

## Pterocarpus indicus

Tenasserim mahogany, rosewood, Philippine mahogany, Malay pa  
rosewood, blanco's narra, amboyna

### LOCAL NAMES

Burmese (ansanah,pashu-padauk); English (narra,Malay paduak,pricky narra,red sandalwood,redwood,smooth narra); Filipino (narra); French (amboine,santal rouge); Indonesian (sena,linggod,sonokembang,angsana,angsen); Lao (Sino-Tibetan) (chan dêng); Malay (sena,angsana); Thai (praduu baan,pradoo,duu baan); Trade name (amboyna,blanco's narra,Burmese rosewood,Malay padauk,rosewood,Tenasserim mahogany,Philippine mahogany); Vietnamese (gi[as]ng h[uw][ow]ng)

### BOTANIC DESCRIPTION

*Pterocarpus indicus* is a big tree, growing to 33 m in height and 2 m diameter. The trunks are usually fluted and buttressed to 7-m diameter at the base. The crowns are large and bear many long branches that are at first ascending, but eventually arch over and sometimes droop at the ends. Trees with long willowy, drooping branches are particularly conspicuous and attractive in Singapore and some parts of Malaysia and Hawaii. Elsewhere the drooping habit may not develop. In a non-seasonal humid tropical climate such as in Kuala Lumpur and Singapore, the trees are generally evergreen, but in regions with seasonal rainfall, the trees are deciduous.

The leaves are compound-pinnate, bearing about 12 alternate leaflets. The leaflets are rather large, 7 x 3.5 to 11 x 55 cm and ovate to elliptic in shape, with a pronounced acuminate tip.

The flowers are yellow, fragrant, and borne in large axillary panicles. When flowering, the buds do not open in daily sequence. Instead, as buds come to full size, they are kept waiting, to be triggered into opening. The opened flowers last for one day. After that, several days may pass before another batch of accumulated 'ready' buds open. The nature of the trigger is unknown. Whole avenues of such trees blooming in unpredictable synchrony making a splendid display.

The fruits, which take four months to mature, are disc-shaped, flat, and have winged margins. About 5 cm across, the fruit have a central woody-corky bulge containing several seeds (*ptero*-carpus means winged fruit). Unlike most legumes, the *Pterocarpus* fruit is indehiscent and is dispersed by wind. It also floats in water and can be water-dispersed.

There are 1-3 seeds in each fruit.

Two distinct forms of *P. indicus* are recognized: *P. indicus* Willd. forma *echinatus* (Persoon) Rojo and *P. indicus* Willd. forma *indicus*. The seed portion of the pod of forma *echinatus* (common name prickly pear narra) is covered with distinct bristle-like spicules, while the seed of forma *indicus* are smooth (common name smooth narra). The distribution of prickly narra appears to be more limited than that of smooth narra. The end uses are identical.

*Pterocarpus* is based on the Greek words 'pteran' meaning a wing and, 'karpos' meaning fruit.

### BIOLOGY

In the Philippines, N. Borneo and Malay Peninsula flowering is mostly in February-May, occasionally in August-November, whereas in Celebes, Moluccas, Carolines, Solomons, and New Guinea, mostly in July-December, occasionally in February-May. A large number of bee species representing many different genera visit narra, indicating insect pollination. Fruit seems to ripen within 4-6 months.

Willd.

Fabaceae - Papilionoideae



*Pterocarpus indicus* (Chongrak Wachrinrat)



Ten-year-old plantation (Rafael T. Cadiz)



Seedlings: Six-month-old seedlings. (Rafael T. Cadiz)

## Pterocarpus indicus

Willd.

Fabaceae - Papilionoideae

Tenasserim mahogany, rosewood, Philippine mahogany, Malay pa  
rosewood, blanco's narra, amboyna

### ECOLOGY

The genus *Pterocarpus* consists of 20 species distributed throughout the tropics. *P. indicus* has a wide range from southern Myanmar to the Philippines and throughout the Malay Archipelago to New Guinea and the Solomon Islands. There is considerable morphological and ecological variation when viewed throughout its range, but because of extensive propagation, the trees planted in any given locality tend to be uniform. In Malaysia, its natural habitat is by the sea and along tidal creeks and rivers. Elsewhere (e.g., Papua New Guinea), it occurs in inland forests. In the Moluccas, four varieties are locally recognized, which occupy a range of habitats from the coast to submontane forests and seasonal swamps.

### BIOPHYSICAL LIMITS

Altitude: From sea level

Mean annual temperature: 24- 27 deg C.

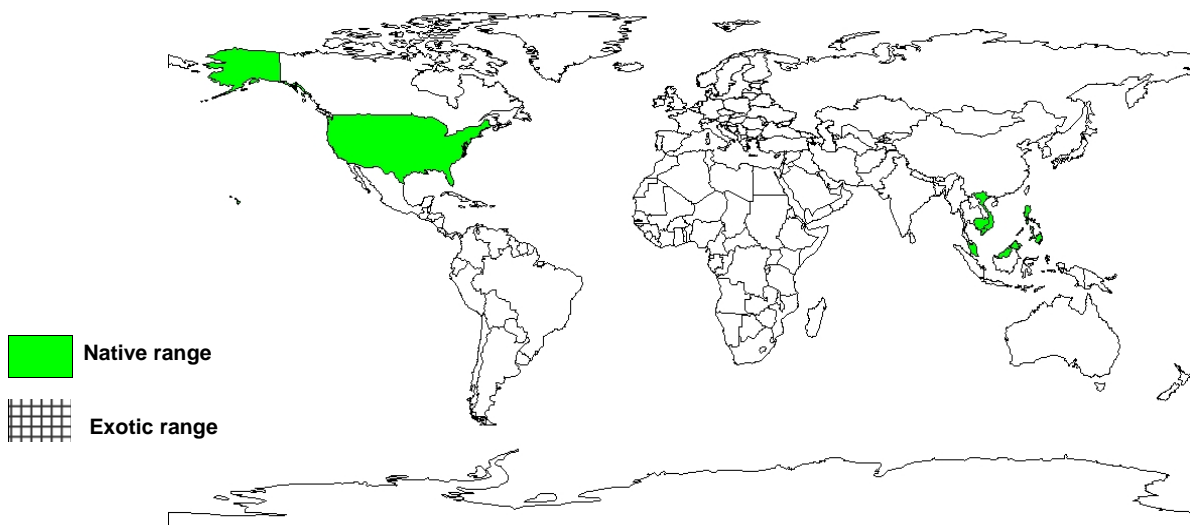
Mean annual rainfall: 900 to 2200 mm

Soil type: Narra is commonly found on sandy or clay loams with neutral or slightly acid reaction.

### DOCUMENTED SPECIES DISTRIBUTION

Native: Cambodia, Malaysia, Myanmar, Papua New Guinea, Philippines, Singapore, Solomon Islands, US, Vietnam

Exotic: Puerto Rico



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.

## **Pterocarpus indicus**

Willd.

Fabaceae - Papilionoideae

Tenasserim mahogany, rosewood, Philippine mahogany, Malay padauk, rosewood, blanco's narra, amboyna

### **PRODUCTS**

**Food:** The young leaves and flowers are said to be eaten and those who eat them probably concentrate such meals during the leaf flush and flowering periods.

**Apiculture:** The flowers are a honey source.

**Fuel:** Although the wood is not necessarily recommended as firewood, it certainly could be used for firewood. Some *Pterocarpus* burn green.

**Timber:** The timbers of all species of *Pterocarpus* are highly valued. *P. indicus* timber is moderately hard (.52 specific gravity), moderately heavy, easy to work, pleasantly rose-scented, takes a fine polish, develops a range of rich colors from yellow to red, and has conspicuous growth rings, which impart a fine figure to the wood. Remarkably, such growth rings are developed even in the non-seasonal humid tropics. Traditionally, *Pterocarpus* has been so much in demand for cabinet class furniture that nearly everywhere its existence in the wild is precarious. In the Philippines, it is the national tree and the favorite timber for the manufacture of fine furniture, cabinetry, cart wheels, carving, construction and musical instruments.

The heartwood is brick red to golden brown in color but ages to a dull brown leather colour. The highly prized Amboyna burl, one of the rarest and most valued wood products in the world, is marked with little twisted curls and knots in a manner more varied than bird's-eye maple. There is a distinctive sweet smell when working the wood. The more red the wood, the heavier it is, but an average density might be 720 kg/m<sup>3</sup>. It is little used for ornamental turning, but because the burl is so exquisitely figured, it makes a nice compliment to a piece to use it for finials or perhaps a cabochon-like inlay on a flat box top.

**Tannin or dyestuff:** The wood gives a reddish dye, more fugitive than that of *Pterocarpus santolinus*. It is also a source of kino.

**Medicine:** The red latex is used in folk remedies for tumors, the plant for cancers, especially of the mouth. The leaves are reported to significantly inhibit the growth of Ehrlich ascites carcinoma cells in mice. Malaysians apply the kino to sores of the mouth, and the root juice to syphilis. Javanese apply the young leaves to boils, prickly heat and ulcers. In the Carolyn Islands, finely powdered leaves are applied to a ruptured vagina. The kino, containing kinotannic acid, was once administered in diarrhoea, often combined with opium. Reported to be antibilious, emetic, and sternutatory, Malay padauk is a folk remedy for bladder ailments, diarrhoea, dropsy, headache, sores, stones, thrush, and tumors of the abdomen.

**Other products:** The leaf infusion is used as a shampoo.

### **SERVICES**

**Shade or shelter:** In Malaysia, it has been planted as a shade tree for at least 200 years.

**Nitrogen fixing:** Studies in Hawaii, Malaysia, the Philippines, and Singapore, indicate that the species fixes nitrogen.

**Ornamental:** It flowers gregariously, the whole crown becoming as though painted yellow. In Singapore, it is practically the symbol of that country's garden city planting program; many avenues are graced by this attractive tree. Planted occasionally in Puerto Rico for shade and ornament.

## **Pterocarpus indicus**

Willd.

Fabaceae - Papilionoideae

Tenasserim mahogany, rosewood, Philippine mahogany, Malay padauk, rosewood, blanco's narra, amboyna

### **TREE MANAGEMENT**

*P. indicus* behaves like a pioneer and grows best in the open. Seedlings are slower growing than cuttings and exhibit considerable variation in vigor. A strict culling program would be necessary to ensure that only the best stocks are planted out. Rooted cuttings can be established readily on nearly all kinds of soils, from coastal sands to inland clays, in urban and garden situations, and even in quite small planting holes dug into pavements. However, establishment trials in forest areas have had mixed results and some have failed. The reasons are not clear. With a little practice, it is easy to distinguish a healthy tree by its luxuriant foliage from one that is thinly leafed and stressed. Under favorable conditions, trees in Singapore have been known to grow an average of 33 m in height and 1.55 m in girth in 11 years, or an average annual increment of 1.2 m height and 14 cm girth. Urban trees in Singapore are fertilized with compound fertilizer at the rate of 0.5, 1, and 15 kg /tree /annum in the first, second, and third years of growth. Subsequently, they get 3-5 kg per tree per annum depending on their size. The fertilizer is spread evenly on the soil under the tree crown and is applied once a year. Where the area of the soil is smaller than the crown (e.g. for trees planted in pavements and road dividers), the fertilizer is divided into two or more smaller applications. As an urban tree, *P. indicus* is relatively wind-firm and seldom suffers branch breakage. Trees of all sizes and ages easily regenerate new shoots when lopped or pollarded. In Papua New Guinea, logged forest trees readily regenerate new plants from the roots.

### **GERMPLASM MANAGEMENT**

The seeds are difficult to extract, but will germinate readily through built-in weaknesses in the fruit wall. There is therefore no advantage of extracting the seeds because the germination time and percentage are practically the same between whole fruits and extracted seeds.

### **PESTS AND DISEASES**

*P. indicus* trees in Singapore and Malaysia suffered extensively from an unknown disease between 1875 and 1925. The leaves of affected trees withered, the branches died back, and after 2-3 months the whole tree would die. Sometimes, whole avenues were wiped out. Strangely, the disease then disappeared and has not recurred. Some pathogens and pests include *Ganoderma lucidum*, *Ganoderma pseudoferreum*, *Schizophyllum commune*, and *Sclerotium rolfsii* (fungi); *Hypomeces squamosus* (coleoptera); *Parasa lepida* (lepidoptera), and *Sus scrofa* (mammalia).

## **Pterocarpus indicus**

Willd.

Fabaceae - Papilionoideae

Tenasserim mahogany, rosewood, Philippine mahogany, Malay pa  
rosewood, blanco's narra, amboyna

### **FURTHER READING**

Little EL, Wadsworth FH. 1964. Common trees of Puerto Rico and the Virgin Islands. Agricultural Handbook. No. 249. US Department of Agriculture. Washington DC.

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

National Academy of Sciences. 1979. Tropical legumes: resources for the future. National Academy Press. Washington D.C.

NFTA. 1992. Pterocarpus indicus- The majestic N-fixing tree. NFTA 92-02. Waimanalo.

Troup RS. 1929. The silviculture of Indian trees. Controller of publications, New Delhi, India.

### **SUGGESTED CITATION**

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestry Database:a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/af/treedb/>)