Intsia bijuga

(Colebr.) Kuntze

merbau

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])

leaves (TopTropicals.com)

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.

Intsia bijuga (Colebr.) Kuntze

merbau

Fabaceae - Caesalpinioideae

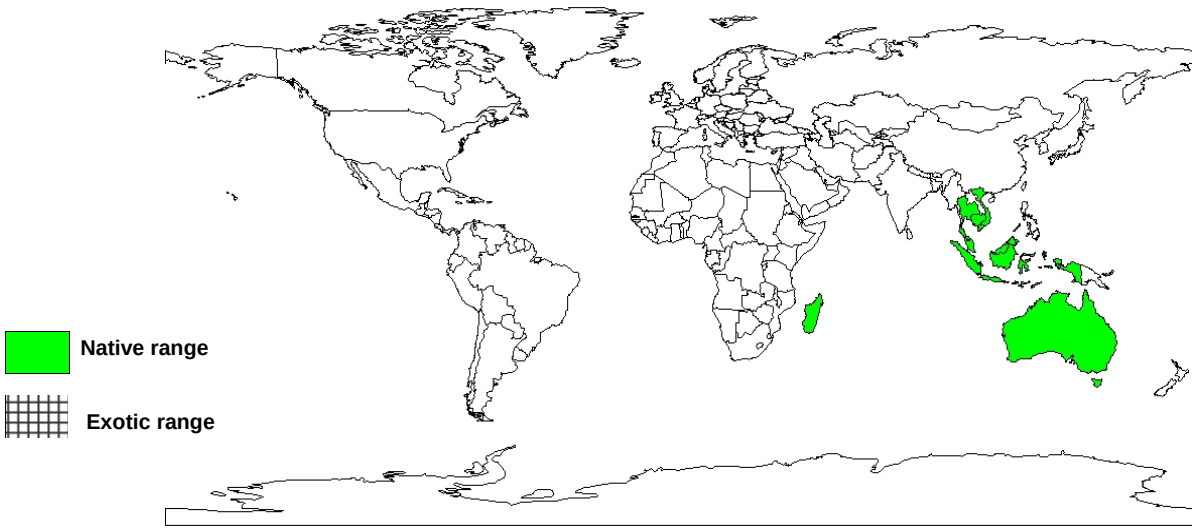
ECOLOGY
I. bijuga is oftenly found on sand and coral beaches, but also features in periodically inundated localities further inland. It also occurs in dryland mangroves which are the final stage of mangrove forest succession and the transition to inland forests.

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.

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.

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.

FURTHER READNG

Backer CA. 1963. Flora of Java Vol. 1. N.V.Noordhoof, Groningen, The Netherlands.

Banack SA and Cox PA. 1987. Ethnobotany of ocean-going canoes in Lau, Fiji. Economic Botany. 41(2) 148-162.

Catibog CS. 1977. Occurrence of plant parasitic nematodes at the Forest Research Institute nursery, Mt. Makiling, Laguna [Philippines]. Sylvatrop. 2(2) 155-158.

Henderson CP and Hancock IR. 1988. A guide to the useful plants of Solomon Islands, Research Dept., Ministry of Agriculture and Lands, Honiara, Solomon Islands.

MacDicken GK. 1994. Selection and management of nitrogen fixing trees. Winrock International, and Bangkok: FAO.

Mohiuddin S et al. 1987. Laboratory investigations on the repellency of some plant oils to red flour beetle, Tribolium castaneum Herbst. Pakistan Journal of Scientific and Industrial Research. 30(10). 754-756.

Nugroho JD. 1997. Litterfall and soil characteristics under plantations of five tree species in Irian Jaya. Science in New Guinea. 23(1): 17-26.

Sloover JR-de et al 1994. Buttresses of tropical forest trees and spatial competition. Phytocoenologia. 24: 573-577.

Streets RJ. 1962. Exotic forest trees in the British Commonwealth. Clarendon Press, Oxford.

Supriana N. 1988. Feeding preference behaviour of Cryptotermes cynocephalus Light and Coptotermes curvignathus Holmgren on twenty eight tropical timbers. Jurnal Penelitian dan Pengembangan Kehutanan. 4(2): 1-5.

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/)