

## Mesua ferrea

penaga, mesua

### LOCAL NAMES

Bengali (nagesar,nageswar); English (Ceylon ironwood,Indian rose chestnut,iron wood tree); Filipino (kaliuas); Gujarati (nagchampa); Hindi (nagachampakamum,nahar,nagor,nanga,nageshvaro,nangku); Indonesian (nagasari gede,nagasari); Javanese (nagasari); Lao (Sino-Tibetan) (may lek,ka thang); Malay (lengapus,penaga,penaga lilin); Sanskrit (nalakeshara); Thai (bunnak,saaraphi-doi); Trade name (penaga,mesua); Vietnamese (v[aas]p)

### BOTANIC DESCRIPTION

*Mesua ferrea* is a medium-sized or fairly large evergreen tree up to 36 m tall. Bole cylindrical to poorly shaped, up to 95 cm in diameter, often fluted at base. Bark surface is smooth to adherent scaly, sometimes somewhat dippled, ochrous-brown revealing a bright orange layer below.

Leaves opposite, simple and entire, usually elliptical to narrowly elliptical, glabrous or occasionally glaucous. Leaves shiny with numerous secondary veins, looping, running parallel nearly to the margin, frequently with equally prominent reticulating tertiary veins. Sometimes with more or less persistent stipule-like interpetiolar modified leaves.

Flowers terminal or axillary, bisexual, solitary or in an up to 9-flowered open panicle, pedicel with small paired bracts. Sepals 4 decussate, sub-orbicular, persistent and variously enlarged and thickened in fruit. Petals 4, white or pink. Stamens numerous, free or connate only at the base, ovary superior (1-2 celled) each cell with 1-2 axillary ovules. Style slender with a peltate to 4-lobed stigma.

Fruit a capsule, usually globose, often beaked, thinly woody, usually dehiscent with 2(-4) valves before falling, often exuding resinous droplets. One fruit contains 1-4 seeds.

The generic name is after J. Mesue (777-857) and the specific epithet is from Latin meaning 'belonging to iron', in reference to its famed and very hard, durable timber.

### BIOLOGY

It flowers during the dry season and flushes of new leaves are produced just after flowering at the start of the rainy season. The bisexual flowers open for one day, between 3 and 4 a.m. and closing around sunset. Thrips sp. and *T. hawaiiensis* visit the flowers often and breed within the young inflorescences.

L.

Guttiferae



flower (David Lee, Professor and Chairperson, Department of Biological Sciences, Florida International Unive)



foliage (David Lee, Professor and Chairperson, Department of Biological Sciences, Florida International Unive)



habit (David Lee, Professor and Chairperson, Department of Biological Sciences, Florida International Unive)

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### ECOLOGY

*M. ferrea* is a canopy component in lowland forest, but commonly features as an understorey tree in montane evergreen or semi-evergreen forest. In Borneo, the species is associated with dipterocarps.

### BIOPHYSICAL LIMITS

Altitude: up to 2 300 m

Soil type: *M. ferrea* requires a fairly rich, well drained soil.

### DOCUMENTED SPECIES DISTRIBUTION

Native: Cambodia, India, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Thailand, Vietnam

Exotic:



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**

**Fodder:** Decorticated seed kernel meal can be incorporated up to the 10% level to replace maize in the feed of poultry without adverse effects on their performance. *M. ferrea* seed meal is a good source of protein and energy, and its use as a feed ingredient for cattle is proposed. Seed meal contains 12.8% digestible crude protein and 87.3% total digestible nitrogen on a DM basis.

**Fuel:** Used as firewood.

**Timber:** Yields a moderately durable, heavy and very hard wood (often blunts saws). The heartwood is reddish-brown with a purple tinge when fresh, becoming dark red-brown upon exposure. Its density is 940-1 195 kg/cu m at 15% moisture content. The wood is used for heavy construction (posts, beams, rafters, joists, columns) and heavy duty flooring and furniture. Also used for joinery, cabinet work, tool handles, agricultural implements, vehicles and boat building.

**Tannin or dyestuff:** The flowers are used in dyeing for fixed colours.

**Lipids:** The kernels contain about 75% of a yellowish oil, constituted by the glycerides of common fatty acids: linoleic, oleic, stearic, and arachidic acids. An oil called nahor is extracted from the seeds.

**Poison:** Flowers extracts of *M. ferrea* terminated pregnancy or resulted in lack of implantation in rats (Sethi et al. 1989).

**Medicine:** In Malaysia and India, a mixture of pounded kernels and seed oil is used for poulticing wounds. The seed-oil is used for treating itch and other skin eruptions, dandruff and against rheumatism. In Java, a decoction of the flowers is drunk by women after childbirth. Qurs-e-Habis is a traditional medicine consisting of the seeds of *Wrightia tinctoria*, the stamens of *M. ferrea*, and the shells of pearl oysters (*Pinctada margaritifera*). Qurs-e-Habis is used as a haemostatic, antidiarrhoeic and antidiarrhoeic. The medicinal properties of the constituents of Qurs-e-Habis, particularly styptic and astringent properties are related to its haemostatic effects. Flowers of *M. ferrea* exhibit antibacterial activity.

**Other products:**

The fragrant flowers are used to stuff pillows and cushions and in cosmetic products.

**SERVICES**

**Shade or shelter:** *M. ferrea* is an important shade provider in its distribution range.

**Nitrogen fixing:** Endomycorrhizal associations are reported in *M. ferrea*.

**Ornamental:** *M. ferrea* is an attractive lawn tree with a regular, conical, bushy crown, vivid green leaves and showy, fragrant flowers. It is commonly grown along roadsides and in parks.

**Intercropping:** *M. ferrea* is a strong shade tree and selective cutting must be done in intercropped farm systems. It is considered suitable for underplanting in teak plantations.

**Other services:** In India the tree is considered sacred.

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### TREE MANAGEMENT

Seedlings are planted in the field after one year when they are about 30 cm tall or after 2 years when they are about 75 cm tall. The tree grows very slowly and is not popular for plantations. Its logs sink in water and should be either rafted to lighter logs or transported by road.

### GERMPLASM MANAGEMENT

Seed is easy to handle in the nursery and germination is good and rapid. Seedling germination is hypogeal. Seed germination rates are in the 30-70% range, however, record germination rates of 75-90% in 11-24 days have been made. The seed loses its viability quickly, 2-3 months. Best storage is done using perforated polythene bags at 5 deg C. Protection from moisture and sunlight is essential for fair germination and early growth. There are 300-500 seeds /kg.

### PESTS AND DISEASES

Wood liable to termite attack. The fungus *Ganoderma lucidum* causes root and butt rot. The larvae of the insects *Phenacaspis dilatata* and *Toxoptera aurantii* feed on the sap of leaves.

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**SUGGESTED CITATION**

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