Rhizophora mucronata

Poiret

Rhizophoraceae

true mangrove, bakauan

LOCAL NAMES

Burmese (pyoo); English (true mangrove); Filipino (bakßuan); Indonesian (bakau bakau hitam); Javanese (dyankar,bako); Malay (bakau hitam,bakau kurap,bakau jangkar); Thai (phangka,kongkang,kon gkang bai yai); Trade name (true mangrove,bakauan); Vietnamese (duoc rung cam,duoc bop,dung)

BOTANIC DESCRIPTION

Rhizophora mucronata is a tree up to 27(-30) m tall and with trunk 50-70 cm in diameter; taproot usually abortive; lateral roots numerous, developed from base of the trunk, much branched, usually called stilt roots, hoop or pile-like, supporting the tree; hanging air-roots are sometimes also produced from the lower branches; stem in closed forest cylindrical, or developing a straggling or semi-prostrate habit especially in unfavourable conditions; bark almost black or reddish, rough or sometimes scaly, with prominent, horizontal cracks almost encircling the stem.

Leaves leatherly, broadly elliptic to oblong-elliptic, (8.5-)11-18(-23) cm x 5-10.5(-15) cm, with very distinct black dots on the undersurface, tapered at both ends and tipped with a fine spine, glossy green above and paler beneath; petiole 2.5-5.5 cm long; stipules large, 5.5-8.5 cm long, pinkish or reddish, sticky.

Inflorescences axillary, 2 or 3 times forked, rather loosely (1-)3-5(-12)-flowered; peduncles 2.5-5 cm long; flowers with 4-8 mm long pedicels and united, cup-shaped bracteoles at the base; calyx deeply lobed, 13-19 mm long, pale yellow or almost white; petals lanceolate, 9 mm long, light yellowish, densely hairy along the margins, sparsely hairy on the back; stamens 8, sessile, equal, anthers 6-8 mm long; ovary semi-inferior, free part high conical, 2.5-3 mm high, style very short, 0.5-1.5 mm long, obscurely 2-lobed.

Mature fruit an elongately ovoid berry, 5-7 cm x 2.5-3.5 cm with hardly contracted apex and often rugose base, dull brown-green.

Seedlings with cotyledons 2-4 cm protruding from the fruit; hypocotyls hanging, cylindrical, 36-64(-over 100) cm x 1.8-2.5 cm, tuberculate, usually straight, gradually narrowed upwards into a hard, shrap point.

One should keep in mind that, at least in Malesia, botanical information on R. mucronata can often also be applied to a closely allied, also common, widely distributed species R. apiculata Blume. The latter species can be distinguished from R. mucronata in the field by some easily observed characters. The bark is grey, almost smooth, with vertical fissures. Inflorescences are shorter, fork only once, and are always 2-flowered. Seedling hypocotyls are usually less than 30 cm long, smooth. In western Malaysia and west from New Guinea a few specimens occur with characters intermediate between R. mucronata, R. apiculata and a third species, R. stylosa Griffith. Hybridization might occur in nature between these species.

BIOLOGY

Rhizophora is usually wind-pollinated. The flowers are bisexual, self-compatible and therefore may be able to self-pollinate. Insects (e.g. bees) have been observed sometimes visiting flowers to look for pollen.

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ECOLOGY

Plants of R. mucronata are most profusely developed, generally gregariously, on the banks of tidal creeks, in estuaries and on low coastal areas flooded by normal, daily, high tides. The trees of this species form a rather uniform, evergreen fringe to the mangrove forest. In certain favourable regions in Malesia they may occupy considerable large areas, sometimes associated with R. apiculata, sometimes forming almost pure stands. Communities of the two common species of Rhizophora can sometimes be identified at a glance by their different shades of green.

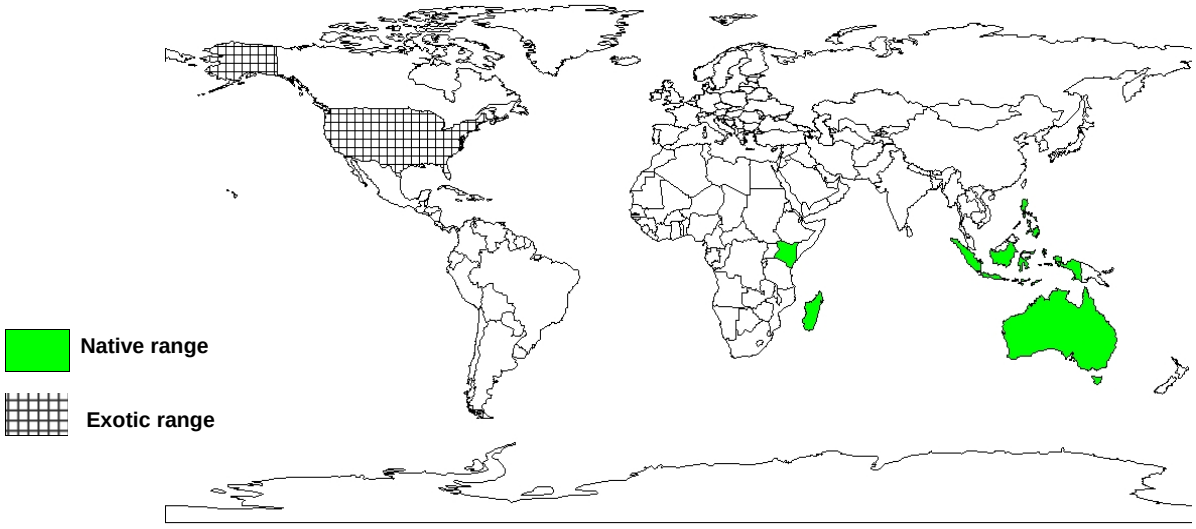
BIOPHYSICAL LIMITS

Soil types: In general they prefer deep soft mud rich in humus with suitable salinity and they are often found well developed in wet climates.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia, Indonesia, Kenya, Madagascar, Philippines

Exotic: US



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: The trees are important for producing good quality charcoal and for firewood. A great advantage of Rhizophora L. in the eyes of firewood dealers is that it can easily be split.

Timber: The wood shows a beautiful silver grain on radial section and the heartwood is dark orange-red. The use of the wood is limited because of its light weight, poor durability and small size of the trunk.

Tannin or dyestuff: In the Malesian Archipelago, the bark of mangrove trees (Chiefly R. mucronata and/or R. apiculata Blume) is an important source of tannin. It is used for tanning leather and to toughen and dye lines, nets, and ropes used by fishermen. According to laboratory investigations, mangrove tannin extracted from the bark could be used to produce adhesive for the manufacture of plywood and particle board.

Medicine: It is used also occasionally as medicine in cases of haematuria.

SERVICES
Soil improver: The bark, according to some chemical analyses, appears to contain mainly of lime (18%) and calcium carbonate (70%), and can be used as fertilizer.

Other services: The trees are also used for fish-traps.

TREE MANAGEMENT
The tree grows slowly. In Peninsular Malaysia it takes 35-40 years to reach up to 19 cm in diameter. A 40-years rotation is favourable. For tannin production the bark is removed by hand from living trees or from trees just felled for firewood, charcoal or timber. Its yield of bark is 23-27% of the volume or 18-20% of the weight.

GERMPLASM MANAGEMENT

PESTS AND DISEASES
Diseases: The radicles and hypocotyls of germinated R. mucronata seeds occasionally suffer from a peculiar disease which is characterized by a brown discolouration and dying of the tissues.

Pests: Crabs are great enemies to seedlings and will damage plantations. In the Philippines it has been reported that drying the seedlings for several days in the shade before planting can stave off crab attack. Beetles (e.g. from the family Scolythidae) may damage the root tips, resulting in deformed roots.

FURTHER READNG

CSIR. 1972. The Wealth of India: A dictionary of Indian raw materials and industrial products, Vol. IX. CSIR.

Hou D. 1992. Rhizophora mucronata Poiret. In Lemmens, R.H.M.J. & Wulijarni-Soetjipto, N. (Eds.): Plant Resources of South-East Asia. No. 3: Dye and tannin-producing plants. Prosea Foundation, Bogor, Indonesia. pp. 110-112.

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/)