary peeled veneer, selling at US$947/m³ and US$496/m³.

Cameroon exported 19,000m³ of plywood, selling at US$1005/m³, 29,000m³of veneer, selling at an average price of US$795/m³, 20,000m³ of sawnwood, selling at an average price of US$500/m³, and 311,000m³ of logs, selling at an average price of US$251/m³.

Congo exported 73,000m³ of logs.

Gabon exported 20,000m³ of logs at an average price of US$37,000/m³.

DR Congo exported 6000m³ of veneer at US$596m³, 10 ,000m³ of sawnwood at US$408/m³ and 16,000m³ of logs at US$178/m³ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**
There are protected populations and felling restrictions in place in various countries.

**Forest management and silviculture**
The species does not respond well to burning. Growth rates are amongst the slowest in the genus. Successful plantations are established in Côte d'Ivoire.

**References**
Ake Assi, L. 1990. Annotated WCMC list of timber species for the Ivory Coast. (Côte d'Ivoire).
Alder, D. 1989. Natural forest increment, growth and yield. pp. 47-52. Wong, J.L.G. (ed.), Forest *Inventory Project, Seminar Proceedings, 29-30 March 1989, Accra.*
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Hutchinson, J., J.M. Dalziel, & F.N. Hepper. 1927. *Flora of West Tropical Africa*. Published by the English Ministry of State for the Colonies.
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N'Sosso, Dominique. 1995. Contribution de N'Sosso Dominique au projet *Conservation and sustainable management of trees*. (unpublished). 24pp.
Okullo, J.B. *et al*. 1997. Completed data collection forms for woody plants of Uganda.
Songwe, C. 1990. Revised preliminary list of timbers of Cameroon with conservation categories.

## *Entandrophragma delevoyi*
Meliaceae

**Distribution**
DR Congo, Tanzania, Zambia

**Habitat**
A species of evergreen forest and thicket on well-drained soils. It occurs in disturbed areas but is sensitive to fires.

**Population status and trends**
Although most members of the genus are heavily exploited for their commercially valuable timber, this species is more seriously threatened by habitat loss throughout its range.

**Role of species in the ecosystem**

**Threats**
Clear-felling/logging of the habitat, expansion of human settlement and agriculture.

**Utilisation**
The species is used locally as a source of timber and firewood.

**Trade**

**IUCN Conservation category**
NE

**Conservation measures**

**Forest management and silviculture**

**References**
Adjanohoun, E.J. 1979. Benin. Part of appendix to: Possibilities and needs for conservation of plant species and vegetation in Africa. pp. 91-92. *In* Hedberg, I. (ed.). *Systematic botany, plant utilization and biosphere conservation.* Stockholm: Almquist & Wiksell International.

Styles, B.T. & F. White. 1991. Meliaceae *in Flora of Tropical East Africa.* Rotterdam: A.A. Balkema. 68pp.

## *Entandrophragma excelsum*
Meliaceae

**Distribution**
DR Congo, Malawi, Tanzania, Uganda, Zambia

**Habitat**
This species is scattered in areas of upland semi-deciduous forest.

**Population status and trends**
Unlike most other members of the genus, which are commercial sources of African mahogany, this species is too rare to be exploited at anything other than a local level. Habitat loss is a more serious threat.

**Role of species in the ecosystem**

**Threats**
Expansion of human settlement and agriculture.

**Utilisation**

**Trade**

**IUCN Conservation category**
LR/lc according to WCMC

**Conservation measures**

**Forest management and silviculture**

**References**
Gelderblom, Caroline. 1994. Letter from Caroline Gelderblom to Dr Kerry Walter concerning lists of threatened plants in Southern Africa dated 7 March 1994. 10pp.
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Styles, B.T. & F. White. 1991. Meliaceae *in Flora of Tropical East Africa*. Rotterdam: A.A. Balkema. 68pp.

# *Entandrophragma utile*

Meliaceae

African mahogany, utile, assié, kilouka, mbel, sipo, efobrodedwo, ijebu

**Distribution**
Angola, Cameroon, Congo, Côte d'Ivoire, DR Congo, Gabon, Ghana, Liberia, Nigeria, Sierra Leone, Uganda

**Habitat**
The species grows in various lowland forest types.

**Population status and trends**
A widespread species, although it has a patchy distribution and can be rare or absent from likely places. It is reported to be relatively abundant at Mayombe (N'Sosso, 1995). Heavy exploitation of the timber continues throughout its range. Genetic erosion caused by the depletion of mature individuals has probably occurred in most countries. Local overcutting is also common in parts of West Africa. In Uganda populations are confined to forest at Budongo and Mabira, where it is extremely rare and close to extinction (Okullo *et al.*, 1997).

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, local use, expansion of human settlement and agriculture.

**Utilisation**
An important source of African mahogany, used for interior and exterior construction work, furniture-making.

**Trade**
*Entandrophragma* spp. are listed in exports of plywood from Ghana in 1995, selling at an average price of US$334/m³. *E. utile* was exported from Ghana in 3000m³ of sawnwood, selling at an average price of US$675/m³. DR Congo exported the species as veneer, selling at an average price of US$665/m³, as 3000m³ of sawnwood, selling at an average price of US$442/m³, and as 18,000m³ of logs, selling at an average price of US$231/m³. Cameroon exported 63,000m³ at an average price of US$291/m³. Côte d'Ivoire exported the species as veneer, selling at US$372/m³ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**
There are protected populations and felling restrictions in place in various countries.

**Forest management and silviculture**
Regeneration is good after disturbance and the species is generally noted to be more light-demanding and tolerant of dry conditions. Growth rates are amongst the slowest in the genus and the seeds and seedlings suffer high mortality rates because of insect attack.

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Thorne, J.M. 1979. Liberia. Part of appendix to: Possibilities and needs for conservation of plant species and vegetation in Africa. pp. 88. *In* Hedberg, I. (ed.*). Systematic botany, plant utilization and biosphere conservation.* Stockholm, Almqvist & Wiksell International. 88. Stockholm: Almqvist & Wiksell International.

# *Eribroma oblonga*

synonym: *Sterculia oblonga*
Yellow Sterculia; Eyong

**Distribution**
This species occurs in Cameroon, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia and Nigeria.

**Habitat**

It is a lowland rainforest species of transition forests between humid evergreen and semi-deciduous forest and it also occurs in secondary forests.

Vegetation type according to White (1983)
**1. Guineo-Congolian rain forest**
Mixed moist semi-evergreen Guineo-Congolian rain forest
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones

**Population Status and Trends**
This species is common in Ghana (Hawthorne, 1995a). It is also common in Nigeria and Cameroon (African Regional Workshop, 1996).

**Regeneration**
The seedlings are shade tolerant, but the larger trees are definite light demanders (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
The seeds are probably dispersed by birds (Hawthorne, 1995a).

**Threats**
*E. oblonga* is exploited for its timber.

**Utilisation**
The timber is used for decorative veneers, furniture and construction work.

**Trade**
Côte d'Ivoire exported 246$m^3$ of *E. oblonga* plywood for an average price of US$3974.36/$m^3$ in 1994 (ITTO, 1995a). In 1987, Gabon exported 16$m^3$ from Owendo (IUCN, 1990). Gabon exported 987.165 $m^3$ of Eyong in 1994 and 1,893.308 $m^3$ in 1995 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
According to Hawthorne (1995a), this species is of no particular conservation concern and was awarded a green star for Ghana.

**Conservation Measures**
Regeneration work is necessary (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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Hawthorne, W.D., 1995(a). *Ecological profiles of Ghanaian forest trees.* Oxford Forestry Institute:Oxford. pp.345.
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# *Gossweilerodendron balsamiferum*

Agba

**Distribution**

The genus *Gossweilerodendron* is endemic to the Guineo-Congolian region (White, 1983). *G. balsamiferum* occurs in Angola, Cameroon, Congo, Equatorial Guinea, Gabon, Nigeria and Zaire.

**Habitat**

This shade-tolerant species usually grows in mature little-disturbed forest (evergreen or semi-deciduous) and occurs at elevations below 500m. This species flourishes on ferruginous soils derived from secondary sediments.

**Population Status and Trends**

It is absent or rare from part of its range within the main Nigeria\Zaire forest block (WCMC, 1991).

In the Congo, in the forest zone between Louessé and Niari of Makabana, stands of *G. balsamiferum* are found with 5 or 6 exploitable trees per hectare (N'Sosso *in litt*, 1995).

**Role of Species in its Ecosystem**

No information.

**Threats**

This species is declining because of heavy exploitation, habitat loss and a lack of a plantation programme (FAO, 1986).

**Utilisation**

The main uses of *G. balsamiferum* is in plywood manufacturing and for furniture, flooring, household fittings and light construction.

**Trade**

In 1994, 22$m^3$ of this species was exported as sawnwood from Congo (ITTO, 1995a). From the port of Owendo in Gabon, 6,002 $m^3$ were exported in 1987 (IUCN, 1990). Gabon exported 18,660.055 $m^3$ in 1994 and 27,307.858 $m^3$ in 1995 (DIAF, 1996).

**Conservation Status**

IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)

**Conservation Measures**

FAO (1986) recommended that the genetic material of this species should be protected so that a future planting programme could be set up. A planting programme should be initiated (African Regional Workshop, 1996).

**References**

African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.

DIAF, 1996. Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.

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ITTO, 1995a. *Elements for the annual review and assessment of the world tropical timber situation.* Draft Document.

IUCN, 1990**.** *La Conservation des Ecosystèmes Forestiers du Gabon*. IUCN, Tropical Forest Programme Series. pp. 200.

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WCMC, 1991**.** *Provision of Data on Rare and Threatened Tropical Timber Species.* pp. 58.

White F., 1983**.** *The Vegetation of Africa.* A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

# *Guarea cedrata*

Guarea; light bossé

**Distribution**
This species occurs in Cameroon, Congo, Côte d'Ivoire, Gabon, Ghana, Liberia, Nigeria, Sierra Leone, Uganda and Zaire.

**Habitat**
*G. cedrata* trees are most common in moist semi-deciduous forest and in the dryer undisturbed areas of moist evergreen forest (Hawthorne, 1995a).

**Vegetation type according to White (1983)**
**1. Mixed moist semi-evergreen Guineo-Congolian rain forest**
**2. Guineo-Congolian short forest and shrub forest**
**3. Upland *Parinari excelsa* forest in West Africa**

**Population Status and Trends**
This species is common in Ghana (Hawthorne, 1995a).

**Regeneration**
Seedlings and saplings are often found in shady areas and tend to thrive in undisturbed areas rather than in disturbed areas; trees of all sizes are much more abundant in areas that have not been burnt (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
The fruits are eaten and the seeds are most likely dispersed by birds and animals (Hawthorne, 1995a).

**Threats**
This species is moderately exploited (Hawthorne, 1995a&b).

**Utilisation**
Timber from this species is used for furniture, joinery, panelling, boat building, decorate veneers, turnery and flooring.

**Trade**
Ghana exported 2,450 $m^3$ of *G. cedrata* logs for an average price of US$ 221.00/$m^3$ in 1994 (ITTO, 1995a), 3,710 $m^3$ of air dried sawnwood for US$ 424.00 and kiln dried sawnwood for US$ 563.00/$m^3$ (ITTO, 1995a).
Gabon exported 1,669 $m^3$ from Owendo in 1987 (IUCN, 1990). The following amounts of Bossé (both *G. cedrata* and *G. thompsonii*) were exported from Gabon: 3,179.028 $m^3$ in 1994 and 3,572.884 in 1995 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)
Under Hawthorne's (1995a) star categorization system, *G. cedrata* scores a pink star which indicates that it is common and moderately exploited. Under the new IUCN threat categories (1994) this species is considered Vulnerable (Hawthorne, 1995b)

**Conservation Measures**
This species is protected by law in Côte d'Ivoire. Regeneration work required.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.
White F., 1983. *The Vegetation of Africa.* A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

# *Guarea thompsonii*

Dark Guarea

**Distribution**
This species is found in Cameroon, Congo, Côte d'Ivoire, Gabon, Ghana, Liberia, Nigeria and Zaire.

**Habitat**
This shade tolerant species is found moist and evergreen forest hillsides.

**Vegetation type according to White (1983)**
**1. Mixed moist semi-evergreen Guineo-Congolian rain forest**

**Population Status and Trends**
This species is common in Ghana (Hawthorne, 1995a).
The seedlings are less commonly found in the shade when compared to *G. cedrata*, and some light exposure seems necessary for seedlings until a size of 15cm dbh is reached (Hawthorne, 1995a).

**Regeneration**
It takes almost 200 years to reach a 9 foot dbh, and is therefore relatively slow growing (Keay, 1961 in Hawthorne, 1995a)

**Role of Species in its Ecosystem**
No information

**Threats**
No specific information.

**Utilisation**
Timber from this species is used for furniture, joinery, panelling, boat building, decorate veneers, turnery and flooring.

**Trade**
*G. thompsonii* is not as commercially important as *G. cedrata*, although it is moderately exploited (Hawthorne, 1995a). The following amounts of Bossé (both *G. cedrata* and *G. thompsonii*) were exported from Gabon: 3,179.028 $m^3$ in 1994 and 3,572.884 in 1995 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d,) (African Regional Workshop, 1996)
Under Hawthorne's (1995a) star categorization system, *G. thompsonii* scores a pink star which indicates that it is common and moderately exploited in Ghana. Under the new IUCN threat categories (1994) this species is considered Vulnerable (Hawthorne, 1995b).

**Conservation Measures**
No information.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
DIAF, 1996. Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.
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## *Guibourtia ehie*

Ovangkol;Amazone;Hyedua

**Distribution**
This species occurs in Cameroon, Côte d'Ivoire, Gabon, Ghana, Liberia and Nigeria.

**Habitat**
*G. ehie* is a forest species, preferring closed rainforests and transitional forests (WCMC, 1991).
In Ghana, it is successful in the dryer areas of moist semi-deciduous forest (Hawthorne, 1995a).

**Population Status and Trends**
This species is common in Ghana, particularly in the north-west of the country. All sizes of tree do better in unburnt rather that burnt forest (Hawthorne, 1995a).

**Regeneration**
Seed dispersal is mainly by wind. Seedlings are found clustered around the parent tree and often remain gregarious in advanced stages of regeneration (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
No information.

**Threats**
This species suffers from high rates of exploitation in Ghana (Hawthorne, 1995a&b).

**Utilisation**
The wood of this species is a popular substitute for Rosewood. It is used for fine furniture and cabinetwork, turnery, decorative veneers and flooring (WCMC, 1991).

**Trade**
This species is increasingly available in the U.S.. It is exported by Gabon; in 1987, 15,450$m^3$ were exported from Owendo (IUCN, 1990), in 1994, a total of 8,607.596 $m^3$ were exported (DIAF, 1996) and in 1995, 10,533.197 $m^3$ were exported (DIAF, 1996). The export of this species in log form is banned by Ghana.

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
For Ghana, Hawthorne (1995a) has given this species a red star, which means it is common but under pressure from exploitation and conservation measures are necessary. Under the new IUCN threat categories (1994) this species is considered Vulnerable (Hawthorne, 1995b).

**Conservation Measures**
Regeneration measures are required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
DIAF, 1996**.** Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.
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IUCN, 1990**.** *La Conservation des Ecosystèmes Forestiers du Gabon*. IUCN, Tropical Forest Programme Series. pp. 200.
WCMC, 1991**.** *Provision of Data on Rare and Threatened Tropical Timber Species.* pp. 58.

# *Hallea ledermanni*

synonyms: *Mitragyna ciliata*; *Mitragyna ledermannii*
Abura

**Distribution**
Abura occurs in the coastal regions of the following West Africa countries: Angola, Benin, Cameroon, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Nigeria and Zaire.

**Habitat**

*H. ledermannii* is gregarious in freshwater swamps. This light-demanding species forms a narrow border along rivers and lagoons in high forest areas, grass plains, savanna and in swampy areas of deciduous and evergreen rain forests (FAO, 1986b) and occurs in areas that are periodically inundated. In Ghana it is often found outside forest reserves along rivers and in village swampland; it tends to have a patchy distribution around swamps, although it does not inhabit all swampy areas. It is found in the coastal regions of Nigeria (Keay, 1989 in Hawthorne, 1995a).

**Vegetation type according to White (1983)**
**1. Guineo-Congolian swamp forest and riparian forest**
*Hallea ledermanni* is widespread in this forest type.

**Population Status and Trends**
As noted above, *H. ledermannii* is widespread within swamp and riparian forest. Although information on population status and trends is not directly available this could be inferred from information on the extent and decline of its wetland habitats.

**Regeneration**
Regeneration requires fresh water conditions and this species thrives best in humid conditions where rainfall is over 1250mm/year and the temperature is between 25 ºC and 35 ºC. When in its preferred habitat regeneration is plentiful and successful and growth is rapid (FAO, 1986b).

**Role of Species in its Ecosystem**
*H. ledermanni* releases lots of small winged seeds that can produce patches of regeneration on exposed mud (annon. 1958 in Hawthorne, 1995a). It can also reproduce vegetatively (FAO, 1986b). Commonly Abura is found in pure communities associating with species such as *Gilbertiodendron, Randia lane-poolei*, *Symphonia globulifera*, and *Raphia vinifera* (FAO, 1986b).

**Threats**
This species is suffering from over-exploitation in Ghana (Hawthorne, 1995a).

**Utilisation**
This is a general-purpose timber used in furniture production, joinery, domestic flooring, plywood, veneer, carving and transmission poles. *H. ledermannii* has some important medicinal properties, e.g. it is poisonous to paramecia and has analgesic properties, and many local medicinal uses (FAO, 1986b)

**Trade**
In 1994, 22,133 $m^3$ of Abura logs (*Hallea ciliata*) were exported from the Congo, 9,109 $m^3$ (@ US$ 450.57/$m^3$) were exported from Côte d'Ivoire and an unknown amount of Abura (*Mitragyana ciliata*) was exported from Gabon at an average price of US$ 27.27/$m^3$ (ITTO, 1995a). In the same year, 945 $m^3$ of Abura {*Hallea ciliata*} sawnwood was exported from Congo and 463 $m^3$ of veneer Abura (*Hallea ciliata*) was exported from Côte d'Ivoire for an average price of US$ 1680.61/$m^3$ (ITTO, 1995a).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
Hawthorne (1995a) has given this species a red star, which means it is common but under pressure from exploitation and conservation measures are necessary. This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b).

**Conservation Measures**
It is considered a priority for *in situ* conservation by FAO, 1984. *Ex-situ* conservation work should be commenced and intensified (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996**.** *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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Hawthorne, W.D., 1995(b). Categories of conservation priority and Ghanaian tree species. Working Document 4 (prepared for the November 1995 Conservation and Sustainable Management of Trees - Technical Workshop in Wageningen, Holland). pp.345.
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White F., 1983**.** *The Vegetation of Africa.* A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

## *Hallea stipulosa*

Rubiaceae
abura, bahia, subaha-akoa

**Distribution:**
Angola, Cameroon, Central African Republic, Congo, Gabon, Ghana, Guinea, Nigeria, Senegal, Sierra Leone, Sudan, Uganda, Zambia

**Habitat**
tropical, lowland, moist, non-seasonal, broadleaved, closed forest

**Population status and trends**
In many places it suffers from overexploitation.

**Role of species in the ecosystem**

**Threats**
clear-felling/logging of the habitat

**Utilisation**
A widespread and important source of timber which occurs most commonly in swampy areas. timber (major International trade), timber (stem)

**Trade**
In 1995 the species was recorded in log exports from DR Congo, selling at an average price of US$93/m³ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd according to World Conservation Monitoring Centre

**Conservation measures**

**Forest management and silviculture**

**References**
Hawthorne, W. 1990. *Field guide to the forest trees of Ghana*. Chatham: Natural Resources Institute, for the Overseas Development Administration, London. 278pp.
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Katende, A.B. 1995. Annotations to: WCMC printout of Trees of Uganda dated 23 Nov. 1995. 137pp.

## *Haplormosia monophylla*

Leguminosae
akoriko, idewa, larmé

**Distribution**
Cameroon, Côte d'Ivoire, Liberia, Nigeria, Sierra Leone

**Habitat**
tropical, lowland, moist, broadleaved, closed forest, swamp forest

**Threats**
clear-felling/logging of the habitat

**Utilisation**
timber

**Trade**

**IUCN Conservation category**
VU A1d+2d according to African Regional Workshop

There is little information on the status of populations or their regeneration but it is expected that overexploitation and habitat degradation are resulting in population declines.

**Conservation measures**

**Forest management and silviculture**

**References**
Ake Assi, L. 1990. Annotated WCMC list of timber species for the Ivory Coast. (Côte d'Ivoire).
Ake Assi, Laurent. 1988. *Espèces rares et en voie d'extinction de la flore de la Côte d'Ivoire*. (unpublished). 6pp.
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# *Heritiera utilis*

Sterculiaceae

de-orh, niangom, nyankom, ogoué, yawe

**Distribution**
Côte d'Ivoire, Gabon, Ghana, Liberia, Sierra Leone

**Habitat**
The species occurs in lowland evergreen wet and moist forest and swamp forest.

**Population status and trends**
A timber species which occurs commonly in remaining areas of forest in the Upper Guinea region and Gabon, especially evergreen forest. Exploitation rates are high and likely to be unsustainable.

**Role of species in the ecosystem**

**Threats**
Commercial overexploitation, clear-felling/logging of the habitat

**Utilisation**

**Trade**
In 1995 the species was exported from Côte d'Ivoire, under the name of *Tarrietia*, in veneer exports selling at an average price of US$286/m³ and in 41,000m³ of logs, selling at an average price of US$311/m³ (ITTO, 1997). Ghana also exported 5000m³ of sawnwood, selling at an average price of US$653/m³. Liberia exported 4000m³ at an average price of US$250/m³.

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**

**Forest management and silviculture**
Seeding and early growth can be erratic. The species can grow rapidly, however, in suitable conditions. Growing the species in plantations is being attempted.

**References**

Hawthorne, W. 1990. *Field guide to the forest trees of Ghana*. Chatham: Natural Resources Institute, for the Overseas Development Administration, London. 278pp.

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ITTO. 1997. *Annual review and assessment of the world tropical timber situation 1996*. International Tropical Timber Organization.

## *Irvingia gabonensis*

Irvingiaceae

abesebuo, goron biri, oro, moupiki, muiba, eniok, wild mango, dika nut, andok, manguier sauvage, chocolatier

**Distribution**

Angola, Congo, Côte d'Ivoire, DR Congo, Ghana, Guinea, Nigeria, Príncipe, Senegal, Sierra Leone, Sudan, Uganda

**Habitat**

The optimal habitat of the species is evergreen rainforest. However it occurs also in gallery forest and semi-deciduous forest, also often in towns or on the outskirts of villages. It is restricted to fairly wet, well-drained loamy to clay soils.

**Population status and trends**

Population declines have occurred through logging operations, expansion of human settlements and poor natural regeneration. The species is, however, relatively common and widespread. Regeneration may be limited by the absence of large seed dispersers, such as elephants.

**Role of species in the ecosystem**

The large mango-like fruits are eaten by various animals, including elephants and lowland gorillas which disperse the seeds. In certain regions of Côte d'Ivoire, the species apparently is only able to regenerate through replanting by humans around villages (White & Abernethy, 1996).

**Threats**

Local use, poor regeneration

**Utilisation**

Great quantities of the seeds are harvested throughout the species range. They are processed into compacted blocks, resembling chocolate bars. This is believed to provide a significant source of income to rural communities (White & Abernethy, 1996). The fruits are also sweet and edible. The wood is very hard and fine-grained.

**Trade**

**IUCN Conservation category**

LR/nt according to WCMC

**Conservation measures**

This species is now being researched intensively by ICRAF as a fruit tree species for use in agroforestry systems. It is increasingly being planted on farms as a result. Trees are often conserved on farms during clearance of forest for agriculture, because of their value for fruit production.

**Forest management and silviculture**

**References**

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# *Juniperus procera*

Cupressaceae

East African cedarwood, African pencil cedar, birbirssa, tedh

**Distribution**

Djibouti, DR Congo, Ethiopia, Kenya, Malawi, Saudi Arabia, Somalia, Sudan, Tanzania, Uganda, Yemen (Former North Yemen), Zimbabwe

**Habitat**

A large tree of mountainous areas, occurring in dry forests or as scattered individuals or in pure stands on rocky well-drained soils, mostly between 1750 and 2500m, extending up to 3500m..

**Population status and trends**

A widespread species with a range extending from Arabia to Zimbabwe. Existing populations in the Arabian Peninsula represent a small fragment of the woodlands that once existed. At lower elevations populations appear to be regenerating extremely poorly, possibly because of climatic changes. Trees continue to be cut for fuelwood and timber at a local level, in some places also for export. Few large trees remain. Changing land use patterns, browsing particularly by buffalo and elephants and the increase in plantations of fast growing exotic species are also contributing to the species decline. Outlying populations in Zimbabwe, the Republic of Congo and Malawi are extremely small and threatened. The populations in Kenya are noted to have been seriously depleted as a result of overexploitation of the timber and oil and also because of changing land use (Coppen, 1995). Stands in Somalia are generally made up of trees no larger than 3 or 4m and are small and scattered and in need of protection (Thulin, 1993). The species is said to be common on the West Usambaras and on the northern slopes of Mt. Kilimanjaro and other isolated mountains in Masailand in Tanzania. However good timber is hard to find here because many of the mature trees have heart rot and are hollow (Mbuya *et al*. 1994).

**Role of species in the ecosystem**

**Threats**

Commercial exploitation, grazing/damage by wild animals, commercial plantation development.

**Utilisation**

The wood is distilled to produce cedarwood oil. The commercial form of this oil is made up from a number of different oil-producing conifer species. Both the oil and its derivatives are valuable. The oil is used in soap perfumes, household sprays, floor polishes and insecticides. The timber is of major economic importance, particularly in Kenya where it is used for building houses, for poles, furniture, pencil making and joinery. The bark is used for beehives. The tree is also planted for shade, ornamental purposes and as a windbreak.

**Trade**

USA, Western Europe and Japan are the major markets for cedarwood oil. The major sources are China and USA. Oil from *Juniperus procera* now features rarely in international trade. East Africa was once an important source of oil but overexploitation has reduced the wild resources so that only occasional shipments are now available (Coppen, 1995).

In Kenya the species is not now generally available as a timber. It is unlikely that more than 250m³ per year is used commercially. Local use, mainly for posts and to some extent furniture and joinery, is far greater, at least where stands have survived. A small amount of *J. procera* was re-exported through Kenya from Tanzania to Germany in 1993 (Marshall & Jenkins, 1994).

**IUCN Conservation category**

LR/nt according to WCMC

**Conservation measures**

**Forest management and silviculture**

Slow growth rates have resulted in a decline in interest in experimenting with the species as a plantation tree (Mbuya *et al.*, 1994). In Kenya 4936 ha are planted with the species.

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## *Khaya anthotheca*

Meliaceae

White mahogany, acajou d'Afrique, acajou blanc, krumben, anthotheca mahogany

**Distribution**
Angola, Cameroon, Congo, Côte d'Ivoire, DR Congo, Ghana, Liberia, Malawi, Mozambique, Nigeria, Sierra Leone, Tanzania, Uganda, Zambia, Zimbabwe

**Habitat**
The species occurs in lowland evergreen forest.

**Population status and trends**
A common and widespread species which is heavily exploited, particularly in East and West Africa. Regeneration is poor in places, especially where parent trees are scarce and serious genetic erosion is believed to have occurred. There is only limited commercial application in countries where the occurrence is limited, e.g. Zimbabwe (Goldsmith & Carter, 1981). This species is commonly confused with K.grandifolia.

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, clear-felling/logging of the habitat

**Utilisation**
The species is commercially exploited as a source of African mahogany, used in cabinet and furniture-making, veneer, panelling boat building and joinery.

**Trade**
The trade in African mahogany commenced in the 17th century and escalated in the 19th and 20th centuries after supplies of American mahogany had declined.

| Export of mahogany from Ghana, 1992-1996 | |
|---|---|
| **Year** | **Volume (m³)** |
| 1992 | 14,134 |
| 1993 | 22,059 |
| 1994 | 20,157 |
| 1995 | 17,870 |
| 1996 | 18,112 |

Source: Ghanaian Timber Export Development Board in Hall, 1997.

In 1995 the species was exported as veneer, 10,000m³ of sawnwood and 9000m³ of logs from DR Congo, selling at an average price of US$518/m³, US$328/m³ and US$199/m³.

Togo exported an unrecorded quantity of *Khaya* sawnwood in 1995.

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**
There are protected populations, log export bans and felling restrictions in various countries.

**Forest management and silviculture**
The species is easily confused in smaller size classes with *K. grandifolia*. The two species can even hybridise. There are numerous experimental plantations but the species is not commercially available from plantation sources. The species is slow growing, attaining a DBH of 60cm after 40 years.

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# *Khaya grandifoliola*

Meliaceae

Benin mahogany, kruba, male, oganwo

**Distribution**

Benin, Côte d'Ivoire, DR Congo, Ghana, Guinea, Nigeria, Sudan, Togo, Uganda

**Habitat**

The species is found most frequently in dry semi-deciduous forest or rocky forest and forest outliers.

**Population status and trends**

Exploitation of the timber is heavy and has attributed to the comprehensive extraction of mature individuals from most populations.

**Role of species in the ecosystem**

**Threats**

Commercial use, clear-felling/logging of the habitat

**Utilisation**

The timber is exploited as a source of African mahogany. The wood is esteemed less highly than *K. ivorensis*. The bark is also considered effective against malaria.
It is sometimes planted in towns as a roadside tree.

**Trade**

The trade in African mahogany commenced in the 17th century and escalated in the 19th and 20th centuries after supplies of American mahogany had declined.

| Export of mahogany from Ghana, 1992-1996 | |
|---|---|
| **Year** | **Volume ($m^3$)** |
| 1992 | 14,134 |
| 1993 | 22,059 |
| 1994 | 20,157 |
| 1995 | 17,870 |
| 1996 | 18,112 |

Source: Ghanaian Timber Export Development Board in Hall, 1997.

Togo exported an unrecorded quantity of *Khaya* sawnwood in 1995.

**IUCN Conservation category**

VU A1cd according to Hawthorne (1995).

**Conservation measures**

Protected populations and log export bans are in place in various countries.

**Forest management and silviculture**

Regeneration is poor away from parent individuals and is best at the savanna-forest boundary. The species is easily confused in smaller size classes with *K. grandifolia*. The two species can even hybridise. There are numerous experimental plantations but the species is not commercially available from plantation sources. The species is slow growing, attaining a DBH of 60cm after 40 years.

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# *Khaya ivorensis*

Acajou; African Mahogany

**Distribution**
This species occurs in Angola, Cameroon, Congo, Côte d'Ivoire, Gabon, Ghana, Liberia, Sierra Leone, Nigeria and Zaire.

**Habitat**
In Ghana, this species occurs in many habitat types but seems to thrive best in moist and wet undisturbed evergreen forest (Hawthorne, 1995a).

**Population Status and Trends**
It is found scattered across almost the whole of Congo and is occasionally quite abundant (N'sosso, *in litt*. 1995). African mahogany is common in Ghana (Hawthorne, 1995a).

**Regeneration**
Trees of *Khaya ivorensis* can have good seed production at the age of 30; it seems that abundant seed production only occurs every 3-4 years, although some seed is produced every year. The seeds are wind dispersed (Hawthorne, 1995a). The species does not respond well to disturbance (burning or logging), as there is very little regeneration in disturbed areas. However, it does require small to medium light gaps for subsequent growth (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
No information.

**Threats**
It is over-exploited for its popular timber (WCMC, 1991).

**Utilisation**
The timber is used for panelling, furniture, interior fittings and high quality joinery.

**Trade**
In 1989 Ghana exported 10,463$m^3$ of lumber of this species. In a questionnaire survey of UK traders carried out for the ITTO, source countries for this species were given as Cameroon, Ghana, Liberia and Zaire. Gabon also exports this species; in 1987, from Port Owendo 9,667$m^3$ were exported (IUCN, 1990), in 1994, 5,303.158 $m^3$ were exported and in 1995, 7,510.019 $m^3$ were exported (DIAF, 1996). In 1994, Cameroon exported 12,000 cu m and Ghana exported 11,130 cu m (ITTO, 1995b). At the end of the 1980s, with the price increases for Brazilian Mahogany and Utile, *Khaya* has become popular again in the UK market (WCMC, 1991).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
For Ghana, Hawthorne (1995a) has classified this a scarlet star species, which means it is common but under serious threat from heavy exploitation. Reduced exploitation and full protection are required. Under the new IUCN threat categories (1994) this species is considered Vulnerable (Hawthorne, 1995b).

**Conservation Measures**
*K. ivorensis* is protected by law in Côte d'Ivoire and log export has been banned from Ghana and Liberia. It has been considered a priority species for *in situ* conservation by the FAO (1984).
Pest control for *Hypsilla* is required (African Regional Workshop, 1996).

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# *Khaya madagascariensis*

Meliaceae

Madagascar mahogany, hazomena, bangoma, manitrolatra, hazomahogo

**Distribution**
Comoros, Madagascar

**Habitat**
Populations are found in rainforest, along rivers, salt-water marshes and also in degraded forest up to 800m.

**Population status and trends**
In the north-west, the species occurs in Mahajanga, Port-Bergé, Mitsinjo, Ambilobe and also on the Comoros. It occurs further east on the mainland in Vohémas, Ambila and Mananjary. Both the habitat and trees have been heavily exploited.

**Role of species in the ecosystem**

**Threats**
Commercial use, clear-felling/logging of the habitat

**Utilisation**
The timber is used in the manufacture of fine furniture.

**Trade**
The species is not specifically recorded in international trade from Madagascar.

**IUCN Conservation category**
EN A1cd according to WCMC

**Conservation measures**

**Forest management and silviculture**
Silvicultural studies are under way and the species has been used for afforestation in Kianjasoa.

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# *Khaya senegalensis*

Meliaceae
bisselon, madachi, oganwo

**Distribution**
Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda

**Habitat**
A very widespread tree of savanna woodland in moister zones and transition vegetation types.

**Population status and trends**
Logging and local exploitation are largely uncontrolled and poorly monitored. In northern parts of the range exploitation may be leading to genetic erosion.

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, clear-felling/logging of the habitat

**Utilisation**
The wood is heavier and inferior in quality to *K. ivorensis*, but is much used in savanna zones. The roots are also fed to animals and the bark has medicinal value. Trees are often planted by the roadsides for shade in Nigeria.

**Trade**
The trade in African mahogany commenced in the 17th century and escalated in the 19th and 20th centuries after supplies of American mahogany had declined. The increasing rarity of large individuals of *K. senegalensis* has led to the species becoming less important in the international market.

| **Export of mahogany from Ghana, 1992-1996** | |
|---|---|
| **Year** | **Volume ($m^3$)** |
| 1992 | 14,134 |
| 1993 | 22,059 |
| 1994 | 20,157 |
| 1995 | 17,870 |
| 1996 | 18,112 |

Source: Ghanaian Timber Export Development Board in Hall, 1997.

Togo exported an unrecorded quantity of *Khaya* sawnwood in 1995.

**IUCN Conservation category**
VU A1cd according to WCMC

**Conservation measures**
Legal protection exists in various countries.

**Forest management and silviculture**
Natural regeneration from the seed is poor but does occur from suckers. The species is even more slow growing than other *Khaya* species. An attempt at cultivating the species in mixed plantations is being made on the west coast of Réunion and in production plantations in Mali and Upper Volta (Hall ,1997).

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# *Lophira alata*

Ekki; Azobé

**Distribution**
Azobé is found in Cameroon, the Congo Basin, Côte d'Ivoire, Equatorial Guinea, Gabon, Ghana, Liberia, Nigeria, Sierra Leone, and Zaire.

**Habitat**
It grows in evergreen and moist deciduous forests, in freshwater swamp forests and close to river banks (WCMC, 1991). Although this species has a definite preference for wet evergreen areas, it is assumed to be sensitive to non-evergreen forest soils and is unsuccessful on rocky soils. *L. alata* is a pioneer species and is representative of a disturbed forest (Hawthorne, 1995a). It is also sensitive to drought (Swaine & Veenendaal, 1994 in Hawthorne, 1995a).

**Vegetation type according to White (1983)**
**1. Hygrophilous coastal evergreen Guineo-Congolian rain forest**
*Lophira alata* is one of the most abundant species in this forest type and is indicative of earlier cultivation.
**2. Mixed moist semi-evergreen Guineo-Congolian rain forest**

**Population Status and Trends**
Azobé is a common species in Cameroon and regenerates well (WCMC, 1991). It has been suggested that Cameroon forests with an abundance of this species were once disturbed by humans (Letouzey, 1960 in Hawthorne, 1995a). It is also common in Ghana (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
The seeds of this species are wind dispersed. Light gaps are necessary for successful regeneration, as seed germination does not occur in shady understorey (Hawthorne, 1995a).
It is estimated that is takes 220 years for a tree to reach a girth of 2.7m in Nigeria Leone) (Keay, 1961 in Hawthorne, 1995a).

**Threats**
This species is threatened by over-exploitation (Hawthorne, 1995a&b)

**Utilisation**
Azobé is used for heavy durable construction work, harbour work, flooring and in railway construction. The fruits can be used to make an edible oil.

**Trade**
*L. alata* logs were exported from Cameroon, Côte d'Ivoire, Gabon, Ghana in 1994 (ITTO, 1995a). Cameroon exported 49 000$m^3$ at an average price of US\$200.00/$m^3$, Côte d'Ivoire exported 8 351$m^3$ at an average price of US\$219.43/$m^3$, Ghana exported 1 970$m^3$ at an average price of US\$131.00/$m^3$ and Gabon exported an unknown volume at an average price of US\$11.46/$m^3$ (ITTO, 1995a).
Gabon exported a total of 12,416.85 $m^3$ in 1994 and 8,518.17 $m^3$ in 1995 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). Hawthorne (1995a) has given this species a red star for Ghana, which means it is common but under pressure from exploitation and conservation measures are necessary.

**Conservation Measures**
This species has been selected by FAO for conservation action because of heavy utilisation pressure (Palmberg, 1987). It is protected by law in Côte d'Ivoire.
In Cameroon 277 have been planted. Regeneration work should be intensified (African Regional Workshop, 1996).

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WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species.* pp. 58.

# *Lovoa swynnertonii*
Mukonguru

**Distribution**
This species occurs in Kenya, Mozambique, Tanzania, Uganda, Zaire and Zimbabwe.

**Habitat**
It grows within wet evergreen forest. In Kenya, this species prefers sandy or loamy soils (FAO, 1986). In the Kwale district of Kenya this species is found in lowland forests dominated by *Newtonia paucijuga*, *Milicia excelsa* and *Antiaris toxicaria* and in the Meru district of Kenya it occurs in upland forest dominated by *Newtonia buchanannii* and *Ocotea usambarensis* (FAO, 1986). In Mozambique, this species is only known from the Garuso forests and in Zimbabwe is only known from the Chirinda forest where it is found on well-drained slopes of river banks (Flora Zambesiaca).

**Vegetation type according to White (1983)**
**1. Zanzibar-Inhambane lowland rain forest**
**2. Zanzibar-Inhambane undifferentiated forest**

**Population Status and Trends**
*L. swynnertonii* is very sparsely distributed over its range and is only found in a few locations. It is not regenerating well (FAO, 1986). This species is at the edge of its range in Zimbabwe and is found in low densities in the Chirinda Forest (6km²) where there are over 1000 individuals but no saplings (African Regional Workshop, 1996).

**Regeneration**
Seed is wind dispersed. Natural regeneration is reported to be poor (FAO, 1986).

**Role of Species in its Ecosystem**
No information.

**Threats**
This species is suffering from habitat loss. Excessive exploitation of the large seed-producing trees occurs and natural regeneration is poor. Plantations tend to be unsuccessful because of infestation by *Hypsipyla* (FAO, 1986). In Uganda the species is suffering from genetic erosion (Styles, *in litt*, 1991).

**Utilisation**
The timber is used for furniture production and has been used in Kenya for bridge construction.

**Trade**
No information.

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)
This species' distribution has been greatly reduced, only a few trees remain in Zimbabwe and Mozambique (Styles, *in litt*, 1991). Bandeira (1996) considers this species to be Data Deficient (DD) under the new IUCN (1994) threat categories, due to lack of biological surveys in north Mozambique. *L. swynnertonii* is also rare in Tanzania and Uganda as it is at the fringe of its range (Styles, *in litt.*, 1991). Styles (1991) felt that this species deserves endangered status.

**Conservation Measures**
This species is found in a few protected forest reserves such as the Rau Forest, Tanzania, the Chirinda Forest, Zimbabwe, and the Meru Forest, Kenya (FAO, 1986). In Mozambique, there are no conservation measures being taken (Bandeira, *in litt.*, 1996). Regeneration work is urgently required (African Regional Workshop, 1996).

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Styles, B.T., 1991**.** *In Litt*. Letter to Sara Oldfield.

# *Lovoa trichilioides*

African Walnut; Dibetou

**Distribution**
This species occurs in Angola, Cameroon, Congo, Gabon, Ghana, Côte d'Ivoire, Liberia, Nigeria, Sierra Leone, Tanzania, Uganda and Zaire.

**Habitat**
African walnut occurs in evergreen and deciduous forests, preferring moist sites and tends to be gregarious (WCMC, 1991). It shows a strong preference for acidic, base poor soil (Hawthorne, 1995a).

**Vegetation type according to White (1983)**
**1. Mixed moist semi-evergreen Guineo-Congolian rain forest**
**2. Drier peripheral semi-evergreen Guineo-Congolian rain forest** in the Guinea-Congolian/Zambezia regional transition zone.

**Population Status and Trends**
Dibetou is found all over Congo, however it is generally quite rare (N'sosso, *in litt*. 1995). It is common in Ghana (Hawthorne, 1995).

**Regeneration**
Seeds of this species are wind-dispersed. Copious seed production of this species seems to occur every 3-4 years in Nigeria (Sanders, 1953 in Hawthorne, 1995a). The viability of seeds is shortlived and they are heavily predated (Sanders, 1953 in Hawthorne, 1995a). The seedlings are shade tolerant, however, they will only develop when there is a light gap in the canopy and seem to require more light once the tree reaches larger sizes (Hawthorne, 1995a). *Lovoa* initially has a slower growth rate than *Khaya ivorensis*, but the growth rate does not slow down as it does in *K. ivorensis*. It is predicted to take 106 years to reach a girth of 9 ft (Keay, 1961 in Hawthorne, 1995).

**Role of Species in its Ecosystem**
No information.

**Threats**
Exploitation for international trade.

**Utilisation**
The timber is used for furniture and cabinetwork, decorative veneers, panelling, joinery and shop fittings.

**Trade**
The timber is exported by Gabon and Zaire. It is one of the two main species exploited in the Congo (WCMC, 1991).
Cameroon exported 15,000 $m^3$ of Dibetou logs at an average price of US$390.00/$m^3$ in 1994 (ITTO, 1995). Ghana exported sawnwood at an average price of US$467.00/$m^3$ for air dried wood and US$567.00/$m^3$ for kiln dried wood (ITTO, 1995). In 1987, Gabon exported 4,653 $m^3$ from Owendo (IUCN, 1990).Gabon exported only 1$m^3$ of sawnwood at a price of US$108.00/$m^3$ in 1994 (ITTO, 1995) but according to the Direction des Inventaires et Aménagements des Forêts a total of 8,427.548 m3 was exported from Gabon in 1994. In 1995, Gabon exported 8,923.279 m3 of Dibetou (DIAF, 1996). In 1994, Côte d'Ivoire exported 146$m^3$ of Dibetou as a veneer at an average price of US$2007.74/$m^3$ (ITTO, 1995).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). Hawthorne (1995a) has given this species a red star, which means it is common but under pressure from exploitation and conservation measures are necessary.

**Conservation Measures**
It is protected by law in Côte d'Ivoire and is subject to Ghanaian and Liberian log export bans.
6380 ha have been planted in Cameroon (African Regional Workshop, 1996).

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WCMC, 1991**.** *Provision of Data on Rare and Threatened Tropical Timber Species.* pp. 58.

# *Mansonia altissima*
Mansonia

**Distribution**
This species occurs in Benin, Cameroon, Congo, Côte d'Ivoire, Ghana, and Nigeria.

**Habitat**
*M. altissima* prefers dry fertile forest soil over wet forest and tend to be drought tolerant (Hawthorne, 1995a).

**Vegetation type according to White (1983)**
**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones. *Mansonia altissima* is frequent in the peripheral semi-evergreen lowland rain forest but is absent from wetter types.

**Population Status and Trends**
Mansonia is common in Ghana (Hawthorne, 1995a).

**Regeneration**
The fruits are wind dispersed; seed germination does not occur in large light gaps (Kyereh, 1994 in Hawthorne, 1995a) and seedlings prefer shade for the first two years (Taylor in Hawthorne, 1995a), but after that period the species is a definite light demander (Hawthorne, 1995a). Smaller adult trees (< 60cm dbh) are more common in disturbed forest (i.e. logged or burnt) (Hawthorne, 1995a). More seedlings are found in disturbed areas (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
No information.

**Threats**
In Ghana this species is moderately exploited for its timber (Hawthorne, 1995a&b).

**Utilisation**

**Trade**
Imports: Austria, Portugal and the USA are listed by the ITTO (1995a) as importing Mansonia logs in 1994. Portugal, Sweden and the USA imported Mansonia sawnwood in 1994 (ITTO, 1995a).

Exports: Côte d'Ivoire exported 314 $m^3$ of Mansonia veneer in 1994 for an average price of US$ 2,706.22/$m^3$ (ITTO, 1995a).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). For Ghana this species has been awarded a pink star in Hawthorne's (1995a) star system, which means that it is common and moderately exploited.

**Conservation Measures**
This species is protected by law in Côte d'Ivoire. It is considered a priority for *in situ* conservation by FAO, 1984. The export of this species in log form is banned by Ghana. In Cameroon 420 ha have been planted (African Regional Workshop, 1996).

**References**
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# *Microberlinia bisulcata*

Zebrano

**Distribution**
This species is endemic to Cameroon.

**Habitat**

**Vegetation type according to White (1983)**
**1. Guineo-Congolian rain forest**
Hygrophilous coastal evergreen Guineo-Congolian rain forest
*Microberlinia bisulcata* is gregarious in this region, forming almost pure stands with good regeneration

**Population Status and Trends**
Information is not available but could be inferred from the extent and rate of decline of the coastal evergreen rainforests in Cameroon. The species has a very limited distribution within Cameroon (Gartlan, *in litt.* 1991).

**Role of Species in its Ecosystem**
This is an ectomycorrhizal species and is efficient in phosphorus recycling. Ecophysiological work is currently being carried out on this species and related Leguminous species within Korup.

**Threats**
Cutting for the inernational market.

**Utilisation**
A speciality timber with white and black streaks used in turnery.

**Trade**
This timber fetches a high price (African Regional Workshop, 1996).

**Conservation Status**
IUCN Category and Criteria: CR (A1c) (African Regional Workshop, 1996)

**Conservation Measures**
In-situ conservation provided by Korup National Park and ex-situ conservation presently being undertaken by the Forest Research Station, Kumbu, Cameroon should be intensified (African Regional Workshop, 1996)

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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## *Microberlinia brazzavillensis*

Zebrano; Zebra Wood

**Distribution**
This species is restricted to two coastal areas in Congo and Gabon (Fernan Vaz region).

**Habitat**
It is a forest species.

**Population Status and Trends**
The distribution is sparse in Gabon, with less than one individual per square kilometre (Wilks *in litt.*, 1992).

**Role of Species in its Ecosystem**
The seeds of the this species are large and heavy and are, therefore, not dispersed far from the parent tree (Wilks *in litt.*, 1990).

**Threats**
*M. brazzavillensis* is lightly logged (Wilks *in litt.*, 1992). There are some populations that are not logged in coastal areas of Gabon (Wieringa *in litt.*, 1996).

**Utilisation**
This speciality timber is used for decorative veneers and turnery. It is also used in ski manufacture. (WCMC, 1991).

**Trade**
*M. brazzavillensis* is exported by both Gabon and the Congo (WCMC, 1991).

**Conservation Status**
IUCN Category and Criteria: CR (A1c) (African Regional Workshop, 1996)

**Conservation Measures**
No information.

**References**
African Regional Workshop, 1996**.** *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
IUCN, 1990**.** *La Conservation des Ecosystèmes Forestiers du Gabon*. IUCN, Tropical Forest Programme Series. pp. 200.
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Wilks, C., 1990. *in litt*. to Richard Luxmoore.
Wilks, C., 1992. *in litt*. to Pete Atkinson.

# *Milicia excelsa*

synonym: *Chlorophora excelsa*
Iroko; Tule

**Distribution**
This species is widely distributed across Africa; it occurs in Angola, Benin, Burundi, Burkina Faso, Central African Republic, Cameroon, Congo, Côte d'Ivoire, Ethiopia, Gabon, Equatorial Guinea, Sao Tomé & Principe, Ghana, Kenya, Malawi, Mozambique, Nigeria, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zaire and Zimbabwe.

**Habitat**
*M. excelsa* is found in transitional vegetation between closed forests and savanna. It is often found in gallery forest and can be found in deciduous, semi-deciduous or evergreen forest. Occasionally it is found in isolated relict forests from sea level to about 1300m. It is fairly abundant in the drier areas of semi-deciduous *Antiaris-Chlorophora* forest (FAO, 1986b).

Both *M. excelsa* and *M. regia* show a preference for dry, flat, light areas (Hawthorne, 1995a). Most effective seed germination occurs in half-shade, the seedlings are most commonly found in medium sized light gaps and then become light dependant (Hawthorne, 1995a). *M. excelsa* is considered to be a pioneer species which regenerates in disturbed, open areas and in logged forest (Hawthorne, 1995a).

In Kenya, this species is found in relict moist forest and wooded grassland (Beentje, 1994) along the coast and in the central Meru district and Nyanza province (Marshall & Jenkins, 1994). It has been found at an altitude of 4500 m on Mount Kilimanjaro in Tanzania; although, it is usually found between sea level and 1200 m (FAO, 1986a). In West Africa this species is found in areas where rainfall is between 1150mm and 1900mm and the temperature is between 25 ºC and 35 ºC.

**Vegetation type according to White (1983)**
**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones
*Milicia excelsa* is also commonly found in wetter secondary forest types.
Old secondary forest
**2. Drier peripheral semi-evergreen Guineo-Congolian rain forest** in the Guinea-Congolia/Zambezia regional transition zone
**3. Drier peripheral semi-evergreen Guineo-Congolian rain forest** in the Lake Victoria regional mosaic
**4. Zanzibar-Inhambane lowland rain forest**
**5. Zanzibar-Inhambane undifferentiated forest**
**6. Zanzibar-Inhambane secondary grassland and wooded grassland**
In this habitat type, *M. excelsa* from the original forest have been left standing.
**7. Príncipe**

**Population Status and Trends**
Iroko is commonly found growing around villages and old farms as it is left to grow there because of its commercial value (FAO, 1986b).
This species is abundant, especially in Côte d'Ivoire, Cameroon, Congo, Gabon and Zaire (N'Sosso *in litt*, 1995). It is also commonly found in Ghana (Hawthorne, 1995a)
In Mozambique, *M. excelsa* is very scarce and dispersed (Moreno Saiz, 1996). This is also the case in Kenya where this species is now sparsely distributed due to heavy exploitation (Marshall & Jenkins, 1994).

**Regeneration**
There is very little regeneration of this species in Zimbabwe (African Regional Workshop, 1996). In Mozambique, where an area was cleared but large trees of *M. excelsa* left standing, there seems to be regeneration in the open areas (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**
The fruit of this species contains many small seeds which are dispersed by bats and birds (Osmaston, 1965 in Hawthorne, 1995a). Duikers and animals eat the newly emergent shoots (FAO, 1986b).

**Threats**
This species is heavily exploited in Ghana (Hawthorne, 1995a&b) and plantations of this species tend to be unsuccessful (FAO, 1986b). In Zimbabwe, *M. excelsa* is threatened by habitat degradation; it is found only in an area which is suffering from alluvial erosion. It is not, however, exploited in Zimbabwe (African Regional Workshop, 1996).

**Utilisation**
The high quality timber is used as a Teak substitute. It is widely used for all kinds of construction work and carpentry including domestic flooring, veneer and cabinetwork (WCMC, 1991). The timber is used for building ships and barrels. It is used externally because it has great resistance to bad weather (Moreno Saiz, 1996). Locally, this species has many medicinal uses; the bark is also used as a dye (FAO, 1986b). The wood is also exploited by the local people (African Regional Workshop, 1996).

**Trade**
This species is not distinguished from *Milicia regia* by commercial logging companies (Hawthorne, 1995a).

Iroko is a major commercial species in international trade. Tanzania and Uganda were in the past major sources of the timber and some Iroko is still exported from E. Africa. In Kenya users of this species claimed that supplies were variable and unpredictable (Marshall & Jenkins, 1994).

West African countries are now the main exporters, especially Ghana (traded together with *M. regia*) and Côte d'Ivoire (WCMC, 1991). The UK imported 22 648$m^3$ in 1989. Côte d'Ivoire supplies 60% of the Iroko imported to the UK (WCMC, 1991).

In 1987, 11,988$m^3$ were exported from Owendo, Gabon (IUCN, 1990). In 1994, Gabon exported 8,236.664$m^3$ of Iroko and in 1995 exported 12,823.169$m^3$ (DIAF, 1996).
According to the ITTO (1995a) in 1994 Iroko logs were exported by: Cameroon (65 000$m^3$ at an average price of US$245.00/$m^3$), Congo (10 206$m^3$), and Gabon (US$39.75/$m^3$). In addition Cameroon exported 12 000$m^3$ of sawnwood at an average price of US$640.00/$m^3$ and Ghana exported 47 340$m^3$ of air dried sawnwood (@ US$520.00/$m^3$) and an unknown volume of kiln dried sawnwood at an average price of US$653.00/$m^3$ (ITTO, 1995). Congo and Togo both export Iroko sawnwood (ITTO, 1995a). It is estimated that the formal commercial trade in Kenya uses between 800$m^3$ and 1100$m^3$/year of this species (Marshall & Jenkins, 1994).

There is illegal trade in *M. excelsa* from Kenya and Uganda and suspected illegal trade from Tanzania (Marshall & Jenkins, 1994). Most of *M. excelsa* used in Kenya is imported (Marshall & Jenkins, 1994).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
This timber species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). It has been awarded a scarlet star in Hawthorne's (1995a) own system, which means that it is common but it is under profound pressure from heavy exploitation in Ghana. This species requires protection and exploitation has to be limited if it is to be sustainable (Hawthorne, 1995a).

**Conservation Measures**
*M. excelsa* is protected by legislation in Côte d'Ivoire and Mozambique and is subject to a log export ban in Ghana. In Cabo Delgado, Mozambique, no Iroko has been cut since 1987 because it took a dramatic decline (Moreno Saiz, 1996). In Nigeria, Oyo State has a 10 year moratorium on exploitation.

Uganda banned export of unworked timber in 1987, although there is still licensed trade with Kenya and, more recently, with Europe. In 1993, Tanzania also banned the export of unworked timber. Kenya has imposed a "Presidential Ban on Logging of Indigenous Timber" (1986), however, little is known about this ban except that it prohibits logging of indigenous timbers. (Marshall & Jenkins, 1994).

*M. excelsa* is found in the Shimba Hills National Reserve, although there are reports that this species is still being extracted (Marshall & Jenkins, 1994).

*M. excelsa* is found in Reserves and National Parks in Zimbabwe but it is not well protected (African Regional Workshop, 1996).

**Additional Information**

Plantations in Ghana have been unsuccessful because of gall attacks (FAO, 1986b). *M. excelsa* is often found with galled leaves caused by the insect *Phytolyma lata*, it is thought that these outbreaks limit high densities of this species due to increased mortality (Hawthorne, 1995a).

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# *Milicia regia*

Synonym: *Chlorophora regia*
Iroko

**Distribution**
This widespread species occurs in Benin, Cameroon, Côte d'Ivoire, Gambia, Ghana, Guinea-Bissau, Guinea, Liberia, Sierra Leone and Senegal. Introduced into Nigeria.

**Habitat**
Both *M. excelsa* and *M. regia* show a preference for dry, flat, light areas (Hawthorne, 1995a). *M. regia* is found in the same forest types as *M. excelsa*, with a slight preference for moister forest (Hawthorne, 1995a).

**Vegetation type according to White (1983)**
**1. The Coastal Plain of Basse Casamance**
*Milicia regia* is found in the well-drained drier forest.

**Population Status and Trends**
This species is common in Ghana (Hawthorne, 1995a)

**Role of Species in its Ecosystem**
No information.

**Threats**
This species is severely threatened by over-exploitation in Ghana (Hawthorne, 1995a).

**Utilisation**
The high quality timber is used as a Teak substitute. It is widely used for all kinds of construction work and carpentry including domestic flooring, veneer and cabinetwork.

**Trade**
This species is not distinguished from *Milicia excelsa* by commercial logging companies (Hawthorne, 1995a).

Iroko is a major commercial species in international trade. Tanzania and Uganda were in the past major sources of the timber and some Iroko is still exported from E. Africa (WCMC, 1991). West African countries are now the main exporters, especially Ghana (traded together with *M. regia*) and Côte d'Ivoire (WCMC, 1991).

The UK imported 22 648$m^3$ in 1989. Côte d'Ivoire supplies 60% of the Iroko imported to the UK.

**Conservation Status**
IUCN Category and Criteria: VU (A1d) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). It has been awarded a scarlet star in Hawthorne's (1995a) own system, which means that it is common but it is under profound pressure from heavy exploitation. This species requires protection and exploitation has to be limited if it is to be sustainable (Hawthorne, 1995a).

**Conservation Measures**
This species is considered a priority for *in situ* conservation by FAO, 1984. It is legally protected in the Gambia and is subject to a log export ban in Ghana. Known to be resistant to Phytolema attack and deserves trials in plantation throughout its range (African Regional Workshop, 1996).

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## *Millettia laurentii*
Wenge

**Distribution**
This species occurs in Cameroon, Congo, Gabon, Equatorial Guinea and Zaire.

**Habitat**
It is a species of semi-deciduous, dense forest and it is sometimes found in inundated swampy forests.

**Population Status and Trends**
No information also this could be inferred from forest extent and rate of decline.

**Role of Species in its Ecosystem**
No information.

**Threats**
This species is threatened by over-exploitation for timber (African Regional Workshop, 1996).

**Utilisation**
A decorative species used in furniture production, decorative veneers and speciality items (WCMC, 1991).

**Trade**
Zaire is the main source of Wenge for the European market. It is also exported by Congo and Gabon (WCMC, 1991). Gabon exported 589 $m^3$ of *M. laurentii* from Owendo in 1987 (IUCN, 1990), a total of 390.580 $m^3$ in 1994, and a total of 400.584 $m^3$ in 1995 (DIAF, 1996)

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)

**Conservation Measures**
Special permission is required for exploitation of this species in Cameroon.
Regeneration work is urgently required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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WCMC, 1991**.** *Provision of Data on Rare and Threatened Tropical Timber Species.* pp. 58.

## *Monopetalanthus heitzii*
Andoung

**Distribution**
*Monopetalanthus heitzii* is found in the coastal zone of Gabon and follows the Oguooé valley inland. Its total distribution range is at least 70,000 $km^2$.

**Habitat**
This species grows in dryland forest.

**Population Status and Trends**
It is not thought that populations have declined substantially although there has been some logging in recent years (Wieringa *in litt.* 1996).

**Role of Species in its Ecosystem**
No information.

**Threats**
No specific information.

**Utilisation**
The timber is used in furniture production, boxes and crates, light construction and plywood manufacture (WCMC, 1991).

**Trade**
Gabon exported a total of 18,481.058 $m^3$ of Andoung in 1994 and a total of 3,542.281 $m^3$ in 1995 (DIAF, 1996). This trade name includes various species of *Monopetalanthus*.

**Conservation Status**
IUCN Category and Criteria: DD (African Regional Workshop, 1996)

**Conservation Measures**
No information.

**References**
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# *Nauclea diderrichii*

Opepe; Bilinga

**Distribution**
This species is widely distributed: Angola, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Gabon, Ghana, Liberia, Mozambique, Nigeria, Sierra Leone, Uganda and Zaire.

**Habitat**

Vegetation type according to White (1983)
**1. Guineo-Congolian rain forest**
Mixed moist semi-evergreen Guineo-Congolian rain forest

**Population Status and Trends**
In Ghana, this species is found at constant, low densities and is never very abundant (Hawthorne, 1995a).

**Regeneration**
This species is light-demanding. It is a pioneer species that requires large light gaps to regenerate.Young trees are often found in secondary bushy growth in humid areas (N'Sosso, *in litt*. 1995). In Nigeria, this species was found to regenerate well in large canopy gaps, but in a clear-felling *N. diderrichii* is out competed by *Musanga* (Lancaster, 1961 in Hawthorne, 1995a). This species is commonly used in plantations (specifically taungya) (Neil, 1983 in Hawthorne, 1995a).

**Role of Species in its Ecosystem**
Elephants and other animals disperse the seeds of this species. Many small seeds are found in the fruit. The seeds can remain dormant in the forest soil (Hall & Swaine, 1980 in Hawthorne, 1995a). The seeds are stimulated into germination by increased light exposure. The effect on germination of the seed passing through an animal's gut has yet to be examined; seedlings, however, are commonly found along elephant tracks (Hawthorne, 1995a).

**Threats**
This species suffers from heavy exploitation (Hawthorne, 1995a)

**Utilisation**
The timber is used in general construction, flooring, furniture production, dock and marine work, and railway crossings (WCMC, 1991).
Locally it has medicinal uses.

**Trade**
Côte d'Ivoire exported 13,723 $m^3$ of *Nauclea* spp. logs for an average price of US$ 232.18/$m^3$ in 1994. Ghana exported 4,960 $m^3$ of *N. diderrichii* logs for an average price of US$ 135.00/$m^3$ in 1994. In addition Ghana exported 1,430 $m^3$ of *N. diderrichhi* air-dried sawnwood for an average price of US$ 337.00/$m^3$ and an unknown amount of kiln-dried sawnwood (ITTO, 1995a). Gabon exported 1,356$m^3$ from Owendo in 1987 (IUCN, 1990), a total of 3,570.907 $m^3$ in 1994, and a total of 3,010.279 $m^3$ in 1995 (DIAF, 1996).

In the first half of 1994, Liberia exported 8 $m^3$ of Bilinga logs for an average price of US$ 80.00/$m^3$ and from June to December they exported 22 $m^3$ for an average price of US$ 50.00/$m^3$ (ITTO, 1995).

**Conservation Status**
IUCN Category and Criteria: VU A1c,d (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). It has been awarded a scarlet star for Ghana by Hawthorne (1995a), which means that it is common but it is under profound pressure from heavy exploitation. This species requires protection and exploitation has to be limited if it is to be sustainable (Hawthorne, 1995a).

**Conservation Measures**
Opepe is subject to a Liberian export ban.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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# *Nesogordonia papaverifera*

Danta; Kotibé

**Distribution**
This species occurs in Benin, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Gabon, Ghana, Liberia, Nigeria and Sierra Leone.

**Habitat**
This species appears to be confined to areas where savannas have in the past replaced forest.
*N. papaverifera* prefers base-rich soils. In Ghana, it occurs in moist semi-deciduous forest (Hawthorne, 1995a). This species can occur at altitudes up to 1000 m but it rarely occurs over 500 m (FAO, 1986). In logged areas of Ghana, *N. papaverifera* seems to fare well as large trees of this species still remain (Hawthorne, 1995a).

Vegetation type according to White (1983)
**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones
*Nesogordonia papaverifera* is frequent in the peripheral semi-evergreen lowland rainforest but is absent from wetter forest types.
**2. The Coastal Plain of Ghana**
West African dry coastal forest
*N. papaverifera* occurs in the western type of this habitat.

**Population Status and Trends**
According to FAO (1986) this species is endangered in parts of its range and subject to genetic impoverishment in outlying populations in Gabon, Central African Republic, Cameroon, Liberia and Sierra Leone. *N. papaverifera* can be found at high densities e.g. in the *Nesogordonia papaverifera*/*Khaya ivorensis* zone of the *Celtis* spp./*Triplochiton sclerocylon* forest type in Côte d'Ivoire (FAO, 1986). In Ghana, this species is common (Hawthorne, 1995a).

**Regeneration**
This species produces small, wind dispersed seeds, that require moderate shade to germinate and seedlings are common in fairly large light gaps. In Ghana, regeneration is twice as common in disturbed (logged) forest as in similar undisturbed forest (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
No information.

**Threats**
In Ghana this species is moderately exploited (Hawthorne, 1995a).
There are no plantations of this species due to its shade demanding nature (FAO, 1986).

**Utilisation**
The high quality timber is used in flooring, boat and vehicle building, for tool handles and for furniture. It is locally used for shutters, door/window frames and rafters (FAO, 1986).

**Trade**
Côte d'Ivoire exported 9,869 $m^3$ of *N. papaverifera* logs in 1994 at an average price of US$333.23/$m^3$ and 251 $m^3$ of veneer at an average price of US$1186.33/$m^3$ (ITTO, 1995a).
Gabon exported 6,210.734 $m^3$ of Kotibe in 1994 and 7,366.573 $m^3$ in 1995 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: VU A1c,d (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to exploitation (Hawthorne, 1995b). For Ghana this species has been awarded a pink star by Hawthorne (1995a), which means that it is common and moderately exploited.

**Conservation Measures**
*N. papaverifera* is protected by law in Côte d'Ivoire. Ghana has banned export of this species in log form.

The FAO (1986) claim that this species is fairly secure because of the frequent high density stands, its affinity for growing in groups, and its location on hillsides (which are unsuitable for plantation establishment). It still requires *in-situ* conservation of certain populations (FAO, 1986).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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## *Ocotea kenyensis*

Lauraceae

muthuta, muikoni, mututuriet, masaiat, knaget

**Distribution**

DR Congo, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, South Africa (KwaZulu-Natal, former Transvaal), Sudan, Swaziland, Tanzania, Uganda, Zimbabwe

**Habitat**

A species of tropical, moist, closed forest

**Population status and trends**

A timber species confined to areas of moist forest in East Africa extending into Central Africa. In some areas the populations are very small, e.g. the Zimbabwean population consists of 4 immature individuals. It yields a superior hardwood which is heavily exploited throughout its range.

**Role of species in the ecosystem**

**Threats**

Commercial exploitation, clear-felling/logging of the habitat, extensive agriculture, forestry management

**Utilisation**

The species yields a superior hardwood.

**Trade**

**IUCN Conservation category**

VU A1cd according to WCMC

**Conservation measures**

**Forest management and silviculture**

**References**

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Timberlake, J.R. 1996. Annotations to the conservation listing of trees of Zimbabwe.

## *Pericopsis elata*

Leguminosae

African teak, afromosia, afrormosia, assamela, awawai, ayin, kokrodua

**Distribution**
Cameroon, Congo, Côte d'Ivoire, DR Congo, Ghana, Nigeria

**Habitat**
A gregarious species, restricted to the drier parts of semi-deciduous forests.

**Population status and trends**
Four main areas of distribution can be defined; east Côte d'Ivoire and west Ghana, Nigeria and west Cameroon, the Sangha-Ngoko basin in Congo and the central basin in Zaire. Levels of exploitation have been unsustainable in all countries and the species and its habitat has declined through logging and clearance. Remaining populations are small and scattered. Natural regeneration is poor and insufficient to replace lost populations.

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, clear-felling/logging of the habitat, burning, extensive agriculture.

**Utilisation**
*Afrormosia* provides an important alternative to teak. It is used in furniture making, interior and exterior work, flooring and boat-building.

**Trade**
Since 1948 trade in the timber has soared; the most significant producers being Ghana and Côte d'Ivoire. Log production in Congo in 1990 was 9004m³.

*Afrormosia* has been used in the furniture industry in the UK. Imports of sawn timber fell from 3500m³ in 1985 to insignificant levels in 1989.

**IUCN Conservation category**
EN A1cd according to the African Regional Workshop

**Conservation measures**
The species is currently listed in CITES Appendix II.

**Forest management and silviculture**
Although easily propagated from seed and stem cuttings, the species is not being planted on a large scale. Trees are capable of attaining 26m height in 16 years.

**References**
Ake Assi, L. 1990. Annotated WCMC list of timber species for the Ivory Coast. (Côte d'Ivoire).
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## *Platanus orientalis*

Platanaceae
Chinar, oriental plane tree

**Distribution**
Afghanistan, Albania, Azerbaijan, Bulgaria, Greece (Crete), Greece, Iran, Iraq, Italy, Lebanon, Sicily, Syria, Tajikistan, Turkey, Uzbekistan

**Habitat**
This temperate species is confined to damp woodlands, often in temporary ravines, which provide moisture throughout the dry season, occurring from low altitude to 3000m.

**Population status and trends**
The only old world plane tree, this species is very widespread ranging from the east Mediterranean throughout the middle east to the south-east provinces of the Euro-Siberian region. It is considered to be endangered in parts its range because of changing water courses for irrigation purposes and the increased expansion of agriculture.

**Role of species in the ecosystem**

**Threats**
Pests and diseases, extensive agriculture

**Utilisation**
The species has uses as a source of fuelwood and timber, but it is most well-known as an ornamental tree. The most commonly planted tree in London is either a variant or hybrid of the species. It withstands high levels of pollution by storing harmful material in the bark which continually flakes off.

**Trade**

**IUCN Conservation category**
LR/lc according to WCMC

**Conservation measures**

**Forest management and silviculture**
A widely cultivated tree, often planted as an avenue tree.

**References**
Borodin, A.M. *et al.* 1985. Krasnaya kniga SSSR: redkie i nakhodyashchiesya pod ugrozoi ischeznoveniya vidy zhivotnykh i rastenii. - izdanie vtoroe [2]: tom pervyi - vtoroi [1-2]. Moscow: Lesnaya Promyshlennost.

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# *Populus ilicifolia*

Salicaceae
Tana River poplar

**Distribution**
Kenya, Tanzania

**Habitat**
A species of lowland, submontane, moist, closed forest, found in riparian habitat on alluvial sandy and grey-brown, sandy mud soils up to 1200m.

**Population status and trends**
Restricted to the Tana, Athi and Uaso-Nyiro river systems in Kenya and the Ruvu river system of Tanzania, this species is one of the dominant components of riparian forest. The habitat is greatly reduced and the species is notably scarcer. Seed crops are frequently washed away in annual floods after vegetation clearance. In Kenya the habitat has also been widely irrigated and cleared for settlement programmes.

**Role of species in the ecosystem**

**Threats**
Poor regeneration, expansion of human settlement and agriculture.

**Utilisation**
On a local scale the species provides a preferred wood for making dug-out canoes.

**Trade**

**IUCN Conservation category**
VU B1+2c according to WCMC

**Conservation measures**

**Forest management and silviculture**

**References**
Beentje, Henk Jaap. 1994. *Kenya trees, shrubs and lianas*. Nairobi, Kenya: National Museums of Kenya. 722pp.
FAO Forestry Department. 1986. Databook on endangered tree and shrub species and their provenances. Rome: FAO. 524pp.
Knox, Eric B. 1995. *The List of East African Plants (LEAP): An electronic database* (Draft). 72pp.

# *Pouteria altissima*

synonym: *Aningeria altissima*
Mukali; Anegre

**Distribution**
This widespread species occurs in Burundi, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Ethiopia, Gabon, Ghana, Guinea, Kenya, Nigeria, Rwanda, Sierra Leone, Sudan, Tanzania, Uganda and Zaire.

**Habitat**
This species tends to be found in the drier areas of semi-deciduous forests.

**Vegetation types according to White (1983)**
**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones. *P. altissima* is frequent in the peripheral semi-evergreen lowland rain forest but is absent from wetter forest types.
**2. Zambezian dry evergreen forest**
This is a characteristic species of the semi-evergreen forest of marked Guineo-Congolian affinity; small patches are found in the Mbala district in Zambia.
**3. Drier peripheral semi-evergreen Guineo-Congolian rain forest** in the Lake Victoria regional mosaic.
**4. Transitional rain forest** in the Lake Victoria mosaic.
*P. altissima* is at its eastern most limit in the Kakamega forest of Kenya.

**Population Status and Trends**
It is relatively common in Ghana (Hawthorne, 1995a).

**Regeneration**
It is thought that development past the seedling stage requires at least small light gaps (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
Fruits of this species are eaten and dispersed by birds and perhaps other animals (Hawthorne, 1995a). Generally, trees can fruit once they reach a size of 50 cm dbh (Plumptree *et al*, 1994 in Hawthorne, 1995a).

**Threats**
*P. altissima* is threatened by over-exploitation in Ghana (Hawthorne, 1995a). In logged areas of Uganda, regeneration of this species is further affected by elephant damage to seedlings and saplings (Struhsaker *et al*, 1996).

**Utilisation**
Timber from the genus *Pouteria* is used for general carpentry, joinery, veneer and plywood, and furniture components. Locally this species has medicinal uses.

**Trade**
Note: *P. altissima* and *Aningera robusta* are often confused and it is thought that no distinction is made by the timber industry (Hawthorne, 1995a).

*P. altissima* has been exported from Ghana as a veneer; in 1994, 12 080$m^3$ of sliced veneer was exported at an average price of US$984.00/$m^3$ and jointed veneer fetched an average price of US$1375.00/$m^3$ (ITTO, 1995a).

**Conservation Status**
IUCN Category and Criteria: LR (cd) (African Regional Workshop, 1996)
Hawthorne (1995a) has given this species a red star, which means it is common but under pressure from exploitation and conservation measures are necessary. *Aningeria robusta* has been assigned a pink star by Hawthorne, indicating it is of slightly less conservation concern, although the wood of this species is also heavily exploited for timber.

**Conservation Measures**
No information.

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
Hawthorne, W.D., 1995(a). *Ecological profiles of Ghanaian forest trees.* Oxford Forestry Institute:Oxford. pp.345.
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Struhsaker, T.T., Lwanga, J.S., and J.M. Kasenene, 1996. Elephants, selective logging and forest regeneration in the Kibale Forest, Uganda. *J. Trop. Ecol.* 12:45-64.

# *Prunus africana*

synonym *Pygeum africanum*
Red Stinkwood; African Cherry

**Distribution**
This widespread species is found in Angola, Burundi, Cameroon, Ethiopia, Equatorial Guinea - Bioko, Sao Tome & Príncipe, Kenya, Madagascar, Mozambique, Rwanda, South Africa (Cape Province, Natal, Transvaal), Sudan, Swaziland, Tanzania, Uganda, Zaire and Zambia.

**Habitat**

This species occurs at altitudes above 1500m in Kenya (Marshall & Jenkins, 1994). In Madagascar this species occurs above 1000m. In Zimbabwe *P. africana* is restricted to montane rainforest (CITES proposal, 1994)

**Habitat type according to White (1983)**
**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones
**2. Marsabit District, Kenya** in the Somalia-Masai regional centre of endemism
Afromontane evergreen forest, scrub forest, and related types.
**3. Afromontane Forest**
Afromontane rain forest
*Prunus africana* is a characteristic species of the Afromontane rain forest.
Undifferentiated Afromontane forest
**4. Afromontane Bamboo**
*P. africana* is frequently found scattered in *Arundinaria alpina* bamboo.
**5. Transitional rain forest** of the Lake Victoria regional mosaic.
**6. Sao Tomé**
Mist forest region
**7. The Comoro Islands**

**Population Status and Trends**
In Cameroon, where *P. africana* is restricted to the montane forests of the western highlands, the high level of trade has greatly depleted this species (Dawson & Rabevohitra, 1996). This species is relatively rare in Zimbabwe (CITES proposal, 1994). In South Africa, *P. africana* colonises open sites and the species is regenerating well, with younger trees growing along the roads (African Regional Workshop comm., 1996).

**Regeneration**
This is a fast growing species and the seeds germinate easily, however the seeds are recalcitrant (African Regional Workshop, 1996).

**Role of Species in its Ecosystem**
*P. africana* trees are an important part of the montane ecosystem; tree deaths from bark stripping affects the integrity of the forest and reduces food resources for rare birds (Cunningham & Mbenkum, 1993 in CITES proposal, 1994).

**Threats**
High demand for *P. africana* has led to over-exploitation of this species for its medicinal properties and to a lesser degree its timber (Dawson & Rabevohitra, 1996). Bark removal is most extensive in Cameroon and Madagascar (Dawson & Rabevohitra, 1996). In Madagascar, trees are being felled for the bark in protected areas (100-200 trees along the western boundary of the National Park of Mantadia) (Dawson & Rabevohitra, 1996).
Regeneration from cut young trees appears to be low in Cameroon (Dawson & Rabevohitra, 1996)
Tree bark can regenerate if care is taken not to damage the cambium. The forestry procedures for bark removal in Cameroon are as follows, the bark is to be stripped from the two opposite quarters of the trunk and the tree is then left to regenerate its bark for four years, after this time the remaining quarters are then stripped (Parrott & Parrott, 1989).

This species is not under threat in South Africa, as there is regeneration and limited exploitation in rural areas where ring barked trees are dying (African Regional Workshop, 1996).

**Utilisation**
This species has excellent timber for construction, furniture and household utensils. It is used especially in the informal sector, although it is also used commercially (Marshall & Jenkins, 1994). The bark of *P. africana* is highly valued for its medicinal properties; it is used as a purgative and as a medicine for benign prostatic hyperplasia and prostate gland hypertrophy, diseases that commonly affect older men in Europe and N. America (Dawson & Rabevohitra, 1996). Bark extracts were patented about 30 years ago (CITES proposal, 1994).

**Trade**
*P. africana* is exported from Africa to Europe where the active compounds in the bark are used for drug production (Walter & Rakotonirina, 1995). Between 1988 and 1993 in Madagascar, the amount of bark harvested doubled from 300 tonnes/year to 600 tonnes/year; in 1995, the estimated figure doubled again to 1200 tonnes (Dawson & Rabevohitra, 1996). Between 1986 and 1991 Cameroon exported an average of 1923 tonnes/year to France, Zaire exported 300 tonnes/year (of *P.africana* and *P.crassifolia*) to Belgium and France, Kenya exported 193 tonnes {in 1993?} to France and Uganda exported 96 tonnes {in 1993?} (various sources in Walter & Rakotonirina, 1995).

There have been reports of illegal harvesting in Uganda (Anon, 1993 in CITES proposal, 1994). There is evidence of complete stripping of trees or felling in Cameroon and Madagascar (Dawson & Rabevohitra, 1996). Trade bans in Cameroon have led to massive illegal trade (Cunningham & Mbenkum, 1993 in CITES proposal, 1994). *P. africana* is being removed from the Kakamega Forest Reserve, Kenya (Marshall & Jenkins, 1994)

**Conservation Status**
IUCN Category and Criteria: Cr (A1c,d) - This category was applied at the Regional Workshop for the *Conservation and Sustainable Management of Trees* project. It may, however, apply to populations of the species in parts of its range rather than to the entire population.

In many areas, *P. africana* is severely threatened (Dawson & Rabevohitra, 1996). In Madagascar, trees are cut down and completely stripped of bark; this heavy exploitation is causing the species to be severely threatened (Dawson & Rabevohitra, 1996). This species has been listed as Endangered to Extinction by the department of forestry in Cameroon (CITES proposal, 1994).

**Conservation Measures**
This species is listed on Appendix II of the CITES convention.
There are 153 ha of this species in plantations in Kenya (Marshall & Jenkins, 1994). Seed has been collected and substantial planting of *P. africana* is underway in Cameroon (Dawson & Rabevohitra, 1996). There are no conservation measures in practice in Madagascar (Dawson & Rabevohitra, 1996). *P. africana* is no longer harvested in Zimbabwe, it is only used locally in South Africa and it has not entered international trade in Malawi (CITES proposal, 1994).

Intensive regeneration is required (African Regional Workshop comm., 1996).

**Additional Information**
*P. africana* is an important source of income for the villagers employed by licence holders to collect the bark (Walter & Rakotonirina, 1995).

*P. africana* is a fast growing species that can be cultivated on steep slopes, however, farmers are reluctant to plant unless they can be assured that there is a market (CITES proposal, 1994).

**References**
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**Dawson, I. and Rabevohitra, R., 1996.** Status of *Prunus africana* resources in Madagascar. Survey Report.
Marshall, N.T. and Jenkins, M., 1994**.** *Hard Times for Hardwood.* Indigenous timber and the timber trade in Kenya. TRAFFIC International:Cambridge, UK. pp. 53.

Parrott, J. and Parrott, H., 1989. Report on the conservation of *Prunus (Pygaeum) africanum* in Cameroon. Draft Report.

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White F., 1983. *The Vegetation of Africa*. A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

# *Pterocarpus angolensis*
Bloodwood

**Distribution**
This species occurs in Angola, Botswana, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zaire, Zambia and Zimbabwe.

**Habitat**

In Mozambique, this species is found in all types of woodland and wooded savanna, however its occurrence and density is not uniform (Moreno Saiz, 1996). In Zimbabwe, *P. angolensis* is found on the fringe of pan grassland of the Lupane and Nkayi districts and in the woodland thicket on the hills of the Binga district (Timberlake *et al*, 1991). Populations of *P. angolensis* are denser on Kalahari sand (African Regional Workshop, 1996).

Vegetation type according to White (1983)
**1. Zambezian woodland**
Zambezian miombo woodland
*Pterocarpus angolensis* is a canopy associate, rather that a dominant canopy species.
North Zambezian undifferentiated woodland and wooded grassland
South Zambezian undifferentiated woodland and scrub woodland
Zambezian `chipya' woodland and wooded grassland
Zambezian Kalahari woodland
**2. Zambezian thicket**
When found in this habitat type *P. angolensis* tends to be rare and quite small. It is thought that large mammals and fire allow for the occurrence of the species in the Zambezian thicket as it does not regenerate well in the shade.
**3. Grassland and wooded grassland** of the Guinea-Congolia/Zambezia regional transition zone.

**Population Status and Trends**
This species is very widespread although it is never common. In areas where the local people use the trees there are fewer older stands.

In Mozambique, the abundance of this species has decreased dramatically in the last decades; it is rarest in the southern province (Moreno Saiz, 1996).

A large proportion of mature trees have been lost to a fungal disease. Approximately forty percent of the trees in Zambia have died from the fungal disease (African Regional Workshop, 1996).

**Regeneration**
There is evidence of natural regeneration occuring for this species; however regeneration tends to be episodic and is stimulated by high rainfall or fire (African Regional Workshop, 1996). *P. angolensis* is often a secondary coloniser. Reproduction starts when the tree is 15-20 years old. It does not coppice well, if at all, and therefore *P. angolensis* needs to reproduce by seed.

**Role of Species in its Ecosystem**
No information.

**Threats**
*P. angolensis* is exploited for its timber. Larger trees are dying from a fungal disease that blocks up the xylem (African Regional Workshop, 1996).

**Utilisation**
The wood is used for carpentry and construction, especially in the construction of boats.
The sap is used as a long-lasting dye. It also has medicinal properties.
**Trade**
There is a huge demand for this species both within Mozambique for furniture making and for export. Almost all of the trees cut in Cabo Delgado, Mozambique are sent to South Africa for export to the Far East (i.e. Thailand, Hong Kong, etc.). In 1993, 1,690$m^3$ of *P. angolensis* were exported from Cabo Delgardo and in 1994, the volume exported was 5,497$m^3$ (Moreno Saiz, 1996). This is currently a key species for exploitation in Zimbabwe (African Regional Workshop, 1996).

This species is imported into Kenya from Tanzania (Marshall & Jenkins, 1994).

**Conservation Status**
IUCN Category and Criteria: LR (lc) (category assigned by the South African group of the Workshop, due to observations of sufficient regeneration. VU (A1c,d) was assigned by the West African group.)

**Conservation Measures**
Bloodwood is found in the Derre forest reserve in Mozambique. There are 2 ha planted with this species in Kenya (Marshall & Jenkins, 1994). Growth of *P. angolensis* is slow and variable for at least the first seven years, making it less suitable for plantation (African Regional Workshop, 1996).

In Zimbabwe this species is found in Forest Commissioned land where it is rarely exploited. The minimum cutting diameter is 25 cm, however this is not enforced (African Regional Workshop, 1996).

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## *Pterygota bequaertii*

Sterculiaceae
akodiakédé, efok, koto, kyereyebere

**Distribution**
Cameroon, Côte d'Ivoire, DR Congo, Gabon, Ghana, Nigeria

**Habitat**
A tree of moister types of lowland rainforest, often only in mature forest.

**Population status and trends**
A timber species occurring in forest areas in West and Central Africa. It is much rarer than, but commonly confused with, *P. macrocarpa*. The species appears to be suffering declines because of levels of exploitation through most of its range.

**Threats**
Commercial exploitation, clear-felling/logging of the habitat

**Utilisation**
A source of timber and fuelwood

**Trade**
The timber is present at a minor level in international trade.

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**

**Forest management and silviculture**

**References**
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Songwe, C. 1990. Revised preliminary list of timbers of Cameroon with conservation categories.

# *Pterygota macrocarpa*

Sterculiaceae
koto, kyereye, oporoporo

**Distribution**
Cameroon, Côte d'Ivoire, Ghana, Nigeria, Sierra Leone

**Habitat**
A common tree of drier deciduous forest types.

**Population status and trends**
Exploitation for the timber occurs at high levels throughout its range and is likely to be causing population declines. Regeneration is reported to be abundant in areas of logging damage and also after burning.

**Role of species in the ecosystem**

**Threats**
Commercial exploitation, clear-felling/logging of the habitat

**Utilisation**
The species is used as a timber and fuelwood.

**Trade**
In 1995 Ghana exported koto in sliced (3000m³), rotary peeled and jointed veneer consignments, selling at an average price of US$901/m³, US$510/m³ and US$1247 respectively, also in 9000m³ of sawnwood, selling at an average price of US$440/m³ and in 1000m³ of logs, selling at an average price of US$165/m³ (ITTO, 1997).

Côte d'Ivoire exported 2000m³ of sliced veneer, selling at US$963/m³, 2000m³of rotary peeled veneer, selling at an average price of US$406/m³, and 5000m³of logs, selling at an average price of US$67/m³ (ITTO, 1997).

**IUCN Conservation category**
VU A1cd according to Hawthorne (1995).

**Conservation measures**

**Forest management and silviculture**

**References**
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## *Swartzia fistuloides*

Dina; Pau Rosa

**Distribution**
This species occurs in Angola (Cabinda), Congo, Côte d'Ivoire, Cameroon, Gabon, Ghana, Equatorial Guinea, Nigeria and Zaire.

**Habitat**
*S. fistuloides* is found in dense rainforest.

**Population Status and Trends**
This species is rare in Ghana (Hawthorne, 1995a). This species has been classified as a blue star by Hawthorne (1995a), meaning it is widespread internationally but rare in Ghana, and it is Ghana's interests to look after this species.

**Role of Species in its Ecosystem**
Elephants are seed dispersers (1% of elephant dung piles in the Bia South game park reserve contained seeds (Martin, 1991 in Hawthorne 1995a)).

**Threats**
"This species may be suffering from a shortage of elephants" Hawthorne, 1995a.

**Utilisation**
The decorative timber is used for veneer, turnery, carvings and tool handles.

**Trade**
In 1987, Gabon exported 1,250 $m^3$ of Pau Rosa from Owendo (IUCN, 1990); in 1994, Gabon exported 1,387.583 $m^3$ of Pau Rosa and in 1995 they exported 1,921.841 $m^3$ (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)

**Conservation Measures**
Regeneration work is urgently required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
DIAF, 1996. Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.
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# *Terminalia ivorensis*

Combretaceae

black afara, emeri, emire, emiré, framire, framiré, idigbo

**Distribution**

Cameroon, Côte d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone

**Habitat**

A species of lowland semi-deciduous forest types. It is not uncommon in secondary forest. Adult trees are common along roadsides.

**Population status and trends**

A West African timber species found scattered in low densities in remaining forest areas; larger trees occurring in lower-lying parts of semi-deciduous forest. Exploitation is moderate. Poor regeneration is often attributed to crop failure. Seedlings and saplings appear to be very rare except in upland evergreen forest along track sides. It seems the largest stocks of the species may be along roadsides (Hawthorne, 1995b).

**Role of species in the ecosystem**

**Threats**

Commercial exploitation, clear-felling/logging of the habitat

**Utilisation**

*T. ivorensis* produces high-quality timber used, for example, in fine carpentry, joinery, building, flooring and ply wood manufacture. The species is also used locally as a fuel.

**Trade**

The high quality timber plays a major role in international trade. In 1995 Ghana exported 5000m³ of sawnwood, selling at an average price of US$410/m³, Liberia exported logs at an average price of US$175/m³, Cameroon exported 2000m³ of logs and Côte d'Ivoire exported 9000m³ of logs at an average price of US$246/m³. (ITTO, 1997).

**IUCN Conservation category**

VUA1cd according to Hawthorne (1995a).

**Conservation measures**

**Forest management and silviculture**

The species has been well used in Ghana for taungya and other plantations. However frequent diebacks have occurred, dampening the interest in the species as a plantation tree. There are records of trees attaining 17m height in 8 years, 30m in 15 years, 36.5m in 22 years.

**References**

Hawthorne, W. 1995a. *Categories of conservation priority and Ghanaian tree species*. (unpublished). 1-38.

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# *Terminalia superba*
## Combretaceae

**Trade name:** Limba, Afara, Fraké

**Local names** The wider range of local names includes Kojagei (Liberia, Sierra Leone), Kobaté, Fra, Fraké, Fram (Côte d'Ivoire), Ofram (Ghana), Afara, Akom and Mulimba.

**Distribution**
*Terminalia superba* has a broad distribution in West and Central Africa. Range states are Angola, Benin, Cameroon, Central African Republic, Côte d'Ivoire, Congo, DR Congo, Equatorial Guinea, Gabon, Ghana, Guinea, Liberia, Nigeria, Sierra Leone, Togo.

**Habitat**
Limba grows in deciduous moist forest and evergreen rain forest, where it colonises abandoned agricultural land. It prefers a climate with an annual rainfall of 1400-2000 mm, a dry season and a mean annual temperature of 23-26°C. It favours fertile soils of alluvial origin but will grow on a variety of other soil types. The detailed ecological requirements of *T. superba* are discussed by Groulez and Wood (1985).

**Population status and trends**
Although the species is widespread, common and not generally threatened, it is becoming progressively impoverished by heavy exploitation, as pointed out by FAO (1984). Supplies in the southern parts of its range have dwindled so that forest management and restocking are now needed in those areas where the best quality wood occurs (Groulez and Wood, 1985). *In situ* conservation is considered to be a priority for the species by FAO (1990). Heavy exploitation is threatening natural populations in West African countries such as Ghana and Nigeria. N'Sosso (1990) notes that Limba is declining in Congo following 60 years of exploitation, and would benefit from trade controls. *Terminalia superba* has been recorded as threatened in Cameroon, based on assessments by local experts (WCMC, 1991).

**Role of species in the ecosystem**

**Threats**
Over-exploitation is the main recorded threat to the species in parts of its range. Forest clearance will also have caused population declines but the ability of *T. superba* to colonise agricultural land reduces the overall impact of this threat.

**Utilisation**
Depending on where it is grown, Limba is yellowish to brownish-black and of varying hardness and weight. The wood is not durable. It can be easily worked but has a tendency to split when nailed or screwed (Lamprecht, 1989). The timber is used for plywood, furniture, interior joinery and decorative veneers.

**Trade**
The market is mainly interested in Limba from the south of its range, especially from the Mayombe of Congo and DR Congo. Until 1955 DR Congo was the principal producer, followed by Angola and Congo. After 1955 exports from the first two countries declined as the forests became exhausted; whereas those from Congo rose annually (Groulez and Wood, 1985). Limba remains one of the most important commercial timbers of DR Congo and for the period 1983-1986 ranked eighth in terms of species production. In 1995, DR Congo exported 3,000 cu m of Limba logs; 1000 cu m of sawnwood and small quantities of veneer (ITTO, 1997).

Limba was one of the first species commercially exploited in Congo. It declined in importance from the 1950s to the early 1970s. In the 1960s Limba still represented more than 50% of Congo's log production but this had fallen to 4.55% in 1989. In 1989 the volume of log production for Limba in Congo was 45 525 $m^3$ and log exports 22,910 $m^3$, according to MEF and DREF statistics. In 1995, Congo exported 10,000 $m^3$ of logs (ITTO, 1997).

Gabon exported 221 $m^3$ of Limba logs through the ports of Libreville and Port Gentil, in 1989, and 1753 $m^3$ were exported in the first nine months of 1990 (source: SEPBG). No exports from Gabon are reported in ITTO, 1997.

Côte d'Ivoire exported 17 072 235 kg of *T. superba* logs in 1988 (11 months). In 1995, 7,000 cu m of logs and a small amount of veneer were exported.

Cameroon exported 62,000 cu m of Limba logs in 1995 together with 15,000 cu m of sawnwood, 10,000 cu m of veneer and an unrecorded amount of plywood.

Ghana exported 18, 000 cu m of Limba logs, 3000 cu m of sawnwood and 1000 cu m of veneer during 1995 (ITTO, 1997). This compares with an average of 3,240 cu m during the period 1980- 1986 (WCMC, 1991).

Togo exported a small amount of limba sawnwood in 1995 (ITTO, 1997).

The wood of *Terminalia superba* is used particularly in Belgium, Germany and Switzerland (Groulez and Wood, 1985).

**Conservation measures (source of information WCMC, 1991).**

**Legislation**

Congo - Minimum exploitable diameter 0.6 m

Gabon - Minimum exploitable diameter 0.6 m

Ghana - Minimum exploitable diameter 0.7 m

Liberia - Minimum exploitable diameter 0.7 m

**Presence in protected areas**

Congo Odzala National Park, Conkouati Faunal Reserve, Lekoli-Pandaka Faunal Reserve, Mont Fouari Faunal Reserve, Nyanga Nord Faunal Reserve, Tsoulou Faunal Reserve, M'boko Hunting Reserve, Mont Maroumbou Hunting Reserve, Nyanga Sud Hunting Reserve

Gabon Sibang

DR Congo Réserve de la Biosphere de Luki

**Provenance collections** Seeds of provenances have been collected in various countries such as Cameroon, Congo, and Côte d'Ivoire for national and international provenance trials and for establishment of conservation stands in the countries of origin. Seed trees have been selected in the southern Congo provenances and seed orchards of grafted select clones have been established (FAO, 1984). Seventeen provenances are being tested in Côte d'Ivoire and are subject to regular measurements of 12 characteristics, including growth rate and wood characteristics (Anon., 1990). International provenance trials are being coordinated by CTFT and FAO's Forestry Department (Anon., 1987).

**Forest management and silviculture**
Groulez and Wood (1985) point out that successful natural regeneration of *T. superba* requires gaps in the forest canopy, sufficiently clean conditions for seed to reach the forest floor, lack of peasant cultivation and the absence of competition for several years. These conditions are seldom found and natural regeneration as a silvicultural system in forest management is possible, but expensive, and not without risk.

This species is widely used as a plantation species both within and outside its natural range. Plantations have been developed mainly in Congo, Côte d'Ivoire and DR Congo. The rotation age of this species in plantation varies from 30 to 40 years (Anon., 1987).

**References**
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WCMC (1991)

## *Testulea gabonensis*
Izombé

**Distribution**
This species occurs in Cameroon, Congo, Equatorial Guinea, and Gabon.

**Habitat**
It is found in dense primary forests and transitional formations (WCMC, 1991).

**Population Status and Trends**
It has a scattered distribution. It has a very limited range in Southern Congo near Conkouati (WCMC, 1991).

Izombé also has a very limited geographic distribution within Cameroon (Gartlan, *in litt*. 1991)

**Role of Species in its Ecosystem**
No information.

**Threats**
Exploitation for international trade.

**Utilisation**
Izombé is used for door and window frames, furniture, flooring, turnery and carving (WCMC, 1991).

**Trade**
In 1987, Gabon exported 935 $m^3$ of Izombé from Owendo (IUCN, 1990). Gabon exported *T. gabonensis* logs for an average price of US$33.50 in 1994 (ITTO, 1995a). In 1994, 5,176.546 $m^3$ of Izombé were exported from Gabon and 4,942.090 $m^3$ were exported in 1995 (DIAF, 1996).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)
The species has been considered to be Endangered in Cameroon (Palmberg, 1987).

**Conservation Measures**
Regeneration work is required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
DIAF, 1996**.** Timber trade statistics for Gabon sent from the Direction des Inventaires et Aménagements des Forêts (DIAF) of the Ministere des Eaux et Forêts for 1994 and 1995 sent by Tom Hammond.
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WCMC, 1991**.** *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.

# *Tieghemella africana*

Douka; Makoré

**Distribution**
This species occurs from Sierra Leone to Cameroon, Congo, Equatorial Guinea, Gabon and south to Cabinda.

**Habitat**
*T. africana* is a high rain forest species.

Vegetation type according to White (1983)
**1. Guineo-Congolian rain forest**
Hygrophilous coastal evergreen Guineo-Congolian rain forest
*Tieghemella africana* is found in the western centre of endemism but is replaced by the closely related *T. heckelii* in the east.

**Population Status and Trends**
No direct information although this could be inferred from information on forest extent and rate of decline.

**Role of Species in its Ecosystem**
No information.

**Threats**
In Cameroon it is under pressure because of changes in land use (WCMC, 1991).

**Utilisation**
This species is used for timber.

**Trade**
Gabon exported 15,278 $m^3$ of *T. africana* in 1987 from Owendo (IUCN, 1990). In 1994, Gabon exported 201$m^3$ of Douka sawnwood at an average price of US$92.71$m^3$ (ITTO, 1995a). Total Douka export from Gabon in 1994 was 20,115.323 $m^3$ and total export in 1995 was 20,515.665 $m^3$ (DIAF, 1996). Côte d'Ivoire exported 196$m^3$ of *T. africana* veneer for an average price of US$1801.07/$m^3$ (ITTO, 1995a).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)

**Conservation Measures**
Regeneration work is required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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White F., 1983. *The Vegetation of Africa.* A descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. Paris:UNESCO. pp.356.

# *Tieghemella heckelii*
Makoré

**Distribution**
This species occurs in Cameroon, Côte d'Ivoire, Gabon, Ghana, Liberia, Nigeria and Sierra Leone.

**Habitat**
It is a high rainforest species, preferring wet, evergreen forest.

Vegetation type according to White (1983)
**1. Guineo-Congolian rain forest**
Hygrophilous coastal evergreen Guineo-Congolian rain forest
*Tieghemella heckelii* is found in the eastern centre of endemism but is replaced by the closely related *T. africana* in the west.

**Population Status and Trends**
This species might become extinct in Liberia unless re-planted by the Forest Service (Voorhoeve, 1979 in WCMC, 1991). *T. heckelii* is common in Ghana (Hawthorne, 1995a).

**Regeneration**
Both the seedlings and the saplings are shade tolerant and shoot up in height when exposed to light (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
The large seeds and fruit are eaten by small animals and elephants (in 12% of piles of elephant dung, seeds were found in the Bia South game park reserve (Martin, 1991 in Hawthorne, 1995a)). Seedlings are rare because of predation by rodents who eat the large oily cotyledons.

**Threats**
This species is severely threatened by over-exploitation in Ghana (Hawthorne, 1995a).
The reduction of elephant numbers in high forest areas has limited the natural regeneration of Makoré (WCMC, 1991).

**Utilisation**
Locally the oil from the seed is eaten and the fruit is used to make soap.

**Trade**
Ghana exported 2,090 $m^3$ of *T. heckelii* air dried sawnwood for an average price of US$510.00/$m^3$ and kiln dried sawnwood was sold for US$659.00/$m^3$. Ghana also exported 3,240 $m^3$ of sliced veneer at an average price of US$778.00/$m^3$, rotary peeled veneer for US$446.00/$m^3$, and jointed veneer for US$1734.00/$m^3$ (ITTO, 1995a).

Portugal imported 227 $m^3$ of *T. heckelii* logs at an average price of US$215.00/$m^3$.
Italy imported 2,336 $m^3$ of sawnwood. The USA imported both logs and sawnwood. Portugal and Sweden both imported Makoré sawnwood. (ITTO, 1995a).

**Conservation Status**
IUCN Category and Criteria: EN (A1c,d) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). For Ghana this species has been awarded a scarlet star by Hawthorne (1995a), which means that it is common but it is under profound pressure from heavy exploitation. This species requires protection and exploitation has to be limited if it is to be sustainable (Hawthorne, 1995a).

**Conservation Measures**
*T. heckelii* is protected by law in Côte d'Ivoire. The export of Makoré in log form is banned by Ghana and Liberia.

**References**
African Regional Workshop, 1996**.** *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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# *Triplochiton scleroxylon*

Obeche; Wawa

**Distribution**

This species occurs in Benin, Cameroon, Congo, Côte d'Ivoire, Equatorial Guinea, Ghana, Guinea, Liberia, Nigeria, Sierra Leone and Zaire.

**Habitat**

*T. scleroxylon* occurs mainly in forests transitional between humid evergreen and semi-deciduous forests. It prefers base rich, high ph soils and is associated with a two-peak rainfall pattern (Hall & Bada, 1979 in Hawthorne, 1995a). The species has extended its range due to deforestation for agricultural purposes (White, 1983).

Vegetation type according to White (1983)
**1. Guineo-Congolian rain forest**
Drier peripheral semi-evergreen Guineo-Congolian rain forest and similar forest in the transition zones.
*Triplochiton scleroxylon* is often gregarious and can regenerates well on abandoned farmland.
Old secondary forest

**Population Status and Trends**

It is very common in Ghana, especially outside the wet evergreen forest type (Hawthorne, 1995a). Increasingly smaller trees are being logged in Nigeria for match production which is putting pressure on the species (WCMC, 1991). Populations of this species only occur in north Congo especially in the Sangha region.

**Regeneration**

This species regenerates well in logged forest (Hawthorne, 1995a) and in abandonned farmland. It is fast growing and light demanding. Seed production is very irregular for this species; good seed years occur every 4-5 years. It is thought that the dry spell between the two rainy peaks is a stimulus for flowering (Hall & Bada, 1979 in Hawthorne, 1995a).

**Role of Species in its Ecosystem**

No information.

**Threats**

This species is severely threatened by over-exploitation in Ghana (Hawthorne, 1995a)

**Utilisation**

Used locally and internationally as a timber species.

**Trade**

*T. scleroxylon* accounts for more of the timber volume extracted annually from west African forests that any other single species. It is Ghana's major timber species for the export trade; in 1989, it accounted for 56.6% of the country's log exports and 22.9% of lumber exports.

In 1994, 310,000 $m^3$ of Obeche were exported in log form from Cameroon at an average price of US\$220.00/$m^3$. Ghana exported Obeche logs and 131,360 $m^3$ of sawnwood, air dried sold for an average of US\$274.00/$m^3$ and kiln dried sold for US\$330.00/$m^3$.
Togo exported *Triplochiton* spp. as sawnwood. As a veneer, Obeche was exported in 1995 from Cameroon, and Ghana (sliced veneer: 660 $m^3$ @ ave. US\$1214.00/$m^3$; rotary peeled @ ave. US\$357.00/$m^3$; jointed veneer @ ave. US\$1951.00/$m^3$). Plywood *T. scleroxylon* was exported from Cameroon (10,000 $m^3$ @ ave. US\$695.00/$m^3$) and Ghana in 1994 (ITTO, 1995a).

In 1994, *T. scleroxylon* logs were imported into the Netherlands (2,000 $m^3$), Portugal (408$m^3$ @ ave. US\$18.00/$m^3$), Switzerland (3,000 $m^3$) and the USA (ITTO, 1995a). Italy imported 46,144 $m^3$ and Switzerland imported 1,900 $m^3$ of Obeche sawnwood. Portugal, Sweden, and the USA also imported Obeche sawnwood. In addition, Portugal and the United States imported Obeche veneer and plywood. (ITTO, 1995).

**Conservation Status**

IUCN Category and Criteria: LR (lc) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to excessive exploitation (Hawthorne, 1995b). It has been awarded a scarlet star in Hawthorne's (1995a) star system for Ghana, which means that it is common but it is under profound pressure from heavy exploitation. This species requires protection and exploitation has to be limited if it is to be sustainable (Hawthorne, 1995a).

**Conservation Measures**

It is protected by law in Côte d'Ivoire. Export of this species has been banned by Liberia. (WCMC, 1991).

**References**

African Regional Workshop, 1996. *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
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# *Turraeanthus africanus*
Avodiré

**Distribution**
The genus *Turraeanthus* is endemic to the Guineo-Congolian regional centre of endemism (White, 1983). This species is distributed in Angola, Benin, Cameroon, Congo, Equatorial Guinea, Ghana, Nigeria, Sierra Leone, Uganda and Zaire.

**Habitat**
*T. africanus* is found commonly in moist semi-deciduous forest and tends not to occur in the wettest and the driest forest (Hawthorne, 1995a).

**Population Status and Trends**
This species is common in Ghana and regeneration is sufficient (Hawthorne, 1995a).

**Regeneration**
Only the smaller trees produce fruit and this occurs irregularly (Hawthorne, 1995a). There is high viability of seeds that germinate in the shade and seedlings are shade tolerant, however, a small light gap is best for growth and survival (Alexandre, 1977 in Hawthorne, 1995a). Large trees are usually found in the shade as well (Hawthorne, 1995a).

**Role of Species in its Ecosystem**
Seeds of this species are dispersed by animals (Alexandre, 1977 in Hawthorne, 1995a).

**Threats**
This species is threatened by moderate exploitation in Ghana (Hawthorne, 1995a).

**Utilisation**
*T. africanus* is used for furniture, joinery, decorative veneer, cabinetwork and panelling (WCMC, 1991).

**Trade**
The export of Avodiré in log form has been banned by Ghana (WCMC, 1991).

**Conservation Status**
IUCN Category and Criteria: VU (A1c,d) (African Regional Workshop, 1996)
This species is considered Vulnerable (1994 IUCN threat category) due to exploitation (Hawthorne, 1995b). It has been awarded a pink star in Hawthorne's (1995a) star system for Ghana, which means that it is common and moderately exploited.

**Conservation Measures**
This species is protected by law in Côte d'Ivoire. It is considered a priority for *in situ* conservation by FAO, 1984. Urgent regeneration work is required (African Regional Workshop, 1996).

**References**
African Regional Workshop, 1996**.** *Conservation and Sustainable Management of Trees* project workshop held in Harare, Zimbabawe, July, 1996.
FAO, 1984**.** Report of the Fifth Session of the FAO Panel of Experts on Forest Gene Resources Information No 14:32-49.
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WCMC, 1991. *Provision of Data on Rare and Threatened Tropical Timber Species*. pp. 58.

## *Vepris glandulosa*

Rutaceae
munderendu-itu, munderendu-waitu

**Distribution**
Kenya

**Habitat**
A lower canopy tree confined to patches of upland dry forest between 1550 and 2150m, between the lower edges of montane conifer forest, grassland and open woodlands at lower elevations.

**Population status and trends**
Known populations are confined to Muguga, Ragati and Limuru, in central Kenya. The population at the type locality in Gichuiro was destroyed along with the forest in the 1970s. The largest population is found at Ragati on the eastern slopes of Mt. Kenya, where they are mostly contained in a commercial block of *Vitex keniensis*. In 1995, less than 200 adults were counted along with slightly more saplings and coppices.

**Role of species in the ecosystem**

**Threats**
Local use, expansion of human settlement and agriculture, forestry management activities.

**Utilisation**
The wood is used locally for making tool handles. The tree is also noted for its use as a bee plant and invertebrate food. However the species restricted distribution and population has reduced its utilization.

**Trade**

**IUCN Conservation category**
EN B1+2c, D1according to WCMC

**Conservation measures**
The Muguga population is protected. Ragati Forest Reserve allows controlled exploitation and Thiambethu farm is a privately run ecotourist reserve. Seedlings are being raised on a large scale at the Plant Conservation Programme and Kenya Forestry Seed Centre. Only 3 plants have been successfully raised to maturity *ex situ*.

**Forest management and silviculture**
The species coppices and reproduces by seed.

**References**
Achieng', S. *et al.* 1996. Completed data collection forms for trees endemic to Kenya.
Beentje, Henk Jaap. 1994. *Kenya trees, shrubs and lianas*. Nairobi, Kenya: National Museums of Kenya. 722pp.
FAO Forestry Department. 1986. *Databook on endangered tree and shrub species and their provenances*. Rome: FAO. 524pp.

# *Vitellaria paradoxa*

Sapotaceae
Shea butter tree

**Distribution**
Cameroon, DR Congo, Ghana, Nigeria, Senegal, Sudan, Uganda

**Habitat**
A locally abundant tree restricted to dry savannah and woodland where the water table is shallow, generally between 500 and 1000m, often near towns and villages. It grows in areas with annual rainfall not exceeding 1000mm.

**Population status and trends**
This species has been overexploited for timber, firewood and charcoal production. Its habitat is suffering from agricultural encroachment and increasing population pressure. Natural populations are, however, often left where land has been cleared. Nevertheless the lack of protection and natural regeneration in ageing isolated stands leads to concern over the likelihood of future population declines.

**Role of species in the ecosystem**
The fruit are eaten by elephants.

**Threats**
Local use, seed predation, clear-felling/logging of the habitat, expansion of human settlement, extensive agriculture

**Utilisation**
The seed is the most valuable commodity. The roasted kernels are pounded and ground into an oily paste, which is then boiled and filtered. The purified butter is edible and rich in Vitamin E, used in cooking and suitable as an alternative to cocoa butter equivalent for chocolate manufacture. It is used commercially in soap, cosmetics and candles and has potential for pharmaceutical preparations. Locally it is used in hair dressing, ointments and waterproofing. The fruit pulp is eaten raw or lightly cooked and is a good source of carbohydrates, iron and B vitamins. The seed husk is used as mulch and fertiliser. The timber is difficult to work but is used for stakes, house posts, ship building and tool handles. The wood is also a source of charcoal and firewood.

**Trade**
The amount of fruit harvested each year depends on the price of shea butter. The product is mainly sold in local markets for home consumption and is coming under increasing pressure from imported oils. The butter requires further refining for the export market (Wickens, 1995).

**IUCN Conservation category**
VU A1cd according to MUIENR (Okullo *et al.*, 1997).

**Conservation measures**
It is poorly represented in protected areas but is occasionally given protection or planted in farmed areas.

**Forest management and silviculture**
Little attention has been paid to cultivating the species and no plantations are established. Trees start to fruit at 10-15 years, bearing full fruit crops by 20-25 years with individual yields varying from 20 to 200kg. 50kg of fresh nuts will produce 4kg of shea butter.

**References**
Okullo, J.B. *et al.* 1997. Completed data collection forms for woody plants of Uganda.
Pennington, T.D. 1991. *The genera of Sapotaceae*. Royal Botanic Gardens, Kew & New York Botanical Garden. 295pp.
Wickens, G.E. 1995. *Edible nuts. Non-Wood Forest Products 5*. Food and Agriculture Organization of the United Nations.

# *Vitex keniensis*

Verbenaceae

Meru oak, moru, muuru, mfuu

**Distribution**
Kenya

**Habitat**
A species of moist evergreen forest between 1300 - 2100m

**Population status and trends**
The wild populations of the species are confined to parts of the central highlands, including the north-east slopes of Mt. Kenya. Most populations, although protected, are in grave danger of being overexploited. Most of the commercially available supplies are from plantation sources (Marshall & Jenkins, 1994).

**Role of species in the ecosystem**

**Threats**
Commercial overexploitation, pests and diseases, clear-felling/logging of the habitat, expansion of human settlement, extensive agriculture, forestry management activities

**Utilisation**
Known as the Meru oak, this species provides an excellent commercial timber. It is used for furniture making, veneer and panelling etc. It also provides a source of firewood. The fruit is edible and can be found in local markets. Trees are also planted for ornamental purposes.

**Trade**
The timber appears to be present only in domestic trade. Five furniture companies in Nairobi used on average about 35m³ per year. Total usage is likely to be in the region of 350-450m³ per year. Supplies of good quality timber have been said to be poor, much of available stocks have been cut too young (Marshall & Jenkins, 1994). As supplies are largely of plantation origin it is expected the presence of the species in local markets is small.

**IUCN Conservation status**
VU A1cd+2cd according to World Conservation Monitoring Centre

**Conservation measures**
KEFRI and the Plant Conservation Programme in Kenya maintain a living collection and seed stocks.

**Forest management and silviculture**
The species is one of the very few indigenous trees to be planted over a substantial area, namely in the western highlands. It is also planted on a small scale on farms in Tanzania. The plant is fairly fast growing and coppices well.

**References**
Achieng', S. *et al.* 1996. Completed data collection forms for trees endemic to Kenya.
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Marshall, N.T. & M. Jenkins. 1994. *Hard times for hardwood: indigenous timber and the timber trade in Kenya*.Traffic East/Southern Africa.
Mbuya, L.P. *et al.* 1994. *Useful trees and shrubs for Tanzania*. Identification, propagation and management for agricultural and pastoral communities. Regional Soil Conservation Unit/SIDA.

## *Warburgia salutaris*

Canellaceae

chibaha, muranga, pepper bark tree, xibaha

**Distribution**

Mozambique, South Africa (KwaZulu-Natal, Mpumalanga, Northern Province), Swaziland, Zimbabwe.

**Habitat**

The pepper bark tree has a scattered distribution in southern Africa, occurring in savanna woodland and coastal forest, Afromontane forest up to 1200m and lowland forest patches.

**Population status and trends**

Populations are known from northern KwaZulu-Natal, along the Drakensberg Escarpment in Mpumalanga and on the Soutpansberg and Blouberg ranges in the Northern Province in South Africa. It is recorded from the Eastern Highlands of Zimbabwe and lowland forest patches in Swaziland and the Lebombo Mts. in Mozambique. Habitat losses have occurred but the most serious threat and major cause of population declines is the extensive removal of bark, stems and roots for use in traditional medicine. This has led to the near extinction of the species in KwaZulu-Natal, parts of Mpumalanga, Swaziland and Zimbabwe. In KwaZulu-Natal very little seed is set and no seedlings have been reported for unknown reasons (Hilton-Taylor, 1998). The populations in Mozambique appear to be regenerating reasonably, but exploitation here too is unsustainable (Bandeira, 1995). There are still large, relatively untouched subpopulations in the Northern Province. The precise northern distribution of the species and its relationship with closely related species in East Africa requires further investigation (Hilton-Taylor, 1998).

**Role of species in the ecosystem**

**Threats**

Commercial overexploitation, expansion of human settlement and agriculture.

**Utilisation**

The bark and roots are used in traditional medicinal practices as a treatment of head and chest ailments and also to cure people who are bewitched. The wood is also used for making charcoal/fuelwood.

**IUCN Conservation category**

EN A1acd according to Hilton-Taylor (1998).

**Conservation measures**

Plants have been reintroduced into two protected areas in KwaZulu-Natal. Although there are subpopulations within protected areas, it is difficult to prevent exploitation.

**Forest management and silviculture**

A number of projects are under way to provide a cultivated form.

**References**

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# *Widdringtonia whytei*

Cupressaceae

mkungusa, mlanje cypress, mlanje cedar, mulanje cedar

**Distribution**
Malawi

**Habitat**
The species is scattered in submontane, moist mixed, open forest between 1500 - 2200m.

**Population status and trends**
The taxonomic validity of the Mulanje cedar is doubtful. It is most likely to represent a variant of *W. nodiflora*, which occurs in Zimbabwe and South Africa. It is endemic to Mt. Mulanje. The timber has been heavily exploited in the past. No sizeable stands remain untouched and many former stands have been entirely destroyed (IUCN & WWF, 1994). Licences are available now only for the exploitation of dead trees, but illegal felling or killing of trees is believed to take place. Mature individuals appear to be dying at a high rate, possibly because of their sensitivity to fires, which have become more frequent. Regeneration, on the other hand, depends on fire and appears to be extremely poor. *Pinus patula* has become invasive in areas suitable for *Widdringtonia* colonisation. The forest is further threatened by various forms of encroachment and development.

**Role of species in the ecosystem**

**Threats**
Illegal exploitation, poor regeneration, burning, extensive agriculture, natural disaster

**Utilisation**
Mulanje cedar is an enormously valuable asset. The wood is very fragrant and resistant to termites, borers and fungal attack. It has been recently found to make excellent timber for boat building and fisheries officials have urged that remaining supplies be reserved for the Lake Malawi fishing industry. Wood is used locally for making carvings, boxes and furniture sold to tourists. The species also yields a potentially commercially valuable cedarwood oil.

**Trade**
The trade in mulanje cedar which peaked earlier in the century, is much diminished, confined now to a local scale.

**IUCN Conservation category**
EN A1abcd, B1+2abcde according to SSC Conifer Specialist Group (Farjon *et al*., 1998).

**Conservation measures**
The entire distribution of the species is contained within a forest reserve. Only dead trees are licensed for cutting.

**Forest management and silviculture**

**References**
Erfurth, T. & H. Rusche. 1976. *The marketing of tropical wood*. Rome: FAO. 60pp.
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