

Pterocarpus indicus Willd.

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FABACEAE (BEAN FAMILY)

Pterocarpus wallichii Wight & Arn., *P. pallidus* Blanco, *P. papuanus* F.V.M., *P. blancoi* Merr.,
P. pubescens Merr., *P. carolinensis* Kaneh. *P. casteelsii* De Wild. var. *ealensis* Hauman,
P. echinatus Pers., *P. obtusatus* Miq., *P. vidalianus* rolfe, *P. klemmei* Merr.

Angsana, India padauk, linggoa, narra, Papua New Guinea rosewood, pradoo, terocarpo,
sena (National Academy of Sciences 1979)

Pterocarpus indicus occupies a native range stretching from southern Burma through peninsular Thailand, Vietnam, Malaysia, Sumatra, West Java, Borneo, the Philippines, Sunda Islands, the Moluccas, New Guinea, the Andaman Islands of India, the Solomons, and the Carolinas (Rojo 1977). The tree is widely scattered or uncommon in its native forest habitat.

Pterocarpus indicus is a large tree that tends to have a short, clear bole, a spreading crown, especially when open-grown, and a large buttress. Of a moderate growth rate, mature trees of the species may exceed 30 m in height and 1 m d.b.h. *Pterocarpus indicus* grows in areas receiving about 1200 mm to 3000 mm mean annual precipitation, only minor seasonal temperature variation (around 27 °C mean monthly temperature), and from near sea level to 1300 m elevation (Asiddao and Nestor 1958). Soils from sandy loams to clays with pH from neutral to very strongly acid are suitable.

The species is divided into two forms: *P. indicus* forma *indicus* Willd. and *P. indicus* forma *echinatus* (Pers.) Rojo. They are distinguished by spines on the seed-bearing part of the fruit of the latter. The spiny-seeded form grows on Luzon island in the Philippines and possibly the Celebes, Ambon, Andora, Wetar, and Kisar islands (Rojo 1977). *Pterocarpus indicus* is very closely related to *P. macrocarpus* Kurz. Because the leaves and flowers are almost identical, the fruits are used to differentiate between the two species. Where the ranges of the two species merge, they are indistinguishable. The species is also linked with the endemic *P. santalinus* Linn. of the Andaman Islands (Rojo 1977).

Pterocarpus indicus is highly valued as an ornamental and shade tree throughout the moist tropics. This unusually pleasing tree tolerates the partially compacted fill in which urban trees are frequently planted, and grows relatively rapid-

ly in most urban habitats. However, because its roots become large and grow near the surface, it should be planted several meters away from sidewalks and other structures. It has been planted as a shade tree for at least 200 years in Malaysia (Nitrogen Fixing Tree Association 1992). The colorful (from yellow to deep red) wood ranks among the most valuable woods in the world. It shapes well, takes a high polish, and resists termites and rot. It is used to produce furniture, cabinetwork, paneling, carvings, and flooring.

Open-grown trees usually begin flowering and fruiting between 5 and 10 years of age. The sweet-scented yellow flowers are produced copiously in panicles and racemes. Individual flowers measure about 17 mm across. The buds on individual trees come to full size and responding to some unknown trigger, all flower on the same day (Nitrogen Fixing Tree Association 1992). The season of flowering varies considerably throughout the native range and is reported to occur from July through September in the Philippines (Asiddao and Nestor 1958). The flowers are pollinated by honey bees and other insects. *Pterocarpus indicus* fruits are lenticular-shaped pods with a flat wing that circles its edge. The pods have a diameter of 4 to 7 cm (Rojo 1977). They mature about 6 months after flowering and fall off the trees gradually over several months. A group of medium-sized trees in the Philippines produced an average of 181 L of pods annually (Asiddao and Nestor 1958).

At maturity, the pods dry and turn from greenish yellow to light tan and can be clipped from low-growing trees with pruning poles. Because the fruits and their seeds do not deteriorate for several months after falling, they may be collected efficiently from the ground after most of the crop has fallen. The pods are air-dried and stored in plastic bags with or without refrigeration. Air-dried samples of *P. indicus* forma *indica*

and *P. indicus* forma *echinata* pods collected from one tree each in Puerto Rico yielded 2,816 and 1,697 pods per kg, respectively. The seeds from the latter sample were extracted and found to hold an average of 2 seeds per fruit but ranged from 1 to 4 seeds per fruit. The seeds weighed an average of 0.0763 grams or 13,000 seeds per kg. Air-dried seeds in their pods will still germinate after 1 year of storage at room temperature.

No pregermination treatment is necessary. A germination rate of 24 percent was reported in the Philippines (Asidao and Nestor 1958). A sample of *P. indicus* forma *echinata* in Puerto Rico gave 57-percent germination which started in 5 days and took 3 months to complete. Shelled seeds of the closely related *P. macrocarpus* germinate quickly, uniformly, and with percentages of 70 to 90 percent (Francis 1989c). Because shelling the fragile seeds from the tough pods is difficult by hand and currently impossible mechanically, pods are sowed with seeds inside.

Pods are lightly covered with potting mixture in germination beds or trays and kept moist until germination. Planting seeds with the pods requires thinning the plants soon after emergence. When true leaves develop, the seedlings are transplanted into nursery bags or pots filled with a potting mixture. Seedlings about 0.5 m in height are suitable for most forestry plantings. Stump plants are also used effectively to establish plantations (Maun 1980). New plantations must be kept weed-free for 1 to 2 years and protected from vines for an additional year or more until the crowns begin to shade the understory. Seedlings intended for ornamentals are often grown in 12- to 15-L plastic pots until they reach 2 to 3 m in height before transplanting. Cuttings of the species can be rooted. In the Philippines, branch cuttings of *P. indicus* about 8 cm in diameter are rooted after hormone treatment to produce instant trees (Dalmacio and others 1978).

