

Timber Notes - Light Hardwoods VI (Dedali, Kedondong, Kelempayan, Kelumpang, Kembang Semangkok)

by

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

- Trade name:** Dedali
- Species:** *Strombosia javanica*.
- 1. Tree type and distribution:** Medium tree to 24 m tall, 90 cm girth. Scattered throughout the country in lowland rain forest but nowhere abundant.
- 2. Wood characteristics:** Heartwood pale yellow to golden yellow weathering to light orange-brown. Sapwood is lighter in colour and well defined. Texture fine and even. Grain straight or interlocked.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 580 to 720 kg m⁻³ air dry.
- 5. Drying and relative moment:** Air drying of 15 mm and 40 mm boards takes 7 months and 12 months respectively. Timber prone to cupping, end-checks and surface-checking.
- 6. Machining properties:** Easy to resaw and cross-cut. Planing is easy and the planed surface produced is smooth on the tangential side and slightly rough due to grain pick-up on the radial side. Nailing property is rated as good.
- 7. Durability:** Moderately durable. Insect attack during seasoning has been observed. Timber is easy to treat.
- 8. Strength grouping:** B
- 9. Strength properties:**
- | Property (MPa) | Green | Air dry |
|---------------------------|--------|---------|
| Modulus of rupture | 57 | 78 |
| Modulus of elasticity | 10 700 | 11 100 |
| Maximum crushing strength | 30.1 | 39.7 |
- 10. Uses:** Suitable for general utility purposes, medium duty construction under cover, interior finishing, packing case, veneer and plywood manufacture.

- Trade name:** Kedondong
- Species:** Species of *Burseraceae*.
- 1. Tree type and distribution:** *Canarium* is a medium to large buttressed tree, rarely a shrub and widely distributed in the lowland forests, sparsely present in hill dipterocarp forest up to 1200 m. *Dacryodes* is a medium-sized and well-shaped tree distributed in lowland and hill dipterocarp forests, occasionally in swamps. *Garuga* is a small tree and unimportant for commercial purpose. *Santiria* is a medium-sized to large tree, in lowland forests including swamps to hill forest up to 1200 m. *Scutinanthe* is a medium-sized tree, usually in lowland forests, rarely to 820 m. *Triomma* is a very large tree scattered throughout the country mainly in lowland forests.
- 2. Wood characteristics:** Heartwood pink-brown or red-brown and not clearly defined from the sapwood. Planed surface dull to very lustre. Texture moderately fine and even. Grain wavy and interlocked.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 495 to 975 kg m⁻³ air dry.
- 5. Drying and relative movement:** 15 mm boards take about 2 to 3^{1/2} months to air dry, whereas 40 mm boards take 4 to 6 months. For kiln drying, schedulej is recommended. Kedondong gergaji (*C. littorale f. rufum*) has type 11 movement.
- 6. Machining properties:** Working quality of the timber is variable, ranging from easy to work to very difficult to work, due to the presence of silica and deeply interlocked grain. Nailing property is good.
- 7. Durability:** Non-durable. Susceptible to insect attack before seasoning. Timber very difficult to treat.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on the lower values of *Canarium littorale f. rufum*, *C. megalathum* and *Santiria laevigata* tested.

Property (MPa)	Green	Air dry
Modulus of rupture	64	81
Modulus of elasticity	11 200	12 100
Maximum crushing strength	31.8	43.1

- 10. Uses:** Suitable as a general utility timber for planking, cladding, plywood, flooring, furniture, packing case and pallet.

- Trade name:** Kelempayan
- Species:** *Neolamarckia cadamba*.
- 1. Tree type and distribution:** Medium-sized to large tree (to 40 m tall). Bole straight, columnar, sometimes with steep buttresses to 2 m tall. Found in lowlands to mountain forest at about 1000 m, often by streams and rivers and in open sites and deep moist alluvial soils as a pioneer species, frequently gregarious.
- 2. Wood characteristics:** The timber is soft and light. Heartwood white with a yellow tinge and darkening to creamy yellow on exposure and not differentiated from the sapwood. Texture moderately fine and even. Grain straight.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 370 to 465 kg m⁻³ air dry
- 5. Drying and relative movement:** Air drying of 15 mm and 40 mm boards takes 2^{1/2} and 3^{1/2} months respectively.
- 6. Machining properties:** Easy to resaw and cross-cut. Planing is easy and the planed surface produced is smooth.
- 7. Durability:** Non-durable. Timber very easy to treat.
- 8. Strength grouping:** D
- 9. Strength properties:** Based on tests carried out on *Neolamarckia cadamba*.

Property (MPa)	Green	Air dry
Modulus of rupture	43	50
Modulus of elasticity	7300	7700
Maximum crushing strength	21.0	27.9

- 10. Uses:** Suitable for plywood manufacture, packing case, wooden sandals, toys, disposable chopsticks and possibly as a short-fibred pulp.

Trade name:	Kelumpang
Species:	<i>Sterculia</i> species (22 species in Peninsular Malaysia).
1. Tree type and distribution:	About 6 species which are medium to large trees. Present from the lowland to the mountain forests to 450 m altitude throughout the country.
2. Wood characteristics:	Heartwood straw colour to light brown or light red-brown and not well defined from the sapwood. Texture moderately coarse and uneven. Grain straight to moderately interlocked. Growth ring figure on tangential surface.
3. Timber classification:	LHW
4. Wood density:	Ranges from 560 to 640 kg m ⁻³ air dry.
5. Drying and relative movement:	Not available.
6. Machining properties:	Not available.
7. Durability:	Non-durable.
8. Uses:	Suitable for temporary light construction, packing case, core veneer for plywood and furniture.

- Trade name:** Kembang semangkok
- Species:** *Scaphium* species (4 species in Peninsular Malaysia).
- 1. Tree type and distribution:** Large deciduous tree with thick buttress. Usually scattered individually in lowland and hill forests. *Scaphium linearicarpum* mainly in lowland forests to 720 m, *S. longiflorum* in lowland forests particularly in swampy or semi-swampy forests, *S. macropodum* in well-drained undulating land and ridges to 1200 m, *S. scaphigerum* in places with a pronounced dry season particularly in north of P. Malaysia.
- 2. Wood characteristics:** Heartwood yellow-brown and not distinct from the sapwood. Texture coarse and uneven. Grain straight or shallowly interlocked. Growth rings distinct due to layers of parenchyma. Ripple marks present. Traumatic intercellular canals occasionally present.
- 3. Timber classification:** LHW
- 4. Wood density:** Ranges from 515 to 755 kg m⁻³ air dry.
- 5. Drying and relative movement:** Air drying of 15 min and 40 min boards takes about 2 months and 3 months respectively. For kiln drying, schedule H is recommended. Timber prone to mould and blue stain attack. Kiln drying of timber below 8% moisture content is not recommended. Kembang semangkok jantung (*S. macropodum*) has type II movement.
- 6. Machining properties:** Moderately easy to resaw, cross-cut, and plane and the planed surface is generally smooth. However, the siliceous nature of the timber mass, during sawing, has an abrasive effect on the saw teeth, producing rapid blunting of cutting edges and heating of the saw. Generally, the machining properties can be improved by using saw teeth tipped with carborundum steel. Nailing property is rated good.
- 7. Durability:** Moderately durable. Timber very easy to treat.
- 8. Strength grouping:** C
- 9. Strength properties:** Data based on tests carried out on *Scaphium macropodum*.
- | Property (MPa) | Green | Air dry |
|---------------------------|--------|---------|
| Modulus of rupture | 76 | 92 |
| Modulus of elasticity | 15 500 | 17 000 |
| Maximum crushing strength | 37.2 | 50.2 |
- 10.Uses:** Suitable for interior finishing, panelling, furniture manufacture, fancy veneer, flooring for residential dwelling.



Dedali



Kedondong



Kelempayan



Kelumpang



Kembang Semangkok

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

Editor

K.T. Choo

Editorial Panel

Assoc. Prof. Dr. Mohd. Zamin Jumaat

Department of Civil Engineering
Faculty of Engineering, University Malaya
59100 Kuala Lumpur

Dr. Razali Abdul Kader

Golden Hope Plantation Bhd
Research & Development Department
Oil Palm Research Station
P. O. Box No. 207
42700 Banting, Selangor DE

Mr. C. T. Yap

26, Jalan 3, Eng Ann Estate
Klang, Selangor DE