

Identification and utilisation of lesser-known commercial timbers in Peninsular Malaysia 1: Ara, Bangkal, Bebusok and Bekoi

by

S. C. Lim, K. S. Gan & K. T. Choo

Introduction

Lesser-known commercial timbers (LKCT) have been used in Malaysia in the form of mixed species or 'chap-char' for a long time. In fact, the use of LKCT will not only promote maximum utilisation of forest resources and reduce wastage, but also relieve pressure of over-exploitation of the currently highly valuable commercial timber species.

Most of the time, however, the consumers of LKCT do not know exactly the identity of the timber species they used since they were supplied and sold in mixed parcel. The use of LKCT is guided by the weight and the availability of the timber. The heavier LKCT will find their way to the construction industry for such purposes as roof trusses, door and window frames, outdoor structures and many other uses. The lighter-weight timbers, on the other hand, will be used for temporary structures, furniture, boxes and crates and other low values products. Sometimes, however, timbers with low strength are found to be mixed with higher strength timbers and use for structural purposes. Thus, the situation in the use of LKCT can be quite confusing resulting in premature failure of some structural members, particularly roof trusses. When the timber is exposed to the weather, it deteriorates fairly quickly as inadequate precaution such as the durability and treatability of the timber with preservatives are not considered.

The consumer of LKCT can hardly be blamed for using 'unknown' timber because of the diversity of the Malaysian flora as it has been reported that in Peninsular Malaysia alone there are about 8000 species of flowering plants, of which 2650 species are tree species with 890 of them reaching harvestable sizes exceeding 45 cm dbh. Recognizing the large number of LKCT can be quite difficult. Thus, this article attempts to guide those who are involved in the grading, quality control and enforcement of timber on the identification of some of the LKCT using macroscopic features with the hope that a larger number of timber species can be recognized and separated for use. The ability to separate the timber not only provides a more efficient use of the timber but may also be able to enhance the value of the timber species concerned.

Lesser-known commercial timbers

This article highlights four LKCT i.e. ara (*Ficus* spp.), bangkal (*Nauclea/Neonauclea/Ochreinauclea* spp.), bebusok (*Cassia* spp./*Senna siamea*) and bekoi (*Crypteronia* spp.). The write up of individual timber includes main timber species of the group and their general distribution in the country. For the macroscopic features, their characteristics including such features as the

colour of sapwood and heartwood, texture and grain, figure, hardness and their air-dry density. The anatomical features include growth rings (if any), vessels size and their arrangement, types of parenchyma, rays and other features visible to the naked eye or with the aid of a magnifier (with $\times 10$ magnification). Uses or possible uses are also listed to provide as a guide to the user of the timber.

The timbers

ARA

(*Ficus* spp.) (Figure 1)
(Family: MORACEAE)

Main species: *F. callosa* Willd.; *F. drupacea* Thumb.; *F. lamponga* Miq.; *F. magnoleaefolia* Bl.; *F. microcarpa* Linn.f.; *F. racemosa* Linn.; *F. retusa* L.; *F. rumphii* Bl.; *F. stricta* Miq.; *F. sundaica* Bl.; *F. superba* Miq.; *F. tricolor* Miq.; *F. variegata* Bl.; *F. vasculosa* Wall. ex. Miq.; *F. viridicarpa* Corner.

Tree and distribution: More than 100 species in Peninsular Malaysia but mainly as shrubs, woody epiphytic climbers and stranglers or woody creepers except a few which can attain timber trees of commercial size. Trees can reach 33 m tall and 250 cm girth and occur in all types of forest from rocky seashores to tops of mountains. It is commonly found in or around clearings or disturbed sites or in open places.

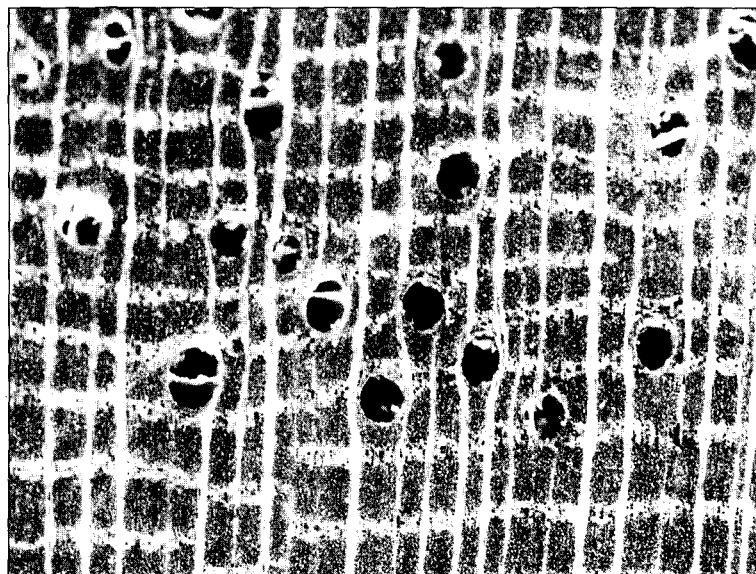


Figure 1 Ara (*F. retusa*) $\times 20$

Characteristics and physical properties

Heartwood yellow or light brown and merges gradually to the sapwood, which is lighter in colour. Texture is moderately coarse to coarse and uneven due to abundance of broad layers of wood parenchyma. Grain straight, interlocked or in some cases, deeply interlocked. Dark brown coloured streaks on flat-sawn lighter-coloured background formed by parenchyma bands giving rise to 'water-silk' figure. The timber is soft to moderately hard but mainly soft. Air-dry density of 352 to 635 kg/m³ (average: 445 kg/m³).

Macroscopic structures

- **Growth rings** indistinct, when present, marked by darker-coloured parenchyma layers on tangential surfaces.
- **Vessels** medium to very large, very few or few, solitary and in radial pairs or multiples of 3 to 6 but mainly 3, occasionally filled with gum-like or chalky-coloured deposit, tyloses occasionally present.
- **Wood parenchyma** abundant, mainly as broad apotracheal parenchyma regularly spaced layers with tendency to confluent and occasionally enclosing the vessels and conspicuous to the naked eye.
- **Rays** medium in size and visible to the naked eye. However, the presence of rays may be over-shadowed by the broad parenchyma bands.
- **Ripple marks** absent but vague ripple marks features may be observed in some species.
- **Intercellular canals** absent. Latex tubes are present in some species and may be difficult to discern, even with a hand lens on the cross section of the wood.

Uses

The timber is suitable for use in which where strength is not critical such as veneer and plywood, disposable chopstick, packing cases, wooden sandals and turnery. Flat-sawn material of the timber is rather decorative due to the presence of thick layers of parenchyma and is suitable for such purposes as decorative sliced-veneer and wall panelling.

BANGKAL

(*Nauclea/Neonauclea/Ochreinauclea* spp) (Figures 2 and 3)

(Family: RUBTACEAE)

Main species: *Nauclea officinalis* (Pierre ex Pitard) Merr. & Chun, *N. subdita* (Korth) Steud., *Neonauclea excelsa* (Bl.) Merr., *N. lanceolata* (Bl.) Merr., ssp. *lanceolata*, *Ochreinauclea maingayi* (Hook.f.) Ridsd.

Tree and distribution: *Nauclea officinalis* is a medium to big tree, about 50 m tall and 70 cm girth whereas *N. subdita* is small, of medium tree, about 25 m tall and 60 cm girth. The trees occur throughout Peninsular Malaysia, mainly in lowland to hill forests, also found in swampy forest and frequently along streams and rivers. *Neonauclea excelsa* is a medium-sized tree to 18 m tall, sometimes with fluted trunk at the base and found in lowland or hill forests to 900 m altitude in the states of Kedah, Penang, Perak, Pahang, Selangor, Johore and possibly other states. *N. lanceolata* ssp. *lanceolata* is medium to big tree, to 35 m tall, with fluted bole at base and on hillside and on hillsides in lowland forest. *Ochreinauclea maingayi* is a medium to big tree, to 25 m tall and 2 m girth. It is found in the lowlands including swamp forest in all states except Perlis, Kedah and Kelantan.

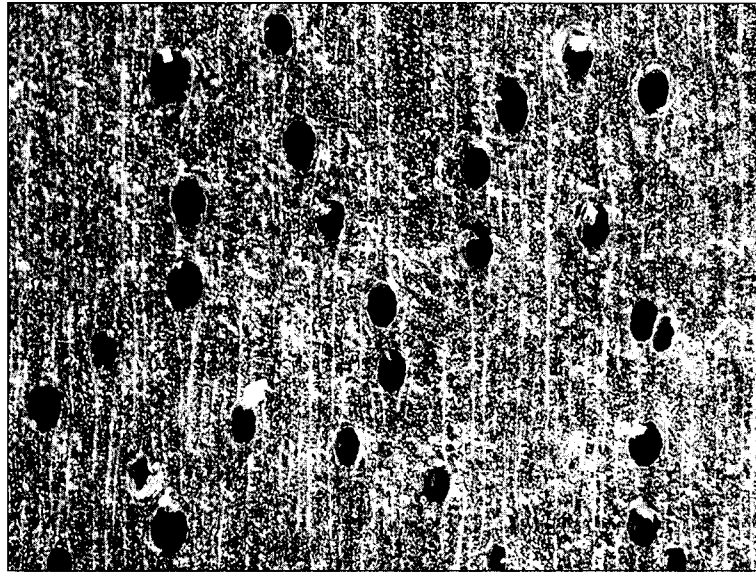


Figure 2 Bangkal (*Nauclea officianalis*) $\times 20$

Characteristics and physical properties

The sapwood is pale orange-yellow and not well defined from the heartwood, which is orange or orange-yellow, or dark orange-yellow. Texture is moderately fine and even. Grain is straight to shallowly interlocked. Stripe figure may be observed on the radial surface. The timber of *Nauclea* and *Ochreinauclea* are soft to hard and moderately heavy with an air-dry density of 335 to 795 kg/m³. *Neonauclea* timber is slightly harder with density as high as 985 kg/m³ at 15% moisture content.

Macroscopic structures

- **Growth rings** indistinct but the presence of layers without vessels and or fewer vessels and parenchyma, sometimes also layers of denser fibres may simulate growth rings.
- **Vessels** moderately small to medium-sized for *Nauclea* and *Neonauclea* but medium to large for *Ochreinauclea*, solitary and others in radial arrangement of 2 to 3, rarely up to 6; for *Ochreinauclea*, mainly radial multiples of 2 to 6, sometimes more, tyloses absent or sparse. Orange-brown, yellow or white deposit present.
- **Wood parenchyma** abundant, mainly as apotracheal parenchyma diffuse, diffuse in aggregate forming lines connecting from ray to ray. Paratracheal parenchyma vasicentric but inconspicuous to the naked eye and even the use of a handlens.
- **Rays** fine to moderately fine and distinct only with the lens.
- **Ripple marks** absent.
- **Intercellular canals** not observed.

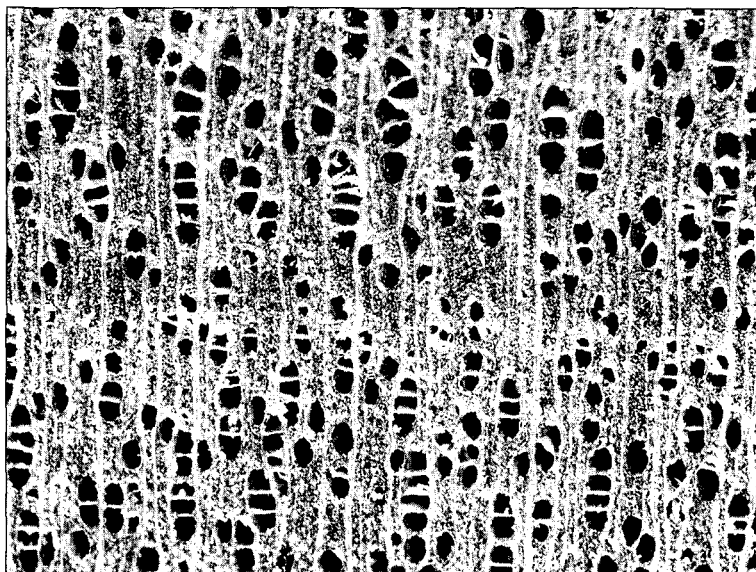


Figure 3 Bangkal (*Ochreinauclea maingayi*) $\times 20$

Uses

Suitable for internal purposes such as furniture, flooring, door and window frames, tool handle for non-impact purposes, skirting, staircase components, veneer and plywood.

BEBUSOK

(*Cassia* and *Senna* spp.) (Figure 4)
(Family: LEGUMINOSAE)

Main species: *Cassia javanica* L. subsp. *nodosa* (Buch.-Ham. ex Roxb.) K. Larsen & S.S. Larsen (busok busok, bebusok), *C. tomoriensis* DC., *Senna siamea* (Lam.) Irwin & Barneby (johar).

Tree and distribution *Cassia* is small to medium-sized tree up to 25 m tall (rarely to 40 m) and up to 60 cm in diameter, bole seldom straight. The trees usually occur in open sites in the forest up to 400 m altitude but can also be found in primary and secondary forest. The trees are commonly planted. *Senna* is small to medium-sized tree up to 20 m tall, sometimes also grow up to 30 m tall, usually with short bole up to 50 cm in diameter. It is a pioneer species and occurs in different types of lowland forest up to 1100 m altitude.

Characteristics and physical properties

The sapwood, which is white to pale yellow and distinct from the heartwood, which is orange brown to dark brown. Texture is coarse and even. Grain is straight or interlocked. Vague zigzag marking on flat-sawn material due to parenchyma. Timber is moderately hard to hard and moderately heavy with an air-dry density of 688 to 875 kg/m³.

Macroscopic structures

- **Growth rings** indistinct, usually marked by layers of terminal parenchyma.
- **Vessels** medium to moderately large, solitary or in radial arrangement of 2 to 3, rarely more, tyloses rare or absent. Deposit is white to reddish-brown in *Cassia*.

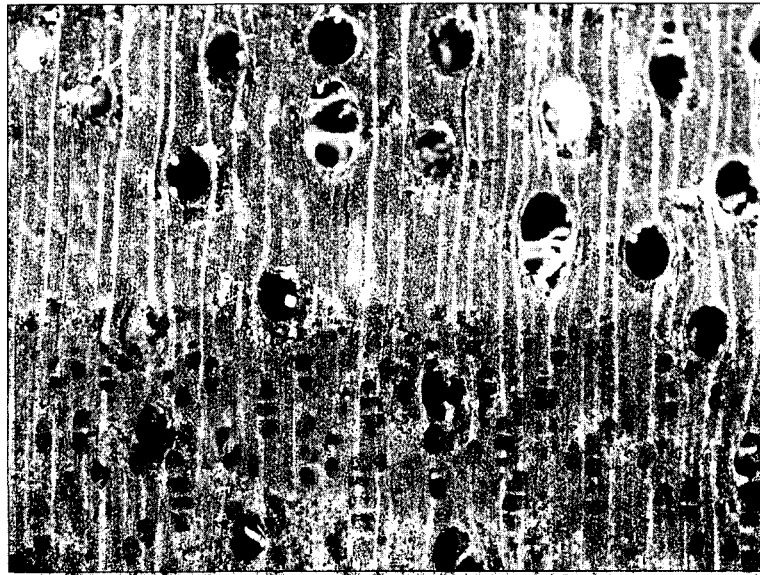


Figure 4. Bebusok (*C. javanica* subsp. *nodosa*) × 20

- **Wood parenchyma.** Abundant, mainly as paratracheal vasicentric, aliform with tendency to confluent connecting 2 to 4 vessels in a row. Apotracheal usually scattered as diffuse strands and more or less concentric layers and conspicuous
- **Rays** fine and not visible to the naked eye.
- **Ripple marks** present but vague.
- **Intercellular canals** not observed

Uses

The presence of lighter-coloured parenchyma layers on the dark-coloured background give rise to a very attractive 'zigzag' pattern on the flat-sawn material and as such, it is suitable for decorative works such as ornamental items, sliced veneer, turneries, high class furniture, antique looking flooring and other high values products.

BOKOI

(*Crypteronia* spp.) (Figure 5)
(Family: CRYPTERONIACEAE)

Main species: *C. griffithii* Clarke (bokoi daun rebah), *C. paniculata* Bl. var. *paniculata* (bokoi langin pipis), *C. paniculata* Bl. var. *affinis* (Planch.) Beus. & Ozinga (bokoi butir)

Tree and distribution: medium to large trees, reaching 45 m tall and 2.7 m girth in *C. griffithii*, 30.5 m tall and 1.75 m girth in *C. paniculata* var. *paniculata* and 27 m tall and 1.8 m girth in *C. paniculata* var. *affinis*. ~~Scattered in primary forests~~ and old secondary forests from lowlands to hills up to 600 m (*C. griffithii*), 1200 m (*C. paniculata* var. *paniculata*) and can be found in the states of Kedah, Kelantan, Penang, Perlis, Perak, Terengganu, Pahang, Selangor, Negeri Sembilan, Malacca and Johore.

Characteristics and physical properties

Heartwood light brown to greyish-brown and not well defined from the sapwood, which is pale brown. Texture moderately fine and even. Grain straight or shallowly interlocked, sometimes wavy. Wood soft to hard, light to slight heavy with air-dry density of 540 to 820 kg/m³ (average 685 kg/m³).

Macroscopic structures

- **Growth rings** may be observed only with a hand lens by the presence of marginal parenchyma or the absence of apotracheal parenchyma bands or vessels on parts of the cross section.
- **Vessels** moderately small to medium-sized and not distinct to the naked eye; moderately few, solitary and radial groups of 2 to 3; tyloses present; yellow-white deposits common.
- **Wood parenchyma** abundant, mainly as apotracheal layers from ray to ray; paratracheal as incomplete sheaths to the vessels.
- **Rays** very fine to moderately fine, inconspicuous to the naked eye and barely visible with a lens on end and tangential surfaces.
- **Ripple marks** absent
- **Intercellular canals** absent.

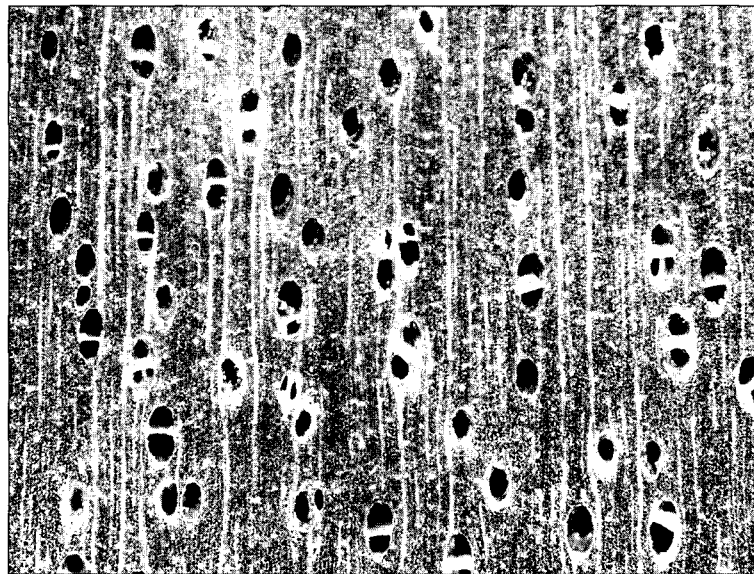


Figure 5 Bekoi (*C. paniculata*) × 20

Uses

General utility purposes such as furniture, domestic flooring, interior finishes, veneer and plywood.

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