Eucalyptus robusta

Smith

Myrtaceae

swamp mahogany

LOCAL NAMES
English (white mahogany,swamp messmate,swamp mahogany,robusta eucalyptus,robusta,red gum,brown gum,beakpod eucalyptus,Australian brown mahogany); Swahili (mkaratusi); Trade name (swamp mahogany)

BOTANIC DESCRIPTION
Eucalyptus robusta is a tree normally attaining heights of 25-30 m and diameters of 1-1.2 m (giant specimens as tall as 55 m and with a trunk of 25 m are found in Hawaii); trunk typically straight and branch free for about half the height of the tree; bark grey or brown, and almost reddish-brown beneath the surface, rough and deeply furrowed, about 2.5-4 cm thick, somewhat soft and spongy, fibrous, with long, scaly ridges, and persistent to the smaller branches; inner bark white and slightly bitter. Trees growing in the open have crowns with long, spreading, irregular and brittle branches, forming a dense canopy; in closely spaced plantations the branches are almost erect so that little crown spread occurs. In plantations in humid climates, some of the trees form aerial roots on the main trunk as far as 6 m above the ground.

Leaves alternate with yellow or pinkish-tinged petioles 2-3 cm long; leaf blades broadly lance shaped, 10-18 x 3-6 cm, sharply pointed at the tip, thick, stiff, leathery, glossy, dark green on topside, paler, light green underneath, with fine parallel venation making angles of 50-60 degrees with midrib; leaves aromatic and when crushed have a spicy, resinous odour.

Axillary umbels of 5-10 cream-coloured, stalked flowers arise from leaf bases; flower buds pear shaped, 12-20 x 7-10 mm; flowers about 3 cm across, with numerous threadlike stamens and oblong anthers.

Fruits cylindrical to cup shaped, 12-15 x 10-12 mm, with 3 or 4 valves sunken below the rim through which the seeds are emitted; the dark green capsules usually remain on the tree for 2 years; seeds dull, light-brown, 1-2 mm long.

The genus Eucalyptus was described and named in 1788 by the French botanist l'Héritier. The flowers are protected by an operculum, hence the generic name, which comes from the Greek words 'eu' (well), and 'calyptos' (covered). The species name comes from the Latin word 'robustus' (robust), but the allusion is obscure. The common name 'mahogany' refers to the similarity of the timber to that of a Central American species, Swietenia mahogani.

BIOLOGY
Under optimal conditions, E. robusta begins flowering by the end of its 3rd growing season. More commonly, trees begin flowering when they are 5 years old. The flowers are insect pollinated. In Australia, flowering occurs from May to July, while in more tropical areas, such as Hawaii and Puerto Rico, flowers may appear at almost any time of the year. Flowering is protandrous, and the fruits mature 5-7 months after flowering. Seed dispersal is largely by wind and may begin within 6 weeks after the capsule ripens.

Habit at Kula, Maui, Hawaii (Forest and Kim Starr)

Habit at Kula, Maui, Hawaii (Forest and Kim Starr)

Cylindrical fruit flattened peduncles at Hobdy collection
Maui, Hawaii (Forest and Kim Starr)

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ECOLOGY
E. robusta naturally occurs from sea level to 100 m above sea level, mainly on wet soils and freshwater swamps. It can maintain itself in valley bottoms and swamps. However, the tree does not prefer these conditions and, if artificially situated on better soils on slopes outside the swamps, it grows much faster.

Remarkably, E. robusta adapts to varied conditions, from equatorial regions with maximum temperatures of about 35 deg. C, to more temperate climates where it can endure frost, provided the frosts are not severe. It grows well in plantations on good sites, but because of its ability to grow on both poorly drained and draughty locations, it is usually planted on adverse sites. It regenerates in areas flooded with fresh water, and its roots appear to be able to penetrate the heavy clays found in these conditions to reach the aerated soils below. The growth habit also helps it to establish on difficult but not necessarily flooded soils in localities widely different from its normal habitat. It can send out aerial roots from its trunk. It prefers a mild dry season, up to 4 months only. It recovers well from fire, sending out shoots from relatively small branches a few centimetres in diameter.

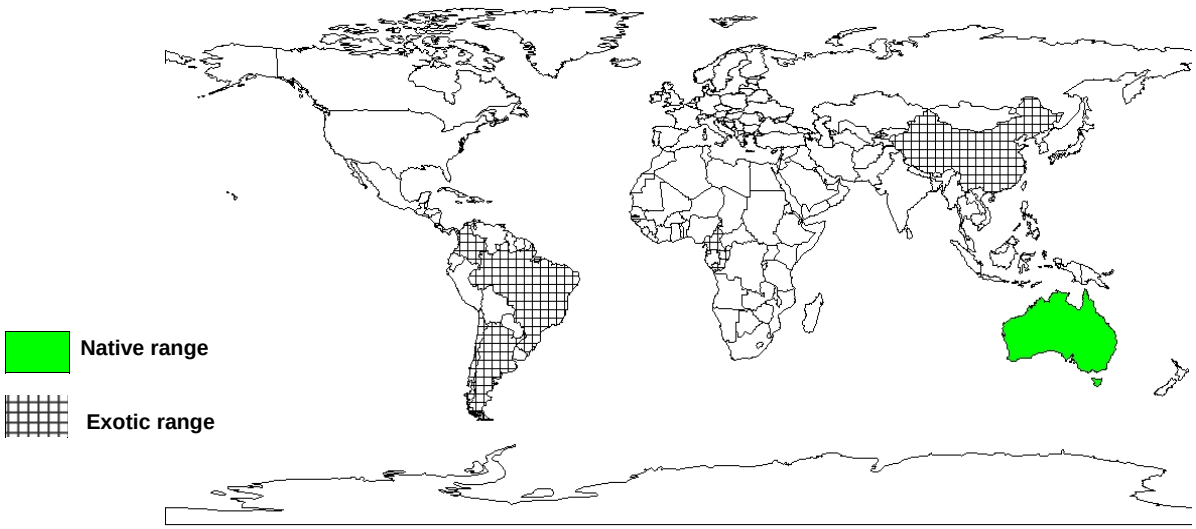
BIOPHYSICAL LIMITS
Altitude: 0-1600 m, Mean annual temperature: 3-13 to 24-35 deg. C, Mean annual rainfall: 1000-2000 mm

Soil type: It prefers stiff clays and leached sandy loams.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia

Exotic: Argentina, Brazil, Cameroon, Chile, China, Colombia, Comoros, Congo, Costa Rica, Democratic Republic of Congo, Ethiopia, Fiji, Honduras, Hong Kong, India, Kenya, Madagascar, Malawi, Malaysia, Mauritius, Mexico, Mozambique, Papua New Guinea, Paraguay, Philippines, Puerto Rico, South Africa, Sri Lanka, Taiwan, Province of China, Tanzania, Uganda, US, Zanzibar



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.

PRODUCTS
Apiculture: In many areas, E. robusta flowers provide significant forage for bees and honey production.

Fuel: E. robusta is widely used as firewood and for charcoal.

Fibre: The timber is used for pulpwood, but the pulp is dark reddish-brown and is not as good for this purpose as some other species of Eucalyptus. The bark must be removed from the stem before pulping. A comparison of the characteristics of E. robusta wood and kraft pulps with those of E. saligna shows that E. robusta can be used as a complementary raw material in commercial-scale pulp production.

Timber: The wood is light red to reddish-brown, coarse textured, moderately hard, strong and durable, with a density of 770 kg/m^3. It is difficult to season. It is used for general construction and for poles, fencing, and wharf and bridge work. Other uses include pallets, house siding, flooring, interior trim, and panelling. Because of its strength and durability, E. robusta is also commonly used for fence posts and gates.

Tannin or dyestuff: The gum contains about 30% tannin.

Essential oil: The essential oil yield is 1.7%, with the characteristic constituents being piperitone, rho-cymene, linalool, 1,8-cineole, terpinen-4-ol, citronellyl acetate and alpha-terpinol.

Medicine: E. robusta is reported to have significant antimalarial activity.

SERVICES
Erosion control: In Africa, the tree is sometimes used to stabilize dunes.

Shade or shelter: E. robusta has a dense crown and makes a good roadside tree. The large leaves are oriented much more in a horizontal plane than in most other Eucalyptus species, and this improves overhead shade. This species is suitable for planting in coastal areas as shelterbelts. It is intolerant of salt spray but is quite wind firm. It is often used as a windbreak, even though the trees often become deformed by continuous exposure to wind.

Ornamental: The fast growth, large leaves and showy flowers make E. robusta a suitable candidate for use as an ornamental.

Other services: Because of their rapid growth, Eucalyptus species use a relatively large amount of water and can be used as pumps to lower the water table and help dry wet sites. In Uganda, E. robusta has been very successful in drying swampy ground, making it possible to grow the less flood-tolerant species like E. saligna on the same site.

TREE MANAGEMENT
Vegetative cover must be removed before seedlings are planted out. Planted seedlings are susceptible to competition and shading, and generally require 2 weedings in the first 6 months. The species coppices well up to the age of 25 years. The length of rotation is largely determined by the product desired. For fuelwood, the tree is sometimes grown in plantations on a 4-5 year rotation. For pulpwood an 8-10 year rotation is appropriate, and saw logs can be produced in plantations or natural stands using 30-60 year rotations. Most E. robusta plantations are regenerated from coppice shoots. The tree is exceedingly tolerant to prolonged flooding, so it is extensively planted in swampy areas and along rivers.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox; hermetic storage at 4 - 6% mc and subzero temperatures is recommended; viability can be maintained for 4 years in hermetic storage at room temperature; seeds will retain much of their germination capacity for at least 10 years even if they are stored in uncontrolled conditions; seed size varies considerably. A single gram of seed may contain 140-1000 seeds, although 400-600 seeds/g is most common; usually only 45-80% of the seeds are viable.

PESTS AND DISEASES
A leaf-eating beetle, Maecolaspis favosa, has reportedly caused serious damage to young seedlings and coppice shoots in Florida but does not affect older trees. Chrysolampra flavipes, a pest of tea, is reported to attack the tree. The chrysomelid peels off the bark of the young twigs and damages the inner angle at the petiole. Severely damaged branches suffer die-back.

In Sao Paulo, Brazil, E. robusta has been attacked by the bacterium Phytomonas tumifaciens. This organism has been detected in plants originating in the USA and Chile. The most common injuries in swamp plantations in Uganda are windthrow and root rot. The tree when young is also susceptible to attack by the gonipterus beetle and termites. In Florida, the fungus Cylindrocladium scoparium causes serious loss in seedlings. In Puerto Rico, the tree suffers from Polyporus schweinitzii and Fomes spp. Another fungus, Botryosphaeria ribis, causes cankers on the trunk.

FURTHER READNG

Boland DJ, Brophy JJ, House APN. 1991. Eucalyptus leaf oils, use, chemistry, distillation and marketing. ACIAR/CSIRO. INKATA Press. Melbourne.

Boland DJ. et. al. 1985. Forest trees of Australia. CSIRO. Australia

FAO. 1979. Eucalypts for Planting FAO Forestry Series No. 11.

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

National Academy of Sciences. 1983. Firewood crops. Shrub and tree species for energy production. Vol. 2. National Academy Press. Washington DC.

North American Forestry Commission. 1988. Useful Trees of Tropical North America. Publication No 3.

Soerianegara I, Lemmens RHMJ (eds.). 1993. Plant Resources of South-East Asia. No. 5(1): Timber trees: major commercial timbers. Backhuys Publishers, Leiden.

Williams R.O & OBE. 1949. The useful and ornamental plants in Zanzibar and Pemba. Zanzibar Protectorate.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/af/treedb/)