Neobalanocarpus heimii

(King) Ashton

Dipterocarpaceae

chengal

LOCAL NAMES
Malay (penak,chengal,chengai); Thai (takhian-chantamaeo,takhian-chan,chi-ngamat); Trade name (chengal)

BOTANIC DESCRIPTION
Neobalanocarpus heimii is a large tree, sometimes more than 60 m tall with a diameter of 1 m or more. The bole is straight and branchless for 30 m. The young twigs are lenticellate, resinous, with prominent buttresses. The bark is characteristically dark and scaly, exuding an almost colourless resin.

Leaves alternate and simple, leathery, elliptical-lanceolate, 7-17 cm long by 2.3-5 cm wide, apex long acuminate. Petioles 5-10 mm long and stipules narrowly oblong, about 12 mm long

Flowers bisexual, broadly ovate, outside caducous puberulent with 5 elliptic, creamy-white or greenish-yellow petals. stamens 15, glabrous; connectives short, curved, slightly exceeding the anthers; ovary ovoid, glabrous with long slender style.

Fruit an acorn-like wingless nut, blanceolate, oblong and cylindrical, 4-5 cm long by 2-2.5 cm wide at the base. At the time of maturity, the fruits begin to turn from green to brown. During germination the fruit splits into three equal valves when the radicle elongates

Seed shaped like the fruit and a few mm shorter and green at maturity.

N. heimii is closely related to the genus Hopea, whose species have similar leaf characteristics, wood anatomy, biochemistry and habit

BIOLOGY
N. heimii, unlike most dipterocarps, sets flowers and fruits annually, the times varying from year to year. Generally, in Malaysia flowering time is in March-November while fruiting is January-December. The fruits ripen about 5 months following first appearance of flowers

Planted trees have been known to set fruit as early as the age of ten years. Pollination is by insects especially honeybees. Seed dispersal is by rolling hill slopes or animals.

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ECOLOGY
Chengal is found in mixed dipterocarp tropical lowland forests, especially on undulating lands, in swampy areas and sometimes in dryer areas of swamp forests. In Thailand it occurs in hill dipterocarp forests along slopes and in valleys, often growing with Shorea curtisii. The species ranges from alluvial forests to the foothills and hills of inland forests

BIOPHYSICAL LIMITS
Altitude: 0-1000 m
Mean annual temperature: 24-27ºC
Mean annual rainfall: 2000-4000 mm
Soil type: Grows well on a wide range of soils from sandy granitic soils, red clay over shale and well-drained dark basic volcanic soils

DOCUMENTED SPECIES DISTRIBUTION

Native: Indonesia, Malaysia, Thailand
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.

PRODUCTS
Timber: Chengal produces a very durable and heavy timber, with an air-dry density of 915-980 kg/m3. The sapwood is pale-yellow, heartwood light-brown, darkening on exposure. The wood is moderately lustrous with prominent ripple marks. It is suitable for all forms of heavy construction, particularly boat-building, bridges, railway sleepers, sawn power line posts, heavy flooring, rubber coagulating tanks and many other uses where great strength and durability are required. Like teak, the timber contains preservative compounds that protect the heartwood and even under exposed conditions the timber can last about 100 years. The breaking strength is several times higher than that of oak, both radially and horizontally. The species is over-exploited, has poor regeneration and is in need of in situ conservation especially in Malaysia.

Gum or resin: A good quality resin is produced and known as Dammar penak. It has been used in the manufacture of varnishes

TREE MANAGEMENT
The silviculture of chengal is totally dependent on natural regeneration. Regeneration beneath parent trees is rarely abundant in primary rainforests except on ridges of hill forests. Seedlings are capable of surviving for long periods under dense shade but suppressed. They respond to openings of gaps and well-established young trees normally appear without assistance once such openings are created. They respond more positively to such openings than saplings of some Shorea species. Seedlings need shade for development and some success has been achieved with planting in secondary forests.

There has been some success in enrichment planting trials in advancing secondary forest in Malaysia. Under optimal conditions, the trees attain an estimated diameter of 64 cm in 75 years (very slow growth)

GERMPLASM MANAGEMENT
Mature fruits have a high moisture content (over 50%) and should be transported in open or loosely folded bags, allowing ventilation. The bags should not be stacked and should be protected from desiccation and direct sunlight

Seeds exhibit recalcitrant storage behaviour. The seeds are desiccation sensitive and cannot be stored for long. Short-term storage at 14ºC for up to 50 days is possible without serious viability loss

PESTS AND DISEASES
Chengal fruits are often attacked by the seed beetle, Coccotrypes graniceps and its larvae. A shoot borer (Lepidoptera-Tortricidae) has been reported to cause damage to 1-3 m high saplings. A pin-hole borer (Diapus spp.) attacks living trees

FURTHER READNG

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SUGGESTED CITATION

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