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Haldina cordifolia (Roxb.) Ridsdale

Taxonomy and Nomenclature

Species Name: *Haldina cordifolia* (Roxb.) Ridsdale
Synonym: *Nauclea cordifolia* Roxb., *Adina cordifolia* Benth. & Hook. f.
Family: Rubiaceae
Vernacular (Common name): Haldu, Kadami (India), Yellow teak or saffron teak (English), Gao tro (Vietnam)

Distribution and habitat

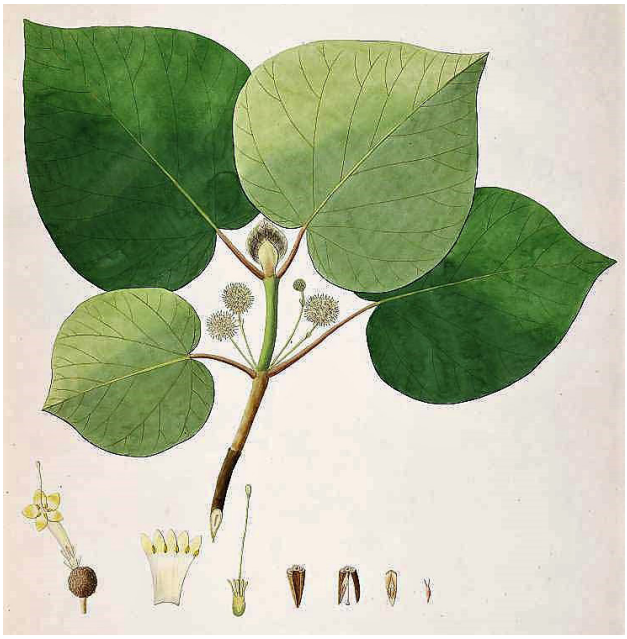
The tree is native to South-east Asia and distributed in the sub-Himalayan tracts from Nepal India, Sri Lanka eastwards to Yunnan in China to Myanmar, Malaysia, Vietnam, and Thailand. It is found throughout India (except arid parts of Rajasthan) from Yamuna eastwards to Assam, Madhya Pradesh, Chhattisgarh and in the deciduous forests of South India, especially Eastern Ghats, Karnataka and parts of Konkan. The range of temperature of its natural zone of occurrence is -2.5-50°C and annual rainfall from 1000-2500 mm. It is not frost-tolerant. The tree grows in various geological formations such as granite, gneiss, schist, quartzite, trap and laterite up to an elevation of 1000 masl. Sandy loam or clayey loam soil with basic pH is preferred.

Botanical description

It is tall, fast-growing, and deciduous with large crown, erect trunk and horizontal branches. Under favorable conditions, the tree may attain 40m height with a straight clean bole of 18m and a diameter 2.2 m. The bark is grey-brown, longitudinally fissured, exfoliating in small patches; blaze pink-red; bole buttressed at the base and ovoid crown. Leaves are large, 10-30 cm long and 8-20 cm wide, petiole 4-9 cm, simple, opposite, decussate, stipulate; lamina orbicular or ovate, base cordate, apex acuminate, margin entire, glabrous above, pubescent beneath. Inflorescences axillary, globose, pedunculate heads, 2-3cm in diameter, Flowers are tiny, bisexual, yellow, fragrant with protruding stigmas, peduncle 3-8 cm long. with many filiform bracteoles; hypanthium densely hairy; calyx cupular, corolla 7-9 mm long, 5-riged, densely finely hairy outside, lobes 5, oblong, stigma projected as pin-head.

Use

The tree produces lustrous, light yellow-colored, moderately strong timber that is soft and easy to work. It is used for construction work, agricultural implements, furniture, canoes, door and window frame, textile mill



accessories, turnery and bobbins. The wood produces moisture-proof ply-wood. It is also suitable for veneers, wall paneling, flooring and wood-carving. A yellow dye produced from the bark of the tree is used for dyeing wool and linen. Leaves and bark are used in local medicine. The root is used in stomach problems and bark is used as antiseptic and febrifuge. The tree also produces fuel wood and fodder.

Fruit and seed description

Fruits: Infructescence is a brownish-yellow, globose head, 1-2.5 cm in diameter, that contains 200-350 capsules, each 0.3-0.6 cm long, splitting into two dehiscent cocci, with 6-8 seeds in each coccus.
Seeds: Seeds are minute, 0.2-0.3 cm, elongated with tail at one end and a bifid wing, dark brown in color. 5-11 thousand seeds weigh one gram.

Phenology, flowering and fruiting habit

Deciduous. In Central India the old leaves are shed in January-February, and the new leaves appear in May-June. The trees remain leafless in March-April, depending on the climate. As the new leaves appear, large whitish stipules enclosing the leaf-buds are shed. The greenish yellow flowers appear from June to September, the development of fruits takes place shortly afterwards and by October they are fully developed. The green pods remain on the tree until they shed their seeds from March to May the following year. Sometimes, the

mature pods fall before shedding the seeds and seeds germinate within the fallen fruit. Seeds are dispersed by wind.

Seed collection

The fruit heads can be collected when the color changes from green to greenish brown and the moisture content of fruit is as high as 45-50%. However, for ease of seed extraction, it is better to collect fruits with 35-40% moisture content before dispersal of seeds. The collection method is to spread a tarpaulin under the tree and collect the fruits by lopping the branches or plucking. The fruits should be dried to 5-6% moisture content to get maximum germination.

Processing and handling

After collection fruits are spread on concrete floor and dried under sun covering a layer of tendu (*Diospyros melanoxylon*) leaves for 7 to 10 days. The capsules open after drying and reddish brown seeds are shed. Seeds can also be extracted manually by pressing between palms. They are sieved to remove the chaff and other fruit parts.

Dormancy and pretreatment

Seeds have no dormancy and do not need any pretreatment. 1g of cleaned seeds produce 250-400 germinated seedling.

Storage and viability

Seeds of *Haldina cordifolia* are of orthodox type which can tolerate drying to 3-5% moisture content, and freezing temperature. Viability can be maintained at ambient temperature for up to one year if stored at 3-5% moisture content and can be extended up to more than five years if stored at low temperatures (15 °C to -20°C).

Sowing and germination

Germination is epigeal. Seeds are mixed with powdered charcoal and ash and then spread in boxes with well-pulverized sandy-loam soil to ensure uniform sowing. They are lightly covered with earth. Watering should be done carefully using fine sprinkler to avoid washing off the seeds. Germination usually starts in about 3 weeks and completes in another 3 weeks. 2-3 months old seedlings with 2 pairs of leaves are transplanted in soil-filled polythene bag/root-trainer. The seedlings are ready for out-planting when about one-year old (20-25cm in height). Transplanting should be done with a ball of earth to avoid damage of root. Its growth is slow in the first year, faster in the second year.

Phytosanitary problem

The insect *Aristobia approximator* feeds on the bark of the living shoots. The larvae of *Dihamnus cervinus* bores in the stems of living saplings. *Dirades adjutaria* defoliate the tree in July-August.

Selected readings

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