Paraserianthes falcataria

(L.) Nielsen

Fabaceae - Mimosoideae

batai

LOCAL NAMES
English (moluca,batai,Indonesian albizia,albizia,peacock plume,paraserianthes,white albizia); Filipino (falcata,moluccan sau); Indonesian (sengon laut,jeungjing,sikat); Javanese (sengon laut,sika); Malay (puah,batai,kayu machis); Trade name (batai)

BOTANIC DESCRIPTION
Paraserianthes falcataria is a fairly large tree, up to 40 m tall; bole branchless for up to 20 m; grows to 100 cm or sometimes more in diameter, with a spreading flat crown.

Leaves alternate, bipinnately compound, 23-30 cm long, with rusty pressed hairs and slender angled axis bearing gland above base; leaflets paired, 15-20 pairs on each axis, stalkless, small, oblong, 6-12 mm long, 3-5 mm wide, short-pointed at the tip, topside dull green and hairless, underside paler with fine hair.

Inflorescence axillary consisting of paniculate racemes, the spikes sometimes arranged in panicles; flowers bisexual, 12 mm long, regular pentamerous, subtended to bracts; calyx hairy, valvate, gamosepalous, tubular to cup or bell shaped; corolla sericeous all over, gamopetalous, funnel or bell shaped, cream to yellowish.

Fruit a chartaceous, flat, straight pod, 10-13 x 2 cm, not segmented, dehiscent along both sutures and winged along ventral suture, puberulous but glabrescent, many seeded (15-20); seed subcircular to oblong, 6 mm long, flat to convex, without aril, dull to dark brown, with a thick sclerified exotesta, not winged; endosperm absent; cotyledons large.

BIOLOGY
Trees may flower as early as 3 years. Two flowering periods per year have been observed in Peninsula Malaysia and Sabah. Ripe pods appear approximately 2 months after flowering. The pods dehisce when ripe, often when still attached to the tree, scattering the seeds on the ground.

P. falcataria leaves in East Kalimantan, Indonesia, ready to be fed to goats. (Ralph Roothaert)

Paraserianthes falcataria: a plus tree in Sesaot, Lombok, Indonesia. (Mulawarman)

Paraserianthes falcataria (L.) Nielsen

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ECOLOGY
A pioneer species, P. falcataria occurs in primary but more characteristically in secondary lowland rainforest and in light montane forest, grassy plains and along roadsides near the sea. It is adapted to peri-humid and monsoonal climates with a dry season of up to 2 (4 max.) months. It is sensitive to fire and easily damaged by strong wind.
In natural stands in Irian Jaya, P. falcataria is associated with species such as Agathis labillardieri, Celtis spp., Diospyros spp., Pterocarpus indicus, Terminalia spp. and Toona sureni.

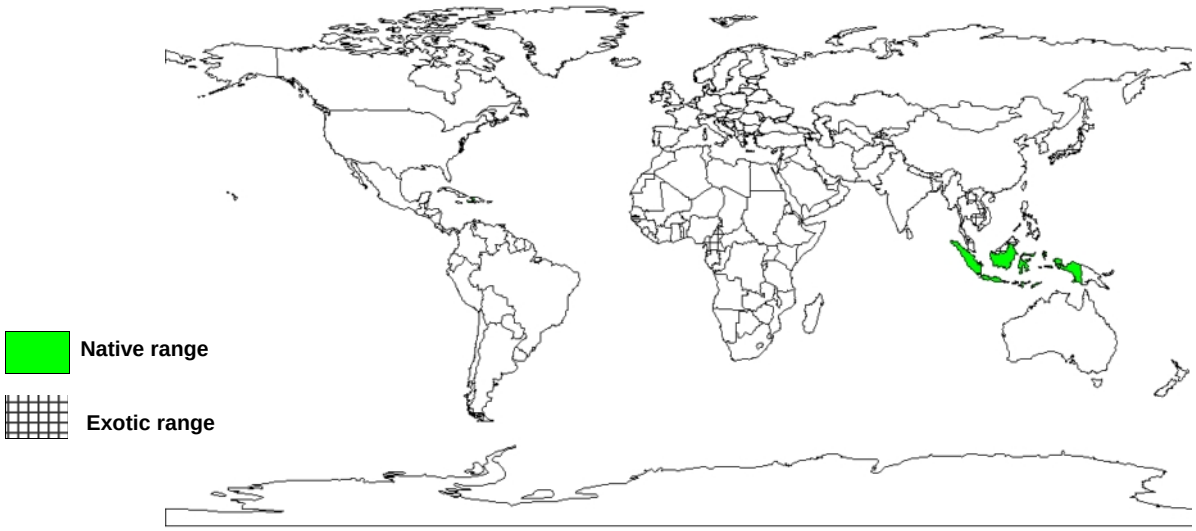
BIOPHYSICAL LIMITS
Altitude: 0-1 200 m, Mean annual temperature: 22-29 deg. C, Mean annual rainfall: 2 000-4 000 mm. averaging 2 800 mm

Soil type: Deep, well drained fertile soils, such as friable clay loam. Prefers alkaline to acid soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: Haiti, Indonesia, Papua New Guinea, Solomon Islands

Exotic: Brunei, Cambodia, Cameroon, Cook Islands, Fiji, French Polynesia, Japan, Kiribati, Laos, Malaysia, Marshall Islands, Myanmar, New Caledonia, Norfolk Island, Philippines, Samoa, Thailand, Tonga, United States of America, Vanuatu, Vietnam



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
Fodder: An activated tree metabolism at the beginning of the wet season synthesizes a complex polysaccharide that increases palatability for cattle of the bark. Leaves are used to feed chickens and goats.

Fuel: Widely used for fuelwood and charcoal production in spite of its low density and energy value.

Fibre: P. falcataria trees coppice fairly well, an advantage for pulpwood production. The wood is suitable for pulping and papermaking. It can be used to produce good-quality pulp by mechanical, semi-chemical or chemical processes. Because of its light colour, only a little bleaching is required to achieve good white paper. The neutral, semi-chemical process produces pulp with excellent strength properties. It has also been used for the manufacture of viscose rayon.

Timber: The comparatively soft timber is suitable for general utility purposes, such as light construction, furniture, cabinet work, lightweight packing materials and pallets, and chopsticks. Because the wood is fairly easy to cut, P. falcataria is also suitable for wooden shoes, musical instruments, toys and novelties, forms and general turnery. P. falcataria is an important source of veneer and plywood and is very suitable for the manufacture of particleboard, wood-wool board and hardboard and has recently been used for blockboard.

Tannin or dyestuff: The bark of P. falcataria has tanning properties.

SERVICES
Erosion control: Pure stands give a good protective cover to prevent erosion on slopes and are recommended in the Philippines for this purpose on catchment areas sheltered from typhoons.

Shade or shelter: The plant is extensively planted in Southeast Asia as a shade and nurse crop for coffee, cocoa, tea, other crops and young timber plantations. Its fast growth and good shading properties outweigh the disadvantages of its sensitivity to strong winds and its relatively short life.

Reclamation: Plantations of P. falcataria have been established even on tailings left after tin mining. It is planted extensively for reforestation and afforestation of denuded and eroding land.

Nitrogen fixing: Nodulates and fixes atmospheric nitrogen.

Soil improver: The natural drop of leaves and small branches contributes nitrogen, organic matter and minerals to upper layers of soil. The plant's extensive root system further improves soil conditions by breaking up soils to provide channels for drainage and aeration.

Ornamental: Suitable as an ornamental, although its brittle branches can be a problem in windy areas.

TREE MANAGEMENT
P. falcataria grows so fast that it is sometimes called the ‘miracle tree’. It is even mentioned in the Guinness Book of Records as the world’s fastest growing tree. On good sites it can attain a height of 7 m in just over a year. Trees reach a mean height of 25.5 m and a bole diameter of 17 cm after 6 years, 32.5 m high and 40.5 cm diameter after 9 years, 38 m high and 54 cm diameter after 12 years, and 39 m high and 63.5 cm diameter after 15 years.

P. falcataria coppices although coppicing vigour is highly variable. It has been found that growth at 2 x 2 m spacing is significantly faster than at 1 x 1 m. If sawn timber is desired, stands can be thinned to 6 x 6 m at 6-8 years and harvested at 15 years. P. falcataria is commonly used in agroforestry systems, usually in a cutting cycle of 10-15 years, in combination with annual crops in the 1st year and grazing animals in subsequent years.

When planted, it can grow on comparatively poor sites and survive without fertilizer. However, it does not thrive in poorly drained, flooded or waterlogged soils. Growth of young trees in a phosphorous-deficient soil is promoted by inoculation with mycorrhizal fungi Gigaspora margarita and Glomus fasciculatum in combination with Rhizobium. Nitrogen-fixing nodules containing leghaemoglobin are found on roots.

P. falcataria plantations should be kept weed free during the 1st few years.

GERMPLASM MANAGEMENT
Seed storage behaviour is orthodox. There is no loss in viability during 1.5 years in air-dry storage at 4-8 deg. C. For storage, seeds are air dried for 24 hours and then packed in polythene bags. When stored at 4-8 deg. C, the germination rate after 18 months may still be 70-90%. There are 38 000-44 000 seeds/kg.

PESTS AND DISEASES
Nursery seedlings are susceptible to damping-off caused by fungi of Rhizoctonia, Sclerotium, Fusarium, Pythium and Phytophthora. Sterilizing the soil before sowing and applying fungicides to soil and seeds may control the disease. The fungus Corticum salmonicolor causes a disease known as pink canker or salmon canker. Light brown lesions appear on the bark of young trees, they gradually enlarge and develop cracks, the colour turns to pale salmon or pinkish, and mycelium mats appear around the lesions. The disease may seriously damage plantations. Plantations can also suffer from other fungal diseases like red root caused by Ganoderma pseudoferrum. An anthracnose seedling disease caused by Colletotrichum species has been observed in Sumatra.

In 1988 and 1989, gall rust disease caused by Uromycladium tepprianum provoked severe damage in Bukidnon Province (Mindanao, the Philippines). The government banned the transport of logs in and out of Bukidnon Province, and planting was suspended.

Plantation pests in Indonesia, Malaysia and the Philippines include stem borers such as the longicorn beetle Xystrocera festiva and the red borer Zeuzera coffea (a cossid moth). Leaf-eating caterpillars (e.g. Eurema blanda, E. hecabe and Semiothesa emersaria) may attack seedlings and trees. Aphids have on occasion been a problem. Insecticides are commonly used in controlling these pests. The small bagworm Pteroma plagiophleps is a serious pest in Sumatra.

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