

MALAYAN FOREST RECORDS

No. 3

Commercial Timber Trees
of the Malay Peninsula

By F. W. FOXWORTHY

Forest Research Officer, Federated Malay States



PUBLISHED BY PERMISSION OF THE
FEDERATED MALAY STATES GOVERNMENT

AND

PRINTED BY FRASER & NEAVE, LTD.,
SINGAPORE

1927.

MALAYAN FOREST RECORDS

COMMERCIAL TIMBER TREES OF THE MALAY PENINSULA.

BY F. W. FOXWORTHY,

Forest Research Officer, F.M.S.

INTRODUCTION.

The timber trees of the Malay Peninsula are of many kinds and are very imperfectly known. The need of a manual which could be used by forest officers and others as an aid in identifying the more important trees has been very much felt. Such a manual should give, as simply as possible, the identification marks for each kind of tree and should also give a concise summary of what is known about each of the commercial trees. Work of this kind was begun by the late Conservator of Forests, A. M. Burn-Murdoch, who, in 1911 and 1912, published the first two parts of his "Trees and Timbers of the Malay Peninsula." This work was stopped by his death in 1915 and was discontinued for a time. When the work was taken up again, it seemed appropriate to organize it on a more systematic basis and to condense it into one volume of not too large size. This offered some difficulty and it was necessary to eliminate as much as possible. The work has been restricted, almost entirely, to those forms which are considered as commercial timber trees, or which are so conspicuous in appearance as to command attention in the forest, and the descriptive matter has been condensed and presented in a uniform manner.

BINTANGOR—*Calophyllum* spp.

This timber is produced by most of our 26 species of the genus.

Alternative names.—Bunut, Mentangor, and Penaga Ayer.

Distribution.—Found in all districts of the Peninsula. Representatives of the genus are found throughout the eastern tropics.

Abundance and manner of distribution.—A common tree, scattered throughout the inland forests, from sea level up to 5,000 feet, on a variety of soils, but usually on well drained land. Frequently occurring to the amount of one tree per acre and making up as much as one per cent of the volume of the forest. Usually about one tree to five acres.

DESCRIPTION.

Habit.—Straight, slender trees of the second storey, usually without buttresses. Crown usually rather open and made up of a few rather large branches. Spread of crown usually less than two thirds of the total height of the tree. Trees as much as 120 feet in height and 60 or 70 feet to the first branch have been found. 1,461 trees measured, in valuation surveys, had an average diameter of 16 inches, the maximum being 32 inches.

Bark.—Grey or yellowish, longitudinally fissured. The inner side of the spidermis is yellow and this colour sometimes shines through, and gives a yellow tinge to the bark. Inner bark pink or reddish, with milky sap which is white or cream-coloured. The bark of large trees is shallowly longitudinally fissured.

Leaves.—Opposite, simple, without stipules, coriaceous, entire, with very numerous, slender, parallel secondary nerves nearly at right angles to the midrib. The underside of the leaf is, in some forms, brownish pubescent.

Flowers and fruit.—Flowers white, often conspicuous, in panicles. Fruit a drupe with a thin fleshy covering. Seed sometimes containing oil.

Seedling.—With leaves of the same form and much the same size as those of the mature tree.

PRODUCTS.

Wood.—Moderately hard or soft, moderately heavy or light, with distinct difference between sapwood and heartwood. Sapwood

very pale or whitish and not useful. In some forms the sapwood makes up a very large part of the thickness of the trunk, and such forms are practically useless, except for firewood. Heartwood yellowish or reddish brown. Very excellent for masts, spars, and other uses which require a good deal of stiffness; very satisfactory for furniture because of the straight grain and the very pretty figure on tangential sections. It is usually undesirable to use for furniture any Bintangor tree which is less than 18 inches in diameter.

Bark.—Sometimes used as a fish poison.

Fruit.—The small and rather sour fruit of some species is eaten.

Gum.—Some forms have a resin or gum in the bark, and this flows out as the result of injuries. The resin is sometimes mixed with coconut oil and used in the treatment of skin diseases.

SYLVICULTURE.

Flowering and fruiting.—Forms of Bintangor have been found in flower and in fruit during every month in the year. We have been unable to find any definite periodicity of flowering and fruiting.

Rate of growth.—185 trees have been measured in sample plots and average annual girth increments of 0.7 to 1.085 in. have been shown.

Representation of size classes.—Fairly good.

Reproduction.—Natural regeneration seems to be ample and Bintangor seems to be succeeding fairly well. We have no information about artificial reproduction.

OTHER FORMS LIKELY TO BE CONFUSED WITH BINTANGOR.

PENAGA LAUT (*Calophyllum Inophyllum* L.).—Found on sea beaches and has very crooked-grained wood.

MERANTI (*Shorea* spp.).—Occasionally some forms of Meranti may look like large trees of Bintangor, but the resin in the bark, and the alternate leaves are sufficient to distinguish them.

PENAGA LAUT—*Calophyllum Inophyllum* L.

Alternative names.—Pudek, Bintangor Bunga.

Distribution.—Found throughout the eastern tropics on sandy sea beaches. It is also frequently cultivated. The total amount in the Peninsula is very small.

DESCRIPTION.

Habit.—A small tree with short, stout, often crooked trunk, and wide-spreading crown made up of a number of large branches, some of them drooping at the ends. The thick trunk is rarely upright, often leaning toward the sea. Trees with a clear trunk of as much as 20 feet are sometimes found. Total height sometimes as much as 60 feet, the crown making up two-thirds or more of the total height. Girth up to 12–14 feet, no buttresses.

Bark.—0·5–0·8 in. thick, grey or brownish in colour, often with a yellowish tinge. Large trees have deep longitudinal fissures, but young trees do not show them. The bark also splits into transverse fissures and is shed in rectangular pieces. Inner bark pink to yellowish or reddish, with concentric bands of darker colour. When cut the bark exudes a brownish yellow sticky sap.

Leaves.—Opposite, simple, without stipules, shining, glabrous, with very numerous parallel nerves at right angles to the midrib, oblong, elliptic or obovate-oblong, obtuse or emarginate, the base acute, 4–6 in. long, 2·5–3·5 in. wide; petiole rather broad, 0·75 in. long.

Flowers and fruit.—Flowers pure white, showy, with yellow stamens, in axillary or terminal racemes, fragrant. Fruit globose, 1 in. in diameter, smooth, green or yellow, pulpy on the outside. Seeds containing oil.

Seedling.—Leaves of the same form as those of the mature tree. The first leaves are distinctly smaller than those of the mature tree. Young leaves yellowish green.

PRODUCTS.

Wood.—Moderately hard and moderately heavy, grain so twisted that the wood can hardly be split. Sapwood white and making up only a small part of the thickness of the stem. Heartwood brownish or pinkish brown, with very pretty figure, because of the contorted grain. An excellent wood for furniture, whenever it can be had in sufficient quantity, but very difficult to work and

requiring an unusual amount of polishing. Used principally for the knees, ribs, stem and stern posts of small boats. Very durable in sea water.

Bark.—The bark is boiled and used medicinally for troubles of the genital organs.

Leaves.—When the leaves are put in water an oil rises to the surface. This is used in some parts of India as a remedy for sore eyes. In the Netherlands Indies it is said that water in which the leaves have been soaked over night becomes of a bluish colour and is refreshing when used to bathe inflamed eyes.

Gum or resin.—A yellowish or brownish gum or resin exudes from cuts in the bark and is used medicinally for the same purposes as the bark. The resin yielded by the trunk is one of the *tacamahac* gums of commerce. It is agreeably aromatic. It is of a yellowish-green colour and is soluble in alcohol.

Flowers.—The fragrant flowers are worn as a hair adornment when fresh, and, when dried, are used to scent clothing.

Fruit.—The half-ripe fruit is sometimes pickled and the scanty pulp eaten. The seed, when left in the sun, sweats a yellow oil, which is poisonous when taken internally, but which is used as a medicine externally for skin diseases and rheumatism. It is also used as a lamp oil and is said to be suitable for the manufacture of soap.

SYLVICULTURE.

Flowering and fruiting.—Cultivated trees of *Penaga Laut* have been observed in flower in every month except August, and in fruit during every month in the year.

Rate of growth.—Cultivated trees seem to grow rather slowly; we have no sample plot records.

Representation of size classes.—Very poor.

Reproduction.—Natural regeneration is rather scanty. It is said that the fruit will germinate readily when fresh, but it does not retain its vitality very long.

OTHER FORMS LIKELY TO BE CONFUSED WITH *PENAGA LAUT*.

The different forms of *Bintangor* are the things most likely to be confused with *Penaga Laut*, but they grow inland and have straight-grained wood.

PENAGA—*Mesua ferrea* L.

Alternative names.—Lenggapus, Matopus.

Distribution.—LOWER SIAM. KEDAH. KELANTAN. TRENGGANU. PENANG. PROVINCE WELLESLEY. PERAK: all districts. SELANGOR: all districts. NEGRI SEMBILAN: Kuala Pilah, Seremban, Coast, Tampin. PAHANG: all districts. MALACCA. JOHORE. SINGAPORE. It seems probable that Penaga occurs in every district of the Peninsula. It is known also from Ceylon, India, Burma, Siam, Indo-China, and the Malay Archipelago.

Abundance and manner of distribution.—Very widely distributed but never abundant. Usually present to the amount of one tree of commercial size to fourteen acres. Usually on well-drained soil, often on low ridges. From sea level up to about 1,000 feet.

DESCRIPTION.

Habit.—Medium-sized trees of the second storey. Trunks slender and straight, with small buttresses, which give the trunk an irregular outline at the base. Crown very dense, more or less conical in shape, made up of numerous small branches and occupying about half of the total height, except in very old trees. Trees as much as 100 feet in height and 60 feet to the first branch have been recorded. 355 trees measured, in valuation surveys, had an average diameter of 18 inches, the maximum being 28 inches.

Bark.—Grey with faint purplish tinge. Outer bark shedding in narrow, elongate, thin, rectangular strips. Many of the strips, which are detached at the lower end, give the trunk a more or less shaggy appearance. Total thickness of bark 0.2–0.25 in. Outer bark very thin, faintly and shallowly longitudinally fissured. Next layer red, pinkish, or brownish red, with a great deal of very sticky latex, which is clear, whitish or pale yellow when it first appears, becoming yellow or brownish after some minutes exposure to the air. Innermost layer of bark lighter-coloured and also containing latex. Sapwood pale yellow or with a very faint pinkish tinge.

Leaves.—Opposite, simple, entire, without stipules, coriaceous, linear-lanceolate to oblong-lanceolate, acute or acuminate, the base acute or rounded, deep shining green above, glaucous white beneath, nerves numerous, close, inconspicuous, length 3–6 in., breadth $\frac{3}{4}$ – $1\frac{1}{4}$ in., petiole 0.25–0.35 in. long. Young leaves are usually pink or pale yellow and gradually change in colour as they become firmer in texture.

Flowers and fruit.—Flowers very conspicuous, up to three inches across, very fragrant, in pairs or solitary. The white petals and bright yellow anthers make the flower very showy. Fruit dark brown, ovoid-conic to subglobose, from one to two inches long, with 1-4 seeds, the sepals persistent.

Seedling.—The first leaves have a bronze colour which later turns to green. They are less pointed and slightly smaller than those of the mature tree.

PRODUCTS.

Wood.—Very hard, very heavy, very strong, one of the most durable of our woods. Sapwood pale yellow or pinkish and useful; heartwood dark reddish brown. Old cracks in the heartwood contain a sticky yellow gum. The wood is very useful for heavy construction, cart axles, tool handles, walking sticks, sleepers, and kandar sticks.

Flowers.—The flowers are used as ornaments. Dried flowers are used for perfume and as a cosmetic, also for medicinal purposes.

Fruit.—The seeds and the oil obtained from them are used in the treatment of skin diseases.

SYLVICULTURE.

Flowering and fruiting.—Penaga has been found in flower and in fruit during every month in the year. There does not seem to be any distinct season.

Rate of growth.—180 trees measured, in sample plots, have shown average annual girth increments of from 0.395 to 0.427 in. Planted trees have shown much more rapid rates of growth. It seems that some of the trees in the sample plots are not very thrifty or are not very well located.

Representation of size classes.—Fair, when the relative scarcity of the plant is considered.

Reproduction.—Natural regeneration is good, but the tree does not seem to increase in relative abundance, probably because of keen competition. The tree is frequently cultivated and makes one of our handsomest ornamental trees. Young plants have been known to put on more than one inch in girth for as much as twelve years. It would seem to be worth while to plant Penaga for a commercial crop.

GERONGGANG—*Cratoxylon arborescens* Bl.

Alternative name.—Gonggang.

Distribution.—KELANTAN. PENANG. PROVINCE WELLESLEY. DINDINGS. PERAK: all districts. SELANGOR: Kuala Selangor, Kuala Lumpur, Klang, Kuala Langat. NEGRI SEMBILAN: Kuala Pilah, Seremban, Coast, Tampin. PAHANG: all districts. MALACCA. SINGAPORE. It is probable that it occurs in every district of the Peninsula. Known also from Burma and the Malay Archipelago.

Abundance and manner of distribution.—Nowhere abundant, but frequently found in small forest at the edge of cleared land. Frequently along stream valleys or at the edge of fresh water swamp, from sea level up to over 4,000 feet.

DESCRIPTION.

Habit.—Small trees. Trunk frequently irregular, but without buttresses, branching rather low. Trees sometimes as much as 60 feet tall and 30 feet to the first branch. Crown rather dense, made up of a number of rather small spreading branches. 30 trees measured, in valuation surveys, had an average diameter of 18 inches, the maximum being 38 inches.

Bark.—Dark grey or pale brown, with yellow and red-brown tones. Frequent patches of greenish lichens, coarsely fissured, the fissures shallow, irregularly longitudinal, rather over an inch apart. Outer bark shedding in thin, almost papery, layers. Under the epidermis are a number of alternately thin and thicker, darker and lighter-coloured, chocolate brown layers, made up of corky and slightly fibrous material. Middle and inner bark thinner, yellow brown, fibrous, rapidly becoming darker and flowing a certain amount of sticky, brownish yellow sap. Sapwood at first white, soon showing stain from the sap. Total thickness of bark 0.3–0.5 in.

Leaves.—Opposite, simple, without stipules, coriaceous, broadly oblanceolate, obvate-elliptic or oblong-obovate, very shortly acuminate, glabrous, dull on both surfaces, the lower pale, yellowish brown with black dots, nerves numerous, obsolete, length 3–5 in., breadth $1\frac{1}{4}$ –2 in.; petiole $\frac{1}{4}$ in., stout. Twigs flattened at the nodes, more or less angular.

Flowers and fruit.—Flower clusters terminal, pyramidal, 4–9 in. long. Flowers $\frac{1}{4}$ in. in diameter, dark red; capsule $\frac{1}{2}$ in. long; seeds $\frac{1}{6}$ in. long, winged all round.

Seedling.—With leaves of the same form as those of the mature tree.

PRODUCTS.

Wood.—Very soft and very light, not durable. Sapwood white and useless; heartwood pink, even-grained and suitable for planks and some classes of ornamental work.

Sap.—The sap is used in the treatment of some forms of skin disease.

SYLVICULTURE.

Flowering and fruiting.—Geronggang has been found in flower in all months except January, and in fruit in all months except June. There seems to be no definite periodicity of flowering and fruiting.

Representation of size classes.—Poor.

OTHER FORMS LIKELY TO BE CONFUSED WITH GERONGGANG.

Some forms of Kelat (*Eugenia* spp.) bear a superficial resemblance to Geronggang, but are readily distinguished from it by their lack of coloured sap, and intra-marginal vein in leaf.

RENGAS—*Gluta* spp., *Melanorrhoea* spp., etc.

Ridley (Agric. Bull. S. S. & F.M.S., i (1901), p. 109) gives *Melanorrhoea Maingayi* Hook. f. as the principal source of the timber known as Rengas. It now seems that Rengas is produced by quite a number of species belonging to the genera *Gluta*, *Melanochyla*, *Melanorrhoea*, *Parishia*, and *Swintonia*. The group is not well understood, and no attempt is made to define the different species.

All forms of Rengas contain a poisonous principle, which seems to be present in all parts of the plant. It is a contact poison, which causes a painful irritation of the skin. The intensity of action of the poison is said to vary with the different species. There are many people who seem to be immune to Rengas poisoning. The poison affects the epidermis and the treatment for it is with local applications of lead acetate, hyposulphite of soda, or zinc sulphate. Washing with strong alcohol, or even with strong soap and water, is sometimes beneficial. Sometimes coolies smear themselves with coconut oil before cutting some of the worst forms. The wood contains some of the poison, which is most active when the wood is fresh, but which is capable of causing poisoning many years after the wood is first cut. Few carpenters object to handling the wood, although they may suffer temporary inconvenience from it. There seems to be no further danger of poisoning with dry wood which has been varnished, so long as the varnish coating is kept intact. The disadvantage does not seem to be serious enough to prevent the use of the wood, which is ordinarily used with a coating of varnish. If the wood is varnished before it is dry, the oil may come through the varnish in spots.

Distribution.—Rengas has been found in all districts of the Peninsula, except Province Wellesley, Matang, and Jelebu, and it is probable that it occurs there also. Various forms of Rengas are found throughout the eastern tropics.

Abundance and manner of distribution.—Rengas is present in all areas where we have done valuation surveys. It is usually about the fourteenth in order of abundance, by number of trees, there being about one tree of commercial size to four acres. It is found under a wide range of conditions. Some forms are found in swamps at sea level, while others are found on mountains up to 4,500 feet or more.



RENGAS—*Melanorrhoea aptera* King.



RENGAS—*Melanorrhoea aptera* King.

DESCRIPTION.

Habit. Medium-sized to large trees, usually of the second storey, but sometimes in the first. Trunk often irregular and with distinct buttresses. Crown rather open, made up of a few large, ascending branches. Trees as much as 120 feet in height and 60 feet to the first branch have been recorded. 916 trees measured, in valuation surveys, had an average diameter of 20 inches, the maximum being 46 inches.

Bark.—Grey and splotchy, reddish brown where bits have been shed, and stained with black, wherever the outer bark has been broken, 0·2–0·3 in. thick. Inner bark yellowish brown and brittle. Sapwood whitish, becoming stained dark yellow and later black in spots by the sap. Black sap, scanty in amount, appearing at the inner edge of the bark immediately after it is cut. When the sap first appears, following a cut, it is yellowish and oily, beginning to turn black within half an hour.

Leaves.—In most forms, simple, alternate, entire, without stipules. There is a good deal of variation in size, shape, and venation of leaves in the different forms. The leaves of *Parishia* differ from those of the other forms of Rengas by being pinnately compound. The young leaves of some forms are red.

Flowers and fruit.—The flowers are usually small and borne in large axillary clusters. They are usually rather inconspicuous, sometimes whitish or yellowish. Fruit usually a drupe, which may be bright coloured. Several forms have winged fruit. *Melanorrhoea* and *Swintonia* have the petals developed into wings, while in *Parishia* it is the calyx lobes that develop into wings. The wings are often red.

Seedling.—Most forms have seedlings with leaves of the same shape as those of the mature tree.

PRODUCTS.

Wood.—There is usually a large amount of sapwood, which is whitish or pale yellowish and worthless. The heartwood has a rich red or yellowish red colour, sometimes with alternating bands of darker and lighter colour, and is quite durable. There is a certain resemblance in colour to some forms of Mahogany. The wood is suitable for ornamental work and makes fine furniture. Sometimes there is no heartwood formed and the tree is then worthless, except for firewood.