

Timber Notes - Light Hardwoods III (Bintangor, Durian, Geronggang, Gerutu, Jelutong)

by

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- Trade name:** Bintangor
- Species:** *Calophyllum* species (about 45 species in Peninsular Malaysia - only 30 species reaching 120 cm girth).
- 1. Tree type and distribution:** Tall, slender, big trees, less frequently medium or small trees, occasionally shrubs or very big trees. Present throughout the country and abundant in dry low-land forest. Also found in peat swamp, lower and upper mountain forests.
- 2. Wood characteristics:** Heartwood pink-brown to red-brown and distinct from the sapwood which is light pink-brown. Texture coarse and uneven. Grain interlocked, spiral or wavy. Planed surface very lustrous. Growth rings figure on tangential surface.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 465 to 865 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards takes 2-4 months and about 5 months respectively. For kiln drying, schedule A is recommended. Both *C. inophyllum* and other *Calophyllum* spp. have Type II movement.
- 6. Machining properties:** Easy to resaw and cross-cut. Planing is easy and the planed surface produced is smooth to moderately smooth. The nailing property is rated poor.
- 7. Durability:** Ranges from moderately durable (*C. retusum*) to durable (*C. curtisii*). Timber is moderately difficult to treat.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on test carried out on *Calophyllum retusum*.

Property (MPa)	Green	Air dry
Modulus of rupture	52	74
Modulus of elasticity	12 100	14 300
Maximum crushing strength	26.5	36.7

- 10. Uses:** Suitable for light construction, flooring, panelling, joinery, furniture manufacture, solid door, veneer and plywood manufacture and wooden pallet.

- Trade name:** Durian
- Species:** Consist of 2 species of *Coelostegia*, 13 species of *Durio*, 4 species of *Neesia*, and *Kostermansia malayana*.
- 1. Tree type and distribution:** *Coelostegia* species are found to scatter in lowlands up to an altitude of 600 m. *Durio* species can be found from lowlands up to 910 m in primary forest. *Durio carinatus* is restricted to peat swamp forest along the east coast of Peninsular Malaysia. *Neesia* species and *K. malayana* are mainly found in the lowland swamp forest.
- 2. Wood characteristics:** Heartwood pink-brown or deep red-brown except *C. griffithii* which is orange-brown or orange-red. Sapwood white in *Durio*, pale yellow in *Kostermansia malayana* and *Neesia* and light orange-yellow in *Coelostegia*. Texture coarse and uneven. Grain straight to interlocked.
- 3. Timber classification:** LHW
- 4. Wood density:** 420-800 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying 15 mm and 40 mm takes 1^{1/2} months and 3-4 months respectively. For kiln drying, schedule D (tentative) is recommended. Class IV movement for *Durio malaccensis*.
- 6. Machining properties:** Easy to slightly difficult to resaw and cross-cut. Planing is easy to moderately easy and planed surface is smooth. Nailing property is rated good to excellent.
- 7. Durability:** Non-durable. Timber very easy to treat.
- 8. Strength grouping:** B&C
- 9. Strength properties:** Data based on minimum average from tests carried out on *Neesia altissima*, *Durio oxyleyanus* and *Coelostegia griffithii*.

Property (MPa)	Green	Air dry
Modulus of rupture	51	65
Modulus of elasticity	8600	9500
Maximum crushing strength	26.5	325

- 10. Uses:** Suitable for light construction indoors, flooring, plywood and wooden sandals, furniture and sliced veneer.

- Trade name:** Gerongang
- Species:** *Cratoxylum arborescens*.
- 1. Tree type and distribution:** Medium to large tree reaching 42 m tall and 200 cm girth. Widely distributed throughout the country except Perlis and Kedah. Very common in peat swamp forest, also dry land forests at all elevations to 1700 m altitude.
- 2. Wood characteristics:** Heartwood brick-red or deep pink and distinct from the sapwood which is lighter in colour. Texture moderately fine and even. Grain interlocked. Planed surface very lustrous.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 350 to 610 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 40 mm boards takes about 2 months. For kiln drying, schedule E is recommended.
- 6. Machining properties:** Easy to resaw and cross-cut. Planing is easy and planed surface is smooth. Nailing property is rated excellent.
- 7. Durability:** Non-durable. Timber extremely easy to treat.
- 8. Strength grouping:** D
- 9. Strength properties:** Data based on test carried out on *Cratoxylum arborescens*.

Property (MPa)	Green	Air dry
Modulus of rupture	40	n.a
Modulus of elasticity	8000	n.a
Maximum crushing strength	18.3	n.a

- 10. Uses:** Suitable for joinery, furniture manufacture, panelling, moulding and veneer for plywood.

Trade name:

Gerutu

Species:

Trade name for the timber of *Parashorea* (family Dipterocarpaceae) in Peninsular Malaysia, similar genus from the state of Sabah is known as white seraya. There are three species of *Parashorea* known to occur in Peninsular Malaysia, i.e. *P. stellata* (gerutu-gerutu), *P. densiflora* (g. pasir) and *P. globosa* (g. pasir daun besar).

1. Tree type and distribution:

The trees of gerutu are usually large with clear bole to a good height. *Parashorea densiflora* and *P. stellata* are found in the southern and northern halves of the peninsula respectively. *Parashorea globosa* is very rare and known to exist only in Perak. Generally, the trees favour undulating, hilly jungles or valleys up to an altitude of about 600 m.

2. Wood characteristics:

Heartwood is light brown or light bronze weathering to darker shade with a distinct pinkish tinge. Sapwood light yellow-brown and distinct. Planed surface lustrous with broad stripe figure on radial surface. Texture coarse but even. Grain shallowly to deeply interlocked. Brittleheart normally present and may be appreciable in some logs.

3. Timber classification:

LHW

4. Wood density:640-770 kg m⁻³ air dry.**5. Drying and relative movement:**

Air drying of 15 mm and 40 mm boards takes 4 months and 6 months respectively. For kiln drying, schedule C is recommended preferably pre-drying to about 30% moisture before kiln drying. Class IV movement for *Parashorea densiflora*.

6. Machining properties:

Slightly difficult to saw and fairly easy to cross-cut. Planing is easy and planed surface is smooth

7. Durability:

Non-durable. Timber very difficult to treat.

8. Strength grouping:

C

9. Strength properties:

Minimum average based on tests carried out on *Parashorea stellata* and *P. densiflora*.

Property (MPa)	Green	Air dry
Modulus of rupture	40	-
Modulus of elasticity	8000	-
Maximum crushing strength	18.3	-

10. Uses:

Suitable for light to medium duty construction under cover, panelling and partitioning, utility furniture, plywood, box, pallet and crate.

- Trade name:** Jelutong
- Species:** *Dyera* spp. (only the species of *D. costulata* present in Peninsular Malaysia).
- 1. Tree type and distribution:** Big tree reaching 60 m tall, 780 cm girth. Present throughout P. Malaysia (except Perlis and Pulau Langkawi) in lowlands, plains, low undulating country, occasionally in swampy places, also hillsides and ridges to 300 m.
- 2. Wood characteristics:** Heartwood and sapwood not differentiated. Wood cream-white weathering to a pale yellow/straw colour. Texture moderately fine and even. Grain straight, slit-like latex traces on tangential surface.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 415 to 495 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards takes 1^{1/2} months and 3 months respectively. For kiln drying, schedule H is recommended, but miscellaneous kiln treatment against mould, fungal and insect attack is usually needed. Type II movement.
- 6. Machining properties:** Easy to resaw and plane and produces a smooth surface.
- 7. Durability:** Non-durable. Susceptible to fungal as well as lyctus beetle and termite attacks. Timber is extremely easy to treat.
- 8. Strength grouping:** D
- 9. Strength properties:**
- | Property (MPa) | Green | Air dry |
|---------------------------|-------|---------|
| Modulus of rupture | 38 | 50 |
| Modulus of elasticity | 7900 | 8100 |
| Maximum crushing strength | 21.0 | 27.0 |
- 10. Uses:** Suitable for pattern making, carving, picture frame, drawing board, black board, toys, packing case, wooden shoe heels and pencil slat.



Bintangor



Durian



Geronggang



Gerutu



Jelutong

BACKGROUND INFORMATION

1. Tree type and distribution

The distribution and size of tree are given.

2. Wood characteristics

The colours of sapwood and heartwood, figure, appearance on planed surface and any other characteristic features of the timber.

3. Timber classification

Under the Malaysian Grading Rules (1984), timbers are classified as Heavy Hardwood (HHW) when their density exceeds 800 kg m^{-3} and the timbers are naturally durable. Medium Hardwoods (MHW) are timbers with density $720 - 800 \text{ kg m}^{-3}$ but lack sufficient natural durability. Light Hardwoods (LHW) are timbers with density below 720 kg m^{-3} and are not naturally durable in exposed condition.

4. Wood density

Green density of freshly sawn board, defined as green mass divided by green volume. It varies with the freshness of the log in the log yard before processing and seasoning. Air dry density is the average mass divided by volume at 15 per cent moisture content.

5. Drying and relative movement

Air drying time for 15 mm and 40 mm boards and moisture content are from Grewal (1979). "Air-seasoning Properties of Some Malaysian Timbers", Timber Trade Leaflet No. 41. Suitable kiln drying schedule is mentioned [schedules based on Grewal (1988), "Kiln Drying Characteristic of Some Malaysian Timbers", Timber Trade Leaflet No. 42]. The relative movement (whenever is available) is defined as the change in dimension of a piece of timber when exposed to the service conditions of 60 % RH/30 °C and 95 % RH/30 °C respectively, and expressed as percentage of the value at 60 % RH/30 °C. The movement ratings stated are based on values of the corresponding tangential movement [Choo *et al.* (1998), "Movement of Seasoned Timber in Service", FRIM Technical Information Handbook No. 18].

Movement rating	Tangential movement (%)
Type I	< 1.5
Type II	1.5-2.0
Type III	2.1-2.5
Type IV	2.6-3.0
Type V	> 3.1

6. Machining properties

Comments are made on the comparative ease or difficulty of sawing, planing, turning, boring, peeling, gluing and other wood working properties.

7. Durability

Durability ratings of Malaysian Timbers are based on performance of test-stacks in graveyard testing. Test-stacks of 50 x 50 x 600 mm are buried in test grounds and their performance monitored. The number of years that the timber can last under such condition is used to classify the durability of the timber. Under the system, timbers are classified as follows:

Rating	Number of years
Very durable	more than 10
Durable	5-10
Moderately durable	2-5
Non-durable	0-2

Susceptibility to fungal, termite attacks and treatability may be mentioned.

8. Strength grouping

In the strength grouping of timber under each trade name, ranking is allocated from A (strongest) to D (weakest). Minimum values for strength groups are based on common grade for dry timber (below 19 % moisture content) (units are in MPa).

Strength group	A	B	C	D
Modulus of elasticity	9700	6600	5500	3100
Bending and tension parallel to grain	12.41	9.65	7.24	4.83
Compression parallel to grain	11.03	7.93	5.51	4.14
Compression perpendicular to grain	1.45	0.90	0.55	0.45
Shear parallel to grain	1.45	0.90	0.62	0.62

9. Strength properties

Values are from Lee *et al.* 1979, "The Strength Properties of Some Malaysian Timbers", Malaysian Forest Service Trade Leaflet No. 34.

10. Uses

Various past and potential uses are given, but the list is obviously not exhaustive.

TIMBER TECHNOLOGY BULLETIN

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