

ICRAF AGROFORESTRY TREE DATABASE

Species identity

Taxonomy

Species name: *Eucalyptus camaldulensis*

Authority: Dehnh.

Family name: Myrtaceae

Synonyms

Eucalyptus longirostris F. Muell. ex Miq.

Eucalyptus rostrata Schlecht.

Eucalyptus camaldulensis Dehnh. var. *brevirostris* (F. Muell.) Blakely

Local names

key bahir zaf (Amharic); ban, kafur (Arabic); pylon-chantha (Burmese); long beak eucalyptus, murray red gum, red gum, river gum, river red gum, red river gum (English); eucalyptus rouge, eucalyptus (French); Rotgummibaum, roter eukalyptus (German); ekaliptus (Indonesian); Eucalipto rostrato (Italian); kalitunsi (Luganda); Eucalipto rojo, eucalipto (Spanish); mkaratusi (Swahili); yukhalip (Thai); keih-kelamitos (Tigrigna); river red gum (Trade name); b[aj]ch d[af]n [us]c, pré;ng khchâl slök sâ, bajch dafn usc (Vietnamese)

Botanic description

Eucalyptus camaldulensis commonly grows to 20 m tall, occasionally reaching 50 m, with a trunk diameter of 1 (max. 2) m; in open formations has a short, thick bole and a large, spreading crown; in plantations has a clear bole of 20 m with an erect, lightly branched crown; bark smooth, white, grey, yellow-green, grey-green or pinkish grey, shedding in strips or irregular flakes; rough bark occupies the 1st 1-2 m of the trunk.

Leaves grey-blue, alternate, drooping, 8-22 cm long, 1-2 cm wide, often curved or sickle shaped, tapering, short pointed at base.

Inflorescence axillary, solitary, 7-11 flowered; flower buds white, globular-rostrate or ovoid-conical; operculum hemispherical, rostrate or conical, 4-6 x 3-6 mm, obtuse.

Fruit very small capsules at the end of thin stalks, 5-8 mm, valves 4, containing minute seeds.

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 is from the Greek words 'eu' (well) and 'kalyptos' (covered). The specific epithet honours Count Camaldoni in whose garden *E. camaldulensis* was planted in 1803.

Ecology and distribution

History of cultivation

Taken from its native Australia in 1803, *E. camaldulensis* was planted in the garden of the Count Camaldoni, for whom it is named. *E. camaldulensis* is one of the most widely distributed *Eucalyptus* species and is probably the world's most widely planted tree in arid and semi-arid lands. It is planted in many tropical and subtropical countries and is naturalized in many areas.

Natural habitat

Its natural distribution covers most of Australia's mainland. Under natural conditions, *E. camaldulensis* occurs typically along watercourses and on floodplains. Very occasionally in southern Australia it extends to hills or ranges, usually in open forest and woodland. It grows under a wide range of climatic conditions, from temperate to hot and from humid to arid zones. The length of the dry season may vary from 0 to 8 months, and the rainfall distribution from a winter maximum in southern regions to a monsoon type with summer rains in northern areas.

Geographic distribution

Native: Australia

Exotic: Albania, Argentina, Bangladesh, Brunei, Cambodia, Eritrea, Ethiopia, Greece, Indonesia, Israel, Italy, Kenya, Laos, Malaysia, Malta, Morocco, Myanmar, Namibia, Nepal, Nigeria, Pakistan, Philippines, Spain, Sudan, Tanzania, Thailand, Uganda, United Kingdom

Biophysical limits

Altitude: 0-1500 m

Mean annual temperature: 3-22 to 21-40 deg. C

Mean annual rainfall: 250-2500 mm

Soil type: Grows best on deep, silty or loamy soils with a clay base and accessible water table. Tolerates waterlogging and periodic flooding. It is one of the species found to be most tolerant to acid soils.

Reproductive biology

Time of flowering in natural stands depends on the geography of a given location.

Pollination is by insects such as blow flies, ants and bees, and by birds and small mammals.

Seeds ripen about 6 months later. *E. camaldulensis* does not develop resting buds and grows whenever conditions are favourable.

Propagation and management

Propagation methods

Seeds can be collected from mature trees before the capsules dehisce. No pretreatment is necessary; the optimum temperature for germination is 32 deg. C, but a wide range is tolerated. The germination rate is generally high and can reach almost 100%. The seeds germinate in 4-15 days and attain size ready for planting out in 4-6 months, depending on temperature and watering. Germination is epigeal, and seedlings have bilobed cotyledons. Seedlings are 1st planted in containers in the nursery. *E. camaldulensis* is suited to mass vegetative propagation. Cuttings from juvenile shoots root readily in about 30% of the genotypes.

Tree management

Seedling growth may exceed 3 m per year for well-adapted provenances on favourable sites. Spacing varies with management system, from community planting around homes, villages and roads to closely spaced commercial plantations, and depends on the end products required. Application of 100 g of NP or NPK (3:2:1) fertilizer to each tree at planting to assist establishment and early growth is common. Poor competition ability with weeds and the development of an open crown necessitate frequent weeding, up to 3 times a year, until the canopy closes 3-5 years after planting. A thinning of less than 700 stems/ha at 5 years provides posts, poles, fuelwood and pulpwood, leaving the better trees for the production of other products, such as sawn timber after 10 years. Coppices readily. Crown die-back during the dry season as a result of boron deficiency is prevalent in parts

of Africa, Asia and South America.

Germplasm management

Orthodox storage behaviour for 3-10 years; viability maintained for 4 years in hermitic storage at room temperature; viability maintained for several years in hermitic storage at 3 deg. C with 6-10% mc. A fully grown *E. camaldulensis* tree may produce a million or more seeds annually, and may continue so for a century (Lars Schmidt, 2000). There are 700 000-800 000 seeds/kg.

Functional uses

Products

Apiculture: *E. camaldulensis* is a major source of honey, producing heavy yields of nectar in good seasons. The honey is light gold and of reasonable density with a distinctive flavour. It has been marketed as a straight line for several years. It crystallizes readily. The tree is particularly valuable for building up bee populations, especially when pollen from the ground flora is available to provide variety.

Fuel: The firewood is suitable for industrial use in brick kilns but is not preferred for domestic use because it is too smoky and burns too fast. However, it makes good-quality charcoal.

Fibre: *E. camaldulensis* is used for pulp and paper production. It is also planted for hardboard, fibreboard and particleboard.

Timber: Because of its great strength and good durability, the wood is suitable for many structural applications, for example, railway sleepers, poles, posts, floorings, wharves, ship building and heavy construction. The density of the wood is 900-980 kg/cubic m at 12% mc. In Pakistan, it is a raw material for the chipboard industry. Estimates show that in 1993, 800 tonnes of raw material was from this species (Charles and Naughton, 1994).

Tannin or dyestuff: The bole yields a gum that can be used as a dye.

Essential oil: Some tropical provenances of *E. camaldulensis* are rich in 1,8-cineole leaf oil and are potential commercial sources of medicinal-grade eucalyptus oil.

Medicine: The oils are used as an inhalant with steam and other preparations for relief of colds and influenza symptoms. Because of its refreshing odour and its efficiency in killing bacteria, the oil is also used as an antiseptic.

Other products: The bole has some potential for shiitake mushroom (*Lentinus edodes*) cultivation.

Services

Shade or shelter: *E. camaldulensis* is widely planted for shade and shelter. In Sudan it is planted to protect crops from blowing sand.

Ornamental: Its graceful form is attractive for avenues and gardens. It is practicable by judicious trimming to shape it to the requirements.

Intercropping: With its light crown, *E. camaldulensis* is well suited for growing in arable fields. Intercropping maize with trees planted at 5 x 5 m gives satisfactory yields.

Pests and diseases

Insects such as termites and aphids and rodents may be troublesome to the tree, and both physical and chemical measures are used to control them. Young trees and those weakened by drought can be badly infected by moth larvae, eucalyptus snout beetle, termites and eucalyptus borer. In the nursery, *E. camaldulensis* is susceptible to various fungi causing damping-off and leaf diseases.

Bibliography

Albrecht J. ed. 1993. Tree seed hand book of Kenya. GTZ Forestry Seed Center Muguga, Nairobi, Kenya.

Mbuya LP et al. 1994. Useful trees and shrubs for Tanzania: Identification, Propagation and Management for Agricultural and Pastoral Communities. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

Bekele-Tesemma A, Birnie A, Tengnas B. 1993. Useful trees and shrubs for Ethiopia. Regional Soil Conservation Unit (RSCU), Swedish International Development Authority (SIDA).

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).

Webb DB, Wood PJ, Henman GS. 1984. A guide to species selection for tropical and sub-tropical plantations. Tropical Forestry Papers No. 15, 2nd edition. Commonwealth Forestry Institute, Oxford University Press.

Hocking D. 1993. Trees for Drylands. Oxford & IBH Publishing Co. New Delhi.

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

Hills WE, Brown AG. 1984. Eucalyptus for wood production. CSIRO/Academic Press. Sydney.

Chingaipe TM. 1985. Early growth of *Eucalyptus camaldulensis* under agroforestry conditions at Mafiga, Morogoro, Tanzania. *Forest Ecology and Management*. 11:241-244.

ICRAF. 1992. A selection of useful trees and shrubs for Kenya: Notes on their identification, propagation and management for use by farming and pastoral communities. ICRAF.

Faridah Hanum I, van der Maesen LJG (eds.). 1997. Plant Resources of South-East Asia No 11. Auxillary Plants. Backhuys Publishers, Leiden, the Netherlands.

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

Goldstein M. et. al. 1984. The Macdonald guide to trees. Macdonald & Co. Ltd.

Luna R K. 1997. Plantation trees. International Book Distributors.

Clemson A. 1985. Honey and pollen flora. Inkata Press, Melbourne.

Bein E. 1996. Useful trees and shrubs in Eritrea. Regional Soil Conservation Unit (RSCU), Nairobi, Kenya.

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

Doran CJ, Turnbull JW (eds.). 1997. Australian trees and shrubs: species for land rehabilitation and farm planting in the tropics. ACIAR monograph No. 24, 384 p.

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

Erkkila A, Harri S. 1992. *Silva Carelica* Forestry in Namibia 1850-1990. University of Joensuu.

Roshetko JM and Evans DO. 1997. Domestication of Agroforestry trees in Southeast Asia. Yogyakarta, Indonesia.

Lanzara P. and Pizzetti M. 1978. *Simon & Schuster's Guide to Trees*. New York: Simon and Schuster

Charles R H and Naughton GG. 1994. Using industrial wood markets to sustain farm forestry: the Pakistan Experience. In: Raintree JB and Hermina AF (eds.). *Marketing multipurpose tree products in Asia*. Proceeding of an international workshop. pp 145-151.

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