

Intsia bijuga

merbau

(Colebr.) Kuntze

Fabaceae - Caesalpinioideae

LOCAL NAMES

English (Moluccan ironwood, Borneo teak); Fijian (vesi); Filipino (ipil laut, ipil); Indonesian (merbau asam); Malay (merbau ipil); Thai (pradu thale, maka-mong, lumpho-thale, lumpaw); Trade name (merbau); Vietnamese (go-nuoc, g[ox])

BOTANIC DESCRIPTION

Intsia bijuga is a common medium-sized, unarmed tree of up to 35-(50) m in height. Mature trees have steep rounded buttresses which when fully developed can exceed 4 m. It has been suggested that these buttresses grant the Moluccan ironwood competitive advantage by preventing establishment of competing individuals in the space occupied by the buttresses. The bole can be crooked or straight but the crown is usually spreading and branchlets are glabrous.

Leaves paripinnate and semi-deciduous, leaflets 1-6 varying in shape from broadly ovate to obovate, oblong or subfalcate and thinly coriaceous.

Inflorescence 5-18 cm varying from very corymbiformly racemose to racemiform. Flowers white and arranged in dense terminal panicles. Bracts, bracteoles and calyx densely short-hairy to glabrous. Pedicels 1-2.25 cm, calyx-tube 7-15 mm segments 9-19 mm. Petals often red or pink in colour.

Fruit pod oblong or pear shaped, 8-23 cm x 4-8 cm. Pod leathery, woody and tardily dehiscent usually containing 1-9 seeds.

The genus *Intsia* has 7-9 species of tropical distribution. *Intsia* is closely related to *Afzelia*. It is difficult to assign sterile material to either genus. *Intsia* differs from *Afzelia* by its three fertile stamens, its flat seeds lacking an aril and its leathery pods. *I. bijuga* is the most widespread representative of the genus in the Malesian region. *I. bijuga* seems seriously threatened due to its overexploitation, however, its inclusion in Appendix II of CITES in 1992 was thwarted by Malaysia's objection.

BIOLOGY

Species within the genus of *Intsia* tend to shed their leaves annually and remain bare for a few days. *I. bijuga* is hermaphroditic, flowers, fruits throughout the year.



leaves (TopTropicals.com)

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ECOLOGY

I. bijuga is oftenly found on sand and coral beaches, but also features in periodically inundated localities further inland. It also occurs in dryland mangroves which are the final stage of mangrove forest succession and the transition to inland forests.

BIOPHYSICAL LIMITS

Altitude: 0-600 m

Mean annual temperature: 26 deg C

Mean annual rainfall: 1 934 mm

Soil type: Prefers sandy, medium-loamy deep acrisols and alisols.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia, Cambodia, Indonesia, Madagascar, Malaysia, Myanmar, Papua New Guinea, Solomon Islands, Thailand, Vietnam

Exotic: Zanzibar



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.

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PRODUCTS

Food: The seeds can be eaten after careful preparation, soaked in salt water for 3-4 days and then boiled.

Apiculture: The flowers of the Mollucan ironwood are visited by pollinators for pollen and nectar.

Fuel: The small branches of felled trees are used as firewood.

Timber: U'ula timber is highly prized within the Solomon Islands, Papua New Guinea and Malaysia and is used for heavy construction for instance bridge making, power pole cross-arms, railway sleepers, boat building, house post beams and furniture. Other items made from the wood are walking sticks, food bowls, canoes and carvings. *I. bijuga* is used in constructing the main hull, masthead, maststep and steering oar of ocean-going canoes. Desirable properties of the timber are its strength, workability, satisfactory glueing, durability and its moderate resistance to ocean water. The wood does not shrink drastically on seasoning and has a density of 630-1 040 kg/cu m at 15% moisture content. The heartwood is durable (very difficult to treat with preservatives) and shows an average service life of 6-11.5 years in contact with the ground under tropical conditions and 20 years under temperate conditions. In experimental trials with small wood samples, *I. bijuga* was durable against the dry-wood termite *Cryptotermes cynocephalus* and the subterranean termite *Coptotermes curvignathus*.

Tannin or dyestuff: A brown dye is obtained from an oily substance present in the wood and bark.

Poison: Seed oil of *I. bijuga* repels the stored products, tenebrionid pest *Tribolium castaneum* and compare favourably with neem (*Azadirachta indica*) extracts.

Medicine: The bark is used in treating persons suffering from a urinary condition (characterised by very dark urine). U'ula is also used in the treatment of rheumatism, dysentery and diarrhoea. An infusion of ipil bark is given to women after delivery.

SERVICES

Erosion control: Ipil is a suitable tree for soil conservation in eroded gullies and in buffer strips along creeks.

Shade or shelter: Ipil has an excellent shade suitable for homes and parks, the tree is wind tolerant thus ideal as a windbreak.

Reclamation: Ipil can be used to reclaim land degraded by gulley erosion.

Nitrogen fixing: *I. bijuga* is confirmed to form nodules in published reports.

Soil improver: The average total annual litter production in *I. bijuga* is, 8789.4 kg/ha with a high leaf litter decomposition rate. Initial tannin content of the leaf litter is the major chemical factor inhibiting decomposition. High uptake of Ca from the subsoil and its enrichment in the surface soil resulted in higher soil pH under *I. bijuga*.

Boundary or barrier or support: U'ula is such a reputed fence post provider that it was recommended in the early 1970's by the Livestock Department, Solomon Islands for a fencing programme.

Pollution control: Ipil is used in water purification.

Other services:

In former times ipil was considered sacred in Fiji. The bowl for serving the esteemed traditional beverage, yagona, was made from ipil wood.

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TREE MANAGEMENT

The tree is tolerant to salt spray and soil salinity. However, ipil is susceptible to frost and moderately resistant to drought. Seedlings need high light intensity for optimal growth. Seedlings can be transplanted into the field after 3 months, at a spacing of 3m x 4m or 5m x 5m. The tree is slow growing and may attain maturity at 80 years. A 50-60 year rotation is recommended for natural stands.

GERMPLASM MANAGEMENT

Seeds of *I. bijuga* germinate well in full sunlight. Scarification is necessary because of the hard seed coat, the most effective scarification technique is by the use of a file to scrape off the small protrusion of the seed-coat located opposite the hilum. Immersion in concentrated sulphuric acid serves the same purpose. Treatment of scarified seeds with fungicides e.g. benlate or daconil may prevent fungal destruction. Seeds must be planted vertically with the hilum downward, so that the seed coat is shed as the hypocotyl emerges from the soil.

PESTS AND DISEASES

The roots of potted seedlings of *I. bijuga* were associated with nematodes of the genera *Rotylenchulus* and *Helicotylenchus*. Young plantations in Kalimantan suffered from grazing by deer and mouse deer, while rats caused considerable losses.

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SUGGESTED CITATION

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