

Khaya senegalensis

khaya wood, African mahogany

(Desr.) A. Juss.

Meliaceae

LOCAL NAMES

Arabic (homraya, homra, murraya, mahogoni); English (African mahogany, dry zone mahogany, Gambia mahogany, khaya wood, Senegal mahogany); French (cailcedrat, Acajou d'Afrique, acajou du Sénégal); Fula (dalehi); German (Afrikanisches Mahagoni); Hausa (madachi); Igbo (ono); Indonesian (kaya); Trade name (khaya wood, African mahogany); Vietnamese (x[af] c[uwf]); Yoruba (ogonwo)

BOTANIC DESCRIPTION

Khaya senegalensis is a deciduous evergreen tree, 15-30 m high, up to 1 m in diameter, with a clean bole to 8-16 m, buttresses not prominent or absent; bark dark grey, with small, thin, reddish-tinged scales; slash dark pink to bright crimson, exuding a red sap.

Leaves alternate, compound, stipules absent; petiole and rachis 13-33 cm long; leaflets 3-4 (max. 7) usually opposite pairs, oblong to narrowly oblong-elliptic, 4-12 x 2-5 cm, apex acute to shortly acuminate, base rounded, margins entire, pale green, lateral nerves 8-16, petiolules about 3.5 cm long.

Inflorescence a lax, much-branched axillary panicle up to 17 cm long; flowers tetramerous, monoecious but with well-developed vestiges of those of the opposite sex with very little external differences between sexes. Calyx pale green, lobed almost to the base, lobes subcircular, about 1 x 1 mm, imbricate; petals cream, free, oblong-ovate, 4 x 2.5 mm, contorted in bud; orange disk around the ovary.

Fruit an upright, almost spherical, woody capsule, 4-6 cm in diameter, opening by 4 valves from the apex (a distinction from *K. ivorensis*, which is closely related but has 5 valves). Seeds brown, 6 or more per cell, broadly transversely ellipsoid to flat, about 25 x 18 mm, margins narrowly winged. The specific name means 'of Senegal', which is where the type specimen was collected.

BIOLOGY

K. senegalensis is insect pollinated. Flowering shortly before or early in the rainy season, the fruit apparently remaining on the tree throughout the dry season. When the fruit ripens, the colour changes from grey to black. Begins to bear seed when the tree is 20-25 years old. Seed may be dispersed up to 100 m by prevailing winds.



Khaya senegalensis flower (Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)



(Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)



Khaya senegalensis foliage (Joris de Wolf, Patrick Van Damme, Diego Van Meersschaut)

Khaya senegalensis

(Desr.) A. Juss.

khaya wood, African mahogany

Meliaceae

ECOLOGY

K. senegalensis occurs in riverine forests and is scattered within the higher-rainfall savannah woodlands. In moister areas, *K. senegalensis* is found on uplands, but it is restricted to riparian habitats or stream bottoms that extend into the savannah in the drier portions of the range. During the 1st year, the seedling develops a strong, deep taproot, which makes it the most drought hardy of all the *Khaya* species. It is also very resistant to flooding and can be considered for planting on swampy soils. Moderately shade tolerant. Except where selectively removed by logging, dry-zone mahogany remains a dominant species in most of its range.

Successful plantations of dry-zone mahogany in other parts of the world have generally been in areas with short dry seasons and high rainfall.

BIOPHYSICAL LIMITS

Altitude: 0-1800 m, Mean annual temperature: 24.5-31.5 deg. C, Mean annual rainfall: 400-1750 mm

Soil type: Tolerant to a wide range of soil conditions, from neutral to very strongly acidic and from very well-drained, coarse sandy loam to somewhat poorly drained clay. Prefers neutral, deep, sandy loam soil that is well drained. Such fertile conditions are often found in alluvial soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Cameroon, Central African Republic, Chad, Cote d'Ivoire, Equatorial Guinea, Gambia, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda
Exotic: Australia, Cuba, India, Indonesia, Puerto Rico, Singapore, South Africa, Vietnam



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

Khaya senegalensis

(Desr.) A. Juss.

khaya wood, African mahogany

Meliaceae

PRODUCTS

Fodder: Young leaves contain fairly large amounts of digestible crude protein. The leaves are used as a fodder for cattle and camels, although they are not very palatable.

Fuel: Only limited quantities are available for fuelwood, and trees of larger dimensions are undesirable because of difficulties with splitting and crosscutting. Hence, even if fuelwood is in short supply, larger-diameter sections are not utilized. The gross energy value of the wood is 19 990 kJ/kg.

Fibre: The wood is used in West Africa for pulp.

Timber: One of the hardest African mahoganies and the hardest of the Khaya species. It is widely used on a commercial scale, particularly in West Africa. The wood density ranges from 0.6 to 0.85, depending on locality. The sapwood is pinkish-tan in colour and the heartwood an attractive dark red-brown. It is moderately resistant to fungi, insects and termites. The sapwood is moderately resistant to preservation treatment, the heartwood extremely so. The timber saws well except for a tendency to be woolly in cross grain. It seasons rapidly, with little degradation; however, tension may occasionally cause splitting and warping. It is favoured for furniture, high-class joinery, trim and boat building. The wood is also used locally for railroad ties, flooring, turnery and veneer. Because of its decorative appearance, the wood of *K. senegalensis* is a very popular timber.

Gum or resin: The presence of oleoresin in the vessels of Khaya species accounts for the durability of the timber and its resistance to insect and fungal attack.

Tannin or dyestuff: The bark is used in tanning.

Lipids: The seeds have an oil content of 67% and are rich in oleic acid (66%). The oil is used in West Africa for cooking.

Poison: *K. senegalensis* is used in Cote d'Ivoire as an ingredient in arrow poison. Bark scales are sometimes used as a fish poison.

Medicine: The very bitter bark has a considerable reputation in its natural range as a fever remedy. The bark is also used as a vermifuge, taenicide, depurative and for treating syphilis. Bark extract is used for treating jaundice, dermatoses, scorpion bite, allergies, infection of the gums, hookworm, bleeding wounds (disinfectant), and as a laxative. Seeds and leaves are used for treating fever, headache; roots against sterility, for the treatment of mental illness, against syphilis, leprosy and as an aphrodisiac. Crushed bark and seeds are regarded as emmenagogue. Bark also used in traditional veterinary practice, for example for cattle suffering from liver fluke, for ulcers in camels, donkeys and horses, and in horses for internal ailments associated with mucous diarrhoea.

Other products: Wood ashes are used for conserving millet seed.

SERVICES

Reclamation: It largely reproduces itself from suckers and is recommended for reforestation purposes.

Ornamental: Dry-zone mahogany is an important urban tree in West Africa.

Khaya senegalensis

(Desr.) A. Juss.

khaya wood, African mahogany

Meliaceae

TREE MANAGEMENT

Strategies to obtain sufficient regeneration on poor sites should include liberation cutting of stands with advanced regeneration. Common spacings on cleared and prepared sites are 5 x 5 m and 5 x 10 m. A spacing of 5 x 20 m is used when planting in riparian forests. Hoeing and weeding are recommended at the onset of the dry season. *K. senegalensis* coppices well. Although older trees are resistant to fire, seedlings are fairly susceptible.

GERMPLASM MANAGEMENT

Seed storage behaviour is intermediate; seeds tolerate desiccation to 6% mc; 81% germinate following 3 years of subsequent storage at 2 deg. C; seeds tolerate desiccation to 5.7% mc (in equilibrium with 54.4% rh), little loss (about 3%) on desiccation to 2.1% mc (in equilibrium with 11.8% rh at 20 deg. C), complete loss in viability following 24 months of hermetic storage at 10 deg. C, 0 deg. C and -20 deg. C with 10% mc; it appears to 0 deg. C is optimal storage temperature for seeds at 2.2-5.6% mc, whereas -20 deg. C is damaging. Normally there are 6000-7000 seed/kg, but occasionally as few as 3000.

PESTS AND DISEASES

In its natural range, *K. senegalensis* can be severely attacked by shootborers (*Hypsipyla robusta*). Such attacks may result in misshapen trees with no timber value. The sapwood is susceptible to attack by long-horn beetles and powder post beetles (*Lyctus* spp.). A bacterial disease of dry-zone mahogany in the Sudan caused by *Xanthomonas khaye* results in rough, scabby leaf spots and knobby stem cankers.

Khaya senegalensis

(Desr.) A. Juss.

khaya wood, African mahogany

Meliaceae

FURTHER READING

Bokkestijn A, Francis JK. 1986. *Khaya senegalensis* Juss. Dry-zone mahogany. SO-ITF-SM-5. Rio Piedras, Institute of Tropical Forestry.

Eggeling. 1940. Indigenous trees of Uganda. Govt. of Uganda.

FAO. 1986. Some medicinal plants of Africa and Latin America. FAO Forestry Paper. 67. Rome.

Hong TD, Linington S, Ellis RH. 1996. Seed storage behaviour: a compendium. Handbooks for Genebanks: No. 4. IPGRI.

Katende AB et al. 1995. Useful trees and shrubs for Uganda. Identification, Propagation and Management for Agricultural and Pastoral Communities. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

Sahni KC. 1968. Important trees of the northern Sudan. United Nations and FAO.

Sosef MSM, Hong LT, Prawirohatmodjo S. (eds.). 1998. PROSEA 5(3) Timber trees: lesser known species. Backhuys Publishers, Leiden.

Vogt K. 1995. A field guide to the identification, propagation and uses of common trees and shrubs of dryland Sudan. SOS Sahel International (UK).

von Maydell HJ. 1986. Trees and shrubs of the Sahel - their characteristics and uses. GTZ 6MBH, Eschborn.

SUGGESTED CITATION

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 *Agroforestry Database: a tree reference and selection guide* version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)