

**LOCAL NAMES**

Filipino (lanutan-bagyo, anauan); Indonesian (ramin); Malay (merang, gaharu buaya)

**BOTANIC DESCRIPTION**

*Gonystylus bancanus* is a tree to 40-45 m tall with a straight, cylindrical bole; branchless to 21 m and a diameter of up to 120 cm. The tree is sometimes slightly fluted at the base with many knee-roots (pneumatophores). The bark surface is often cracked and shows greyish to red brown colour while inner bark is yellow and fibrous.

Leaves elliptical, oblong-oblongate or obovate, 4-14.5 cm x 2-7 cm, broadly cuneate to rounded at the base, suddenly narrowing into a point; petiole 8-18 mm long.

Inflorescence up to 9 cm long with short, adpressed hairs. Flowers with 8-14 mm long pedicels and 13-20, narrowly lanceolate, glabrous petals.

Fruit sub-globose, up to 4.5 cm long, with 3-4 valves, minutely rough but not rugose, 1-3 seeds per fruit.

Seeds compressed ovoid, black, 28 x 22 x 6 mm, partly enclosed in a thin aril.

**BIOLOGY**

Under natural conditions, *G. bancanus* appears to have irregular flowering and fruiting habits, i.e. the month of flowering differs and it does not flower every year. In western Kalimantan, flowering is usually in August-October and in central Kalimantan in April-May. Fruits ripen in about 2 months after flowering. The seeds are dispersed by bats

**ECOLOGY**

G. bancanus is a gregarious, often dominant tree of lowland freshwater swamp and peat-swamp forest. It is a lowland species growing in freshwater swamp and coastal peat-swamp forest including peripheral mixed swamp forest and Shorea albida forest, occasionally forming pure stands. In these forests it is associated with Calophyllum kunstlerii, Xylopia malacensis, Mezzetia parvifolia, and Shorea pauciflora as a top layer of the vegetation. Large areas of peat swamp forest have been cleared for agriculture, with extensive development of oil palm and pineapple plantations.

**BIOPHYSICAL LIMITS**

Altitude: 0-1500m

Mean annual temperature: 24-27°C

Mean annual rainfall: 2000-4000 mm

Soil type: It occurs on heavy alluvial clay in the inland swamps or sometimes on coarse sand and white clays

**DOCUMENTED SPECIES DISTRIBUTION**

Native: Brunei, Fiji, Indonesia, Malaysia, Philippines, Solomon Islands

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**

Food: The fruits and leaves provide food for wild animals such as swamp monkeys

Timber: The timber has white to light yellowish-white heartwood, moderately fine with even texture, and density of 0.54-0.75 g/cm<sup>3</sup> (moisture content 15%). It is very suitable for veneer and plywood, and highly valued for light construction including door and window frames, moulding, skirting, ceilings and partitions. Among other things it is used for decorative cabinets, furniture, interior decoration, wall panelling, light flooring, toys, turnery, broom handles and other non-impact handles, venetian blind slats, dowels, rulers, picture frames, and drawing boards. Populations and habitats of the species have decreased sharply due to over exploitation.

Poison: The pounded fruits are sometimes used as fish poison.

Medicine: A decoction of the roots is administered after childbirth as a protective medicine.

Other products: The resin impregnated pathological heartwood is known as 'gaharu' and is used as incense.

**SERVICES**

Reclamation: In Kalimantan, seedlings are used in enrichment planting.

**TREE MANAGEMENT**

*G. bancanus* tolerates waterlogging and self-prunes. Since seedlings and saplings require shade, the planting should be in the strip or line planting system in logged-over or secondary peat-swamp forest, with spacing of 5 m by 5 m in logged-over forest and 3 m by 1 m in secondary forest. After 2-3 years the shade can be gradually removed to stimulate growth.

First thinning is carried out at an age of 5 years in a planted forest, and from then on at intervals of 3 years up to the age of 20 years, and subsequently at intervals of 5 years up to the felling age. In Indonesia, natural ramin peat-swamp forest is managed under the Indonesian selective felling and planting system, with a diameter limit of 35 cm and a cutting cycle of 35 years. At least 25 healthy trees per ha of over 15 cm diameter should be left as core trees. In Sarawak large areas of logged-over mixed peat-swamp forest are regularly treated to stimulate regeneration and growth of ramin.

**GERMPLASM MANAGEMENT**

The fruits open and release the seeds when ripe. The freshly fallen seeds are collected from the ground. As access to the swamp forest where *G. bancanus* grows is often very difficult, seed collection is generally carried out only around log slide tracks.

The freshly collected seeds have a moisture content of about 40-45%, and during transportation from collection sites, the seeds have to be protected from excessive loss of moisture, e.g. by placing them under shade in moist gunny sacks. At the processing site, the seeds are washed and air-dried on the surface.

The seeds storage behaviour is recalcitrant. The seeds can be stored temporarily with moist sawdust in sealed polyethylene bags in an air-conditioned room (18° C). After longer periods of storage, the seeds begin to germinate. There are 250-300 seeds/kg.

**PESTS AND DISEASES**

Rats predate the seeds during germination in the nursery. Adequate protective facilities are needed to avoid attack during germination.

**FURTHER READNG**

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**SUGGESTED CITATION**

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