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Bruguiera gymnorrhiza | Plantz Africa

Introduction



Description

Description



Tree up to about 10 m tall, but often less; crown conical at first but later more irregular; bark black, rough; with knee-roots. New growth green becoming grey, glossy, hairless.

Leaves opposite, crowded at the ends of branches, roughly elliptical, 60-120 x 20-60 mm, hairless, glossy apple green when young, becoming yellow with age; margins plain, not toothed or scalloped, slightly rolled under, tip pointed but without a spine, base narrowed, stalk up to 30 mm long; with interpetiolar stipules that fall early. (Interpetiolar stipules are small, triangular, leaflike outgrowths on the stem between and so at right angles to the opposite leaf stalks; they are usually a trademark of the coffee family, Rubiaceae, and

mangroves are one of the very few other groups of plants to have this feature.)

Flowers solitary, up to 40 mm long; petals and sepals 8-18, petals creamy white, falling with the stamens; sepals green in shade, pink in direct sun. Fruit a fleshy berry up to 25 mm long, germinating on the tree to form a ribbed, brown hypocotyl (incipient root) about 110 mm long. Trees grow slowly and are probably quite long-lived.



Conservation Status

Status

Mangrove habitats and their inhabitants are threatened almost wherever they are found by over-exploitation. In South Africa, *Bruguiera gymnorrhiza* is protected in terms of the National Forestry Act (and so a permit must be obtained before plants or plant parts are collected). However, the threats in this country are not yet severe enough for this tree to appear on a Red Data list.

Distribution and habitat

Distribution description



Black mangrove is one of the most widely distributed trees in the tropics, and occurs along the east coast of Africa from just north of East London (Eastern Cape) to Somalia, Madagascar and the Indian Ocean islands, the south Asian coast from Iran to China, north Australia and numerous tiny (and larger) islands in the Pacific. It grows on the seaward side of estuaries in mud, in places that are well watered and frost free.

It does not occur naturally in Hawaii, evidently because those islands are too far from anywhere for the propagules to reach by drifting. However, introduced plants have become naturalized there.

Derivation of name and historical aspects

History

Theophrastus of Eresus, writing in the first botany book ever, written about 330BC, repeats a tale told him by a Greek sailor who had been to the island of Serendip about a wonderful forest there that stood above ground at low tide, but was submerged at high tide (*Enquiry into Plants* IV. vii. 4). This mangrove swamp still exists, and still contains a population of *Bruguiera*, in Colombo harbour, Sri Lanka. The genus name commemorates one Jean Guillaume Bruguier(e)s (1750-1798), botanical artist and plant collector, who was sent by the French government to Madagascar, Mauritius, Rodrigues and Kerguelen Islands, and collected at the Cape in 1792. The specific qualifier comes from two Greek words meaning naked roots, and refers to the knee-roots that project above the mud of the swamp.

There are 15 genera and 120 species in the family Rhizophoraceae, of which four genera and 10 species are in southern Africa. Each of the tree mangrove genera in the family in southern Africa is represented by a single widespread species. The main centre of diversity of mangroves is in India, Malaysia, Indonesia and Australia, and so it is no surprise to discover that four of the six species of *Bruguiera* are to be found in Australia, and four (some different) in India.

Ecology

Ecology



It is one of the curious features of mangroves that the object one sees occupying the place of an apparently ripe fruit is neither fruit nor seed. Large numbers of fruits develop and most of these ripen successfully. But then the seed germinates in the fruit, and develops a long hypocotyl, so that what falls from the tree is better called a propagule (in effect, a germinating seedling). In the black mangrove the hypocotyl is about the size, shape and colour of a modest Havana cigar, and so not perfectly adapted to making the most of opportunities for rooting in the mud. In other mangroves, the hypocotyl develops in such a way that the weight is at one end, making it more likely that the propagule will land upright in the mud, with enough force to lodge securely against being swept away by currents and tides. If the propagule (of any mangrove) is swept out to sea, it will soon grow a few pairs of leaves, which act as sails while it is carried to another shore.

One of the major problems for any plant growing in the highly saline conditions of a mangrove swamp is how to get rid of excess salt. Black mangroves achieve this by depositing the salt in old leaves, which are eventually killed by the concentrated "refuse" they contain. The leaves go yellow and fall, taking the excess salt with them, and so visitors to a mangrove swamp will see healthy trees dropping leaves at any and all times of year. Almost as soon as a leaf falls, one of the crabs (*Uca* spp., and possibly others) in the swamp will quickly emerge, grab its prize and dash back to its hole, as these fallen leaves are a major item in the crabs' diet.



Another problem with being a mangrove is that their roots are in permanently waterlogged mud, but still need some air to survive. Different mangroves have evolved different structures to deal with this, such as the prop-roots of *Rhizophora* or the pencil-roots (pneumatophores) of *Avicennia*. In *Bruguiera*, the "breathing-roots" are knee-like structures projecting some 30 cm above the mud and supported on two or more roots. The top of each of these develops a callus-like tissue through which the necessary air exchange takes place.

A report from the Ryukyu Islands (Japan) suggests that *Bruguiera gymnorhiza* is bird-pollinated, which would make sense of the copious nectar secreted by the flowers. However, it seems that Black Mangroves on Inhaca Island, Mozambique, are pollinated by bees.

Other residents of local mangrove swamps include mud-prawns (*Upogebia africana*) and various snails, of which the most conspicuous is *Cerithidium decollata*. Some dozens of individuals of this species will be found half-a-metre and more above ground level on each tree trunk. Although crocodiles and sharks are reported from the waterways in mangrove swamps, probably the most dangerous inhabitant is *Anopheles gambiae*, one of the main mosquito vectors of malaria.

Uses

Use

Mangrove wood is well known for being waterproof, resistant to borers, tough and effectively indestructible. This makes it highly prized and adds enormously to human pressure on the swamps throughout its range.

Thus it was sad but not surprising on a recent (November 2002) visit to the mangrove swamps on Xefina Pequena Island (Maputo, Mozambique) that the only *Bruguiera* we saw was the skeleton of the boat we hired to reach the swamps. All the live trees had been felled for timber; in addition to making boats, poles are used to make fish traps and the frames of huts. In Malaysia, the wood is chipped for the manufacture of pulp and rayon, and fragments of wood are made into charcoal in many places. The bark is high in tannins, and so has been used for tanning. It also yields a black dye. In Hawaii, the flowers are used for making *lei* (flower necklaces, mostly these days draped around arriving tourists).

Growing *Bruguiera gymnorhiza*

Grow

Years ago, the then University of Durban-Westville had a row of large, decorative pots separating the walkway outside their herbarium from the lawn beyond. In these pots they grew Black Mangroves, and this seemed to be an ideal use and habitat for the trees. They need full sun to partial shade, lots of water and a relatively warm environment. In nature, companion plants are restricted pretty well to more mangroves and the occasional glasswort, but in a garden they could be planted with anything that enjoys warm, waterlogged soil.

Anyone wishing to repeat the success of Durban-Westville would be advised to start by waterproofing the inside of a suitably large (at least 1 m tall and not much less across the top) pot; the plastic sheeting used for dams would work a treat. Then fill the pot with black, compost-rich mud. Now comes the most difficult part of all: finding a legal source of plants to grow, as most swamps in KwaZulu-Natal are in nature reserves. Assuming you manage this, plant your tree carefully in the mud, remembering that the young growth is very brittle, and keep it well watered. Many years ago Prof. G.S. Naidoo showed that black mangroves actually grow better on tap water than sea-water, so there is no need to make up exotic mixtures to keep the trees happy. Your trees will grow very slowly, maybe only putting on one pair of leaves in a year, but will eventually form a very attractive, conical miniature tree with a beautifully gnarled and lumpy trunk.

Alternatively, if one has several square metres indoors (for instance, in the lobby of a largish office block) and an enormous budget, one could build an estuarine fish-tank with black mangroves one end, and fish the other. Absolute requirements in this case would be a large area out of sight for filters, protein-skimmers and all the other works of a marine tank, banks of fish-tank-daylight fluorescent lights, a floor capable of supporting several tons per square metre and much advice from an expert keeper of tropical marine fish. I have seen apparently captive-bred mudskippers (*Periophthalmus* sp.) in a tropical-fish supplier near Johannesburg at about ten times the price of ordinary little tetras. Finding the crabs, prawns and snails that are an important part of a mangrove ecosystem would be more difficult.

Once the trees are established, what about pests and diseases? The only sick mangroves my colleagues and I have ever seen were clearly suffering from drought or pollution, and in view of the robustness of the timber it is very unlikely that trees would suffer from any noteworthy pests or diseases. A few unidentified bracket fungi have been seen at Isipingo (Durban, South Africa), but only on dead wood.

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Credits

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KwaZulu-Natal Herbarium

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