

Eucalyptus deglupta

kamarere

Blume

Myrtaceae

LOCAL NAMES

English (mindanao gum,deglupta); Filipino (Dinglás,banikag,bagras,amamanit); Indonesian (leda,galang,aren); Pidgin English (kamarere); Trade name (kamarere); Vietnamese (b[aj]ch d[af]n v[or] d[aa]fjy)

BOTANIC DESCRIPTION

Eucalyptus deglupta is a huge evergreen tree of up to 60 (max. 75) m tall; bole generally of good form, 50-70% of the tree height, up to 240 cm in diameter, sometimes with buttresses 3-4 m high; bark smooth, yellow, brown, and purple, but green after flaking; twigs 4-sided, often with 4 longitudinal wings.

Juvenile leaves opposite, ovate to lanceolate; adult leaves opposite to subopposite, rarely alternate, shortly petiolate, held almost horizontal on branches, ovate to ovate-lanceolate or acuminate, thicker than juvenile leaves, 7.5-15 (max. 20) x 5-7.5 (max. 10) cm.

Flowers 3-7 umbels in terminal or axillary panicles 5-20 x 5-18 cm; pedicels terete or slightly angular, about 5 mm long; young buds small, green with double opercula; developed buds pale green or cream, globular, apiculate, 0.2-0.4 x 0.2-0.5 mm, operculum hemispherical, apiculate and wider than long; flowers with many white to pale yellow stamens 2-10 mm long, strongly reflexed in the unopened bud; anther dehiscing by separate slits.

Fruit pedicellate, hemispherical, with 3-4 valves, thin, deltoid, exerted to 2 mm, making the capsule appear globular, 3-5 x 3-5 mm, and disc very narrow; mature fruits brown to dark brown, containing 3-12 well-formed seeds per valve; seeds minute, brown, flattened, with a small terminal wing.

The genus *Eucalyptus* was described and named in 1788 by the French botanist l'Héritier. The flowers of the various *Eucalyptus* species are protected by an operculum, hence the generic name, which comes from the Greek words 'eu' (well), and 'calyptos' (covered).

BIOLOGY

Flowering may occur within the 1st year but more often it takes place after 2 years and annually thereafter. Flowering can occur in all months of the year, depending on the locality. In Indonesia, *E. deglupta* flowers the whole year and bears fruit at the beginning of the rainy season. In New Britain, seeds of *E. deglupta* are often dispersed by rivers. The flooding rivers in the wet season deposit the seeds mixed with humus on uncolonized alluvium in full sunlight. This constitutes ideal conditions for germination.



E. deglupta, green bark type. (David Boshier)



E. deglupta, brown bark type. (David Boshier)



E. deglupta tree as ornamental. (David Boshier)

ECOLOGY

E. deglupta requires full overhead light for development, and dense stands are commonly found along rivers where it has colonized newly formed banks and non-stagnant river flats. It is also found on sites that have been cleared or disturbed in some way, for example, by landslides, volcanic eruptions, or shifting cultivation. *E. deglupta* generally reproduces in pure stands. Occasionally, however, it forms an association with *Octomeles sumatrana*, an aggressive secondary species. As stands pass maturity, they are invaded by primary forest species such as *Pometia pinnata*, *Dracontomelum mangiferum*, *Celtis* spp., and *Pterocarpus indicus*.

E. deglupta is the only species of *Eucalyptus* that is adapted to lowland and lower montane rainforest habitats. It does not grow naturally in areas with a pronounced dry season but occurs in those where the annual rainfall is very high and the monthly rainfall usually exceeds 150 mm. Because of this, it is widely planted throughout the wet tropics. *E. deglupta* does not withstand prolonged flooding, is highly sensitive to fires and, although it may grow in cool environments, it does not tolerate frost.

BIOPHYSICAL LIMITS

Altitude: 0-1800 m, Mean annual temperature: 23-31 deg. C, Mean annual rainfall: 2500-5000 mm

Soil type: It can grow successfully on coarse-textured sands and loamy soils, volcanic ash and limestone-derived soils (pH 6-7.5). Best growth occurs on deep, moderately fertile, well-drained, sandy alluvial loams with adequate soil moisture.

DOCUMENTED SPECIES DISTRIBUTION

Native: Indonesia, Papua New Guinea, Philippines

Exotic: Brazil, Congo, Costa Rica, Cote d'Ivoire, Cuba, Fiji, Honduras, Malaysia, Puerto Rico, Samoa, Solomon Islands, Sri Lanka, Taiwan, Province of China



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

Fuel: *E. deglupta* is used to a limited extent for firewood and charcoal. However, it is normally considered too valuable for firewood. Trees more than 15 years old yield good charcoal. The energy value of the wood is 18 500-21 100 kJ/kg.

Fibre: Around the world most *E. deglupta* plantations are meant for pulp production. The wood makes a strong sulphate pulp that can be bleached to a high brightness. Kraft pulping of *E. deglupta* wood gives a yield of 50%, and a pulp of good brightness and satisfactory handsheet strength properties. The wood is also used for particleboard, hardboard and wood-wool board.

Timber: *E. deglupta* wood is light to dark brown with a slight lustre, more like coarse-grained rainforest wood than an eucalypt. It is of moderate strength but is not durable. Its density is 390-810 kg/cubic m at 15% mc. Wood of *E. deglupta* works well with hand and machine tools, although it has a slight tendency to tear out in machining and boring and to slight chipping of sharp edges in turning. The heartwood is usually resistant to preservative treatment, and the sapwood permeable. But in plantation-grown material the uptake of copper-chrome-arsenate salts may be fair. Plantation-grown wood of *E. deglupta* is significantly easier to impregnate than wood from natural forest. The wood is useful for furniture, moulding, flooring, construction lumber, boat building, veneer and plywood. In Papua New Guinea, *E. deglupta* is one of the major export timbers.

Essential oil: The aromatic oils of *E. deglupta* have been characterized but they occur in such small quantities (0.2% in the leaves) that they are not of commercial importance.

SERVICES

Reclamation: *E. deglupta* is capable of colonizing land eroded by landslides and areas of recent volcanic activity. It has been used in reforestation and in enriching planting trials in logged-over forest, where it has shown considerable potential.

Ornamental: Due to its very attractive bark and quick growth, the species is frequently planted as an ornamental tree.

TREE MANAGEMENT

Growth is usually rapid, and subsequent management depends on the purpose for which the trees are being grown. Pulpwood production is the common object of management, and therefore short rotations with no thinning are the rule. For example, in the Philippines the spacing most commonly used is 4 x 4 m and the rotation 12 years with no thinning, and in Papua New Guinea the spacing varies from 3 x 3 m to 4 x 4 m, for a rotation of 7-10 years. Plantations grown for saw logs will require thinning. A new regime for saw log production has been introduced in Papua New Guinea of a 25-year rotation, with thinning at the ages 5, 10 and 15 years, the last of which reduces the stocking rate to 99 stems/ha.

The annual volume increment in plantations is 15 cubic m/ha, but occasionally it is as much as 50 cubic m/ha. At the age of 25 years, the trees reach an average height of 42 m and an average bole diameter of 40 cm.

Good weed control (usually a 1 m strip along each planting line) is essential, and weeding 4-5 times each year for 2 years may be necessary before site occupancy is achieved. *E. deglupta* does not coppice vigorously.

GERMPLASM MANAGEMENT

Seed storage behaviour is orthodox. The seeds are short lived at room temperature, but longevity is maintained in hermetic storage at 3-5 deg. C and -20 deg. C. There are 2,000,000 seeds/kg.

PESTS AND DISEASES

Termites are the most serious pests in both natural stands and plantations. Young trees are sometimes damaged by the cossid moth and a ring bark borer. The coreid bug causes tip die-back of young trees. In Papua New Guinea and the Philippines, a stem borer and a bark borer (*Agrilis* spp.) have attacked trees of some provenances. The wood, particularly the sapwood, is liable to termite and lyctus attack and to marine borers.

In the nursery, *E. deglupta* seedlings are susceptible to damping-off. Regular application of a fungicide can control this problem. Heart rot is sometimes found in older trees of *E. deglupta* but is unlikely to be a problem in trees grown on a short (e.g. 10-year) rotation. Field observations suggest that heart rot is more common in trees growing on less well-drained sites.

FURTHER READNG

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

FAO. 1986. Databook on endangered tree and shrub species and provenances. FAO Forestry Paper 77. FAO, Rome.

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.

Noad T, Birnie A. 1989. Trees of Kenya. General Printers, Nairobi.

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

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>)