



Timber Notes – Medium Hardwoods III (Mata Ulat, Mempening, Mengkulang, Meransi, Merawan)

by

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- Trade Name:** Mata Ulat
- Species:** *Kokoona coriacea*, *K. littoralis*, *K. ochracea*, *K. reflexa* and *K. sessilis*.
- 1. Tree type and distribution:** The trees of mata ulat are small to large with straight and cylindrical boles. The largest tree recorded is the species of *K. reflexa* with 55 m height and 390 cm girth. Mata ulat is found in lowland forests up to 1000 m altitude.
- 2. Wood characteristics:** Heartwood yellow-brown to pink-brown with a pink tinge. Sapwood lighter in colour and not distinct. Texture fine and slightly uneven due to the presence of broad parenchyma. Grain shallowly interlocked. Planed surface slightly lustrous. Flat-sawn surface consists of decorative zig-zag marking due to the presence of broad parenchyma bands.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 800 to 1040 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards takes between 2 – 3 months and 3 ½ – 5 months respectively. For kiln drying, schedule C is recommended. Timber is prone to surface-checking and moderate splitting.
- 6. Machining properties:** Easy to saw, cross-cut, plane and bore. Planed surface is generally smooth although some picking-up grain occurs in some radial material. Difficult to turn and the finish is rough.
- 7. Durability:** Moderately durable. Not resistant to subterranean termites. Susceptible to powder-post beetles and sap-staining fungi. Species *Kokoona reflexa* is difficult to treat.
- 8. Strength grouping:** A, require preservative treatment.
- 9. Strength properties:** Data based on tests carried out on *Kokoona littoralis*.
- | Property (MPa) | Green | Air dry |
|---------------------------|--------|---------|
| Modulus of rupture | 102 | - |
| Modulus of elasticity | 16 300 | - |
| Maximum crushing strength | 53.1 | - |
- 10. Uses:** Suitable for heavy constructional works, heavy-duty furniture, panelling, parquet flooring, strip flooring and fancy articles.

- Trade Name:** Mempening
- Species:** *Lithocarpus* (38 species) and *Quercus* (8 species). Out of which only about 32 species of *Lithocarpus* and 6 species of *Quercus* can achieve medium to large size.
- 1. Tree type and distribution:** *Lithocarpus* is found in lowland and lower montane forest to 1370 m altitude. Tree small to large. *Quercus* is widespread in lowland and lower montane forest to 1800 m altitude, medium to large tree.
- 2. Wood characteristics:** Heartwood yellow brown to red-brown usually not distinct from the sapwood. Texture coarse and uneven. Grain straight, interlocked or wavy. Prominent 'silver figure' or radial surface.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 575 to 1010 kg m⁻³ air dry.
- 5. Drying and Relative Movement:** Air drying of 15 mm and 40 mm boards take about 2 months and 5 months respectively. Slight end-checks and splitting. Species *Lithocarpus ewyckii* has Type IV movement.
- 6. Machining properties:** Easy to saw when green but is slightly difficult to work when air dried. Planed surface is smooth. Nailing property is rated poor.
- 7. Durability:** *Lithocarpus ewyckii* is moderately durable under exposed condition. Timber is very difficult to treat.
- 8. Strength grouping:** A & B
- 9. Strength properties:** Data based on the lower average values of test carried out on *Q. argentata* and *Q. lamponga*.

Property (MPa)	Green	Air dry
Modulus of rupture	83	115
Modulus of elasticity	16 900	19 400
Maximum crushing strength	45.9	61.7

- 10. Uses:** Suitable for heavy to medium construction. Also suitable for interior finishing, panelling, parquet flooring and furniture.

- Trade Name:** Mengkulang
- Species:** *Heritiera* spp. (family Sterculiaceae).
- 1. Tree type and distribution:** Medium to large trees. Bole tall, straight, with short or tall buttresses. Widely scattered in Peninsular Malaysia from lowlands to hill forests, some on ridge.
- 2. Wood characteristics:** The wood is moderately heavy to heavy. Heartwood commonly red-brown or dark brown, sometimes with darker streaks and distinct from the sapwood. Texture coarse and even.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 625 to 895 kg m³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards takes 2 and 3 month respectively. For kiln drying, scheduled D is recommended. Type III movement.
- 6. Machining properties:** Difficult to saw and is slightly difficult to plane. However, a smooth finish is produced. Nailing property is good.
- 7. Durability:** Non durable in exposed conditions. Susceptible to lyctus beetle attacks. Average amenability to preservative treatment for both species *H. javanica* and *H. simplicifolia*.
- 8. Strength grouping:** B
- 9. Strength properties:** Data based on tests carried out on *H. simplicifolia*.

Property (MPa)	Green	Air dry
Modulus of rupture	75	91
Modulus of elasticity	13 700	15 990
Maximum crushing strength	37.8	52.1

- 10. Uses:** Suitable for medium construction under cover, plywood manufacture, flooring, interior finishing, furniture, paneling, general planking and glue lamination.

- Trade Name:** Meransi
- Species:** *Carallia brachiata*, *C. eugenioidea*, *C. euryoides*, *C. lanceaefolia*.
- 1. Tree type and distribution:** Only 4 species can achieve timber size. Scattered distribution from lowland to mountain forests. Tree small to medium-sized.
- 2. Wood characteristics:** Heartwood yellow brown or red brown with orange tinge and not differentiated from the sapwood. Texture coarse and uneven. Grain straight to interlocked. Attractive 'silver figure' on radial surface.
- 3. Timber classification:** MHW
- 4. Wood density:** Ranges from 670 to 930 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take about 2 months and 5 months respectively. The timber has Type II movement.
- 6. Machining properties:** Easy to fairly easy to resaw and cross-cut. Planing is easy to fairly easy and planed surface is smooth to moderately smooth.
- 7. Durability:** Species *Carallia brachiata* is moderately durable and is also amenable to treatment.
- 8. Strength grouping:** A
- 9. Strength properties:** Data based on test carried out on *Carallia* spp.

Property (MPa)	Green	Air dry
Modulus of rupture	83	104
Modulus of elasticity	12 400	13 200
Maximum crushing strength	42.9	54.6

- 10. Uses:** Suitable for interior finishing, decorative purposes, panelling, furniture making, sliced veneers, fancy articles and novelty items.

- Trade Name:** Merawan
- Species:** *Hopea* spp. (family Dipterocarpaceae).
- 1. Tree type and distribution:** Small to medium-sized with straight bole without large buttresses. Trees can be as tall as 37 m and 2.5 to 3 m in girth. Widely distributed throughout the country.
- 2. Wood characteristics:** Wood moderately hard to hard and moderately heavy to heavy. Heartwood yellow-brown weathering to dark brown and not well defined from the sapwood which is light yellow-brown. Texture moderately fine and even. Grain shallowly interlocked or wavy.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 495 to 980 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards take about 4 and 6 months respectively. For kiln drying, schedule H is recommended. Type II movement.
- 6. Machining properties:** Moderately easy to resaw and cross-cut. Planing is fairly easy and the surface produced is smooth. Nailing property is rated very poor.
- 7. Durability:** Moderately durable. Both *Hopea sulcata* and *H. sangal* is resistant to treatment.
- 8. Strength grouping:** B
- 9. Strength properties:** Data based on the lower average values of tests carried out on *Hopea nervosa* and *H. sulcata*.

Property (MPa)	Green	Air dry
Modulus of rupture	90	-
Modulus of elasticity	15 000	-
Maximum crushing strength	45.9	-

- 10. Uses:** Suitable for rafters, joists, door and window frames, flooring, joinery, and furniture.



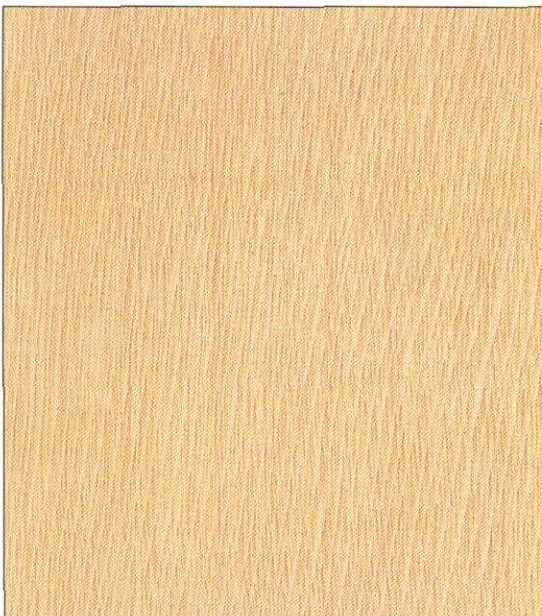
Mata ulat



Mempening



Mengkulang



Meransi



Merawan

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 exceeding 729 kg m^{-3} but lack sufficient natural durability. Light Hardwoods (LHW) are timber with density below 720 kg m^{-3} and 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 13 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
Class I	< 1.5 %
Class II	1.5% to 2.0%
Class III	2.1% to 2.5%
Class IV	2.6% to 3.0%
Class 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-sticks in graveyard testing. Test-stakes 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 conditions 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 years
Durable	5-10 years
Moderately durable	2-5 years
Non-durable	0-2 years

Susceptibility to fungal and termite attacks 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 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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