

## Swietenia macrophylla

mahogany

King

Meliaceae

### LOCAL NAMES

Bengali (bara mahauni, bara-mahagoni, mahagni); Dutch (mahonie, mahok); English (Dominican mahogany, bastard mahogany, big-leaf mahogany, Brazilian mahogany tree, Colombian mahogany tree, Honduras mahogany, large-leaved mahogany, Mexican mahogany tree, West Indian mahogany, Spanish mahogany, mahogany, Peruvian mahogany tree); French (acajou du Venezuela, acajou étranger, acajou du Honduras); German (Echtes mahagoni); Italian (mogano); Malay (cheria mahogany); Portuguese (mogno); Spanish (caoba de Santo, domingo, Caoba de Honduras, caoba del Atlántico, caoba hondureña, zopilozontecomacuahuitl, caoba); Trade name (mahogany)

### BOTANIC DESCRIPTION

*Swietenia macrophylla* is a very large tree, reaching a height of 30-40 m and a girth of 3-4 m; in favourable conditions it can reach 60 m high and 9 m girth. Trunk straight, cylindrical, with a buttressed base; bark rough, flaking off in small patches.

Leaves paripinnate, up to 60 cm long; leaflets 6-16, ovate, lanceolate, acuminate, slightly oblique, light green or reddish when young, dark green and shining when mature, up to 20 cm long, with 8-12 pale, secondary nerves.

Flowers 8 mm across, in narrow supra-axillary panicles about 8-13 cm long and fragrant; petals greenish-white, oblong, 4 mm long, rigidly pointed.

Fruit a woody capsule resembling a large inverted club, about 12.5 x 7.5 cm, erect.

'*Swietenia*' commemorates Gerard von Swieten (1700-1772), botanist and physician to Maria Theresa of Austria. The specific name, '*macrophylla*', means large leaved and comes from Greek words '*makros*' (large) and '*phyllon*' (leaf).

### BIOLOGY

Flowering mahogany trees have male and female flowers (about 10 times as many male as female flowers, often only the central flower of a cyme is female), but the flowers of both sexes are similar. Trees are sometimes functionally dioecious. In mixed inflorescences, male flowers open 1st, but self-pollination may occur.

Flowering and fruiting are distinctly seasonal. Fruit may be produced once a year, and trees start to produce fruit regularly when about 15 years old. Seeds have a thin, taillike wing that makes them rotate when they fall; they are thus dispersed by wind as far as 500 m from the parent tree.



Forest giant escaping extraction from loggers near Maraba, Brazil. (Anthony Simons)



Trees grown in mixed agroforest plot in Davao, Philippines (Anthony Simons)



Fruit and winged seeds collected near Maraba, Brazil (Anthony Simons)

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## ECOLOGY

*S. macrophylla* is found in all forest types, from the edge of the pine savannah to the climax rainforest, but mostly in mixed hardwood forest belts, along riverbanks, on deep alluvial soils of considerable fertility. It occurs scattered or in small groups, but densities of more than 4-8 trees/ha are rarely encountered. In tropical America, it is among the pioneer species reoccupying degraded agricultural land. It has been shown that teak is outcompeted by *S. macrophylla* in a mixed stand. In the Philippines, *S. macrophylla* is reported to be very firm in wind, resistant to cyclones.

The species has some weed potential and may invade native forest communities, especially following disturbance. It should not be planted in close proximity to areas of high nature conservation significance.

## BIOPHYSICAL LIMITS

Altitude: 0-1500 m, Mean annual temperature: (min. 11) 20-28 (max. 35) deg. C, Mean annual rainfall: 1600-2500 (4000) mm

Soil type: *S. macrophylla* grows best on well-drained sites with medium to heavy soils.

## DOCUMENTED SPECIES DISTRIBUTION

- Native: Belize, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Venezuela
- Exotic: Fiji, Haiti, India, Jamaica, Malaysia, Nigeria, Philippines, Puerto Rico, Sierra Leone, Solomon Islands, Sri Lanka, Trinidad and Tobago



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**

**Timber:** The high value attached to *S. macrophylla* wood in the international markets is well known. The heartwood is red-brown in appearance. The density of the wood of plantation-grown trees is often somewhat less than that of trees from the forest in the natural area of distribution and weighs 485-840 kg/m<sup>3</sup> at 12% mc. The wood has been used in interior panelling, joinery work, turnery, furniture, plywood and heavy construction work. Veneer quality is limited by colour variation, wavy grain, pin knots and pinhole borer damage.

**Gum or resin:** A gum is produced from cuts in the bark for markets in Bombay, India, it is marketed in both pure form and mixed with other gums.

**Tannin or dyestuff:** The bark is used for dyeing and tanning leather.

**Lipids:** An oil that might be of some commercial value can be extracted from the seed kernels.

**Medicine:** Various medicinal uses of parts of the tree are reported from Central America.

**SERVICES**

**Shade or shelter:** *S. macrophylla* is used as a shade tree, for example, for young plantations of dipterocarps.

**Reclamation:** *S. macrophylla* has been used in reforestation projects and has proved to be suitable in areas not protected from grazing.

**Soil improver:** The crushed fruit shells have been used as a potting medium.

**Ornamental:** Planted as a lawn tree in peninsular Malaysia.

**Intercropping:** The value of *S. macrophylla* as an undercrop for teak (*Tectona grandis*), to facilitate heavy thinning of the latter without exposing the soil to the risk of serious desiccation and erosion, is quite promising and worth great consideration. In Puerto Rico, farmers have planted *S. macrophylla* among subsistence crops such as corn, beans, bananas, sweet potatoes and cassava.

**TREE MANAGEMENT**

Young trees are fairly tolerant to shade, but conditions for optimum growth call for full overhead light combined with side protection. In natural stands, therefore, it is beneficial to open the canopy over dense, young regeneration in which saplings are about 1.8 m high. In plantation forestry, *S. macrophylla* has always been planted at 10 x 3 m (333 stems/ha), because it requires large amounts of light. Plantations established at such wide spacing rarely need thinning unless selectively to remove diseased stems. The tree is self-pruning and further pruning is not necessary. When grown for timber, *S. macrophylla* has a rotation age of 30-35 years, with a final stocking rate of 150-250 stems/ha.

**GERMPLASM MANAGEMENT**

Despite widespread suggestions to the contrary, seeds of this species are not recalcitrant but are probably intermediate; 2.5% of seeds germinated following 2 years of hermetic storage with dry seeds at 3-5 deg. C. Viability can be maintained for 1 year in hermetic storage. No loss in viability occurs after storage for 7 months at 12 deg. C with 9% mc. Seeds tolerate desiccation to 5%. There are about 2400 dewinged seeds/kg.

**PESTS AND DISEASES**

The most serious pest of *S. macrophylla* is the seedling shoot borer (*Hypsipyla robusta*), which is also a plantation pest. Its attack can reach epidemic proportions, resulting in poor bole form and a severe reduction in timber quality. Orthene, a systematic insecticide, has proved an effective chemical control of this pest. Throughout the Greater Antilles, the mahogany web worm, *Macalla thyrsalis*, causes defoliation and webbing. In the Caribbean the mahogany shoot borer, *Hypsipyla grandella*, bores into the buds, shoots and stems of the tree. The coffee tree borer, *Apate monachus*, attacks both live and dead trees, penetrating deeply into branches, deforming trunks, and making them susceptible to breakage in high winds. In Haiti an unidentified shoot borer, a caterpillar, and the snout beetle, *Pachnaeus litus*, all attack the tree. The beetle attacks the seed capsules and defoliates the plant. In Puerto Rico, the wet-wood termite *Nasutitermes costalis* consumes dead branches and occasionally the tree trunks. A less serious problem of ambrosia beetle damage of standing trees has been noticed in Fiji. The scolytid beetle *Xylosandrus compactus* lays eggs in galleries in the stems of seedlings in the nursery leading to their collapse, it also infests living twigs and branches of older trees. Other minor pests observed in experimental plantings are the leaf-feeding caterpillar *Attacus atlas* and the leaf cutter bee *Megachile* sp.

Heart and butt rots are common in older trees, apparently entering through basal scars and branch stubs. In Puerto Rico, the leaf blight fungus *Phyllosticta swietenia* results in defoliation under humid nursery conditions. Diseases of seedling nurseries in Haiti include leaf spot, anthracnose, leaf blister, damping off and stem blight.

**FURTHER READNG**

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**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>)