

## Timber of Sentang

S. C. Lim, K. S. Gan & A. Khairul

### Introduction

Sentang (*Azadirachta excelsa*) is a well-known village tree in the central and northern parts of Peninsular Malaysia (Figure 1). The species is also commonly planted along roadsides and farm boundaries. In its natural habitat, sentang can be found in old clearings or in secondary forest or in dipterocarp rain forest. It is reported to grow better on level lands than on slope or in mountainous areas.



Figure 1 Sentang trees in a village

### Availability

Sentang plantation (Figure 2) is relatively new in Malaysia. To date, approximately 8253 ha of land have been planted with sentang. Most of them are located in the states of Kedah, Perak, Negeri Sembilan, Johore and Pahang.



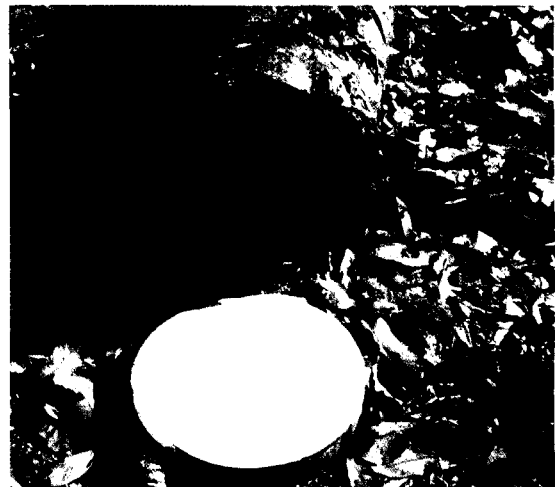
**Figure 2** Sentang plantation (about 7 years old)

### General characteristics

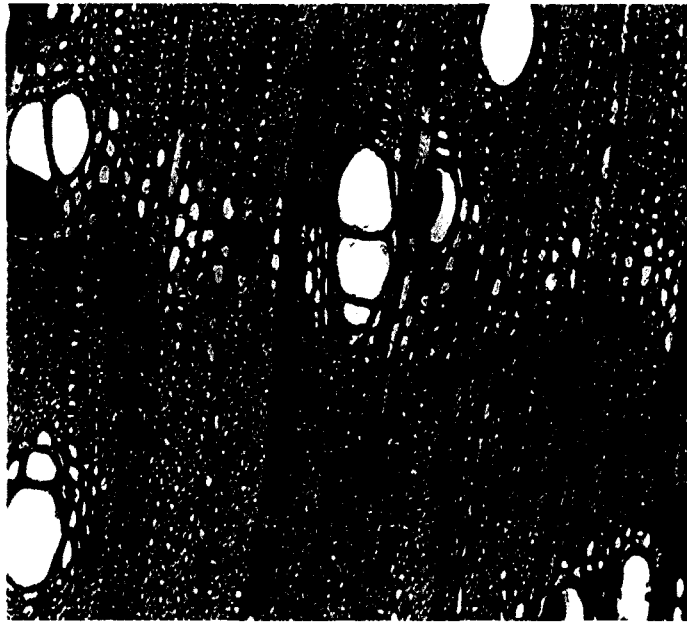
The timber is moderately hard and moderately heavy with an average density of 560–770 kg m<sup>-3</sup> air dry. However, the density of sentang is expected to vary with age. Lim *et al.* (2002) reported that the basic density of 10-year-old sentang ranges from as low as 427 to 654 kg m<sup>-3</sup> with an average of 521 kg m<sup>-3</sup> whereas for the 15-year-old trees, the basic density ranges from 410 to 630 kg m<sup>-3</sup> with an average of 517 kg m<sup>-3</sup>. The sapwood is straw-coloured or pale red and is moderately sharply differentiated from the heartwood, which is reddish brown (Figures 3 and 4). The proportion of sapwood is normally higher in younger trees than the older ones. Lim *et al.* (2002) reported that the percentage of sapwood in 10-year-old sentang ranges from 10.8 to 33.1% with an average of  $18.7 \pm 5.2\%$  and 15-year-old sentang ranges from 10.1 to 23.4% with an average of  $17.8 \pm 4.1\%$ . Texture is slightly coarse and uneven due to a tendency towards a ring-porous structure (Figure 5).



**Figure 3** Logs of plantation-grown sentang



**Figure 4** Cross-cut of a sentang log



**Figure 5** Cross-section of sentang timber

## Properties

### *Mechanical strength properties*

Sentang is reported to be moderately strong and it has been classified under strength group C (probably SG 5 or 6 under the new Malaysian strength classification) in Malaysia which made the timber unsuitable for structural application. The mechanical properties of the timber are shown in Table 1 together with that of rubberwood for the purpose of comparison.

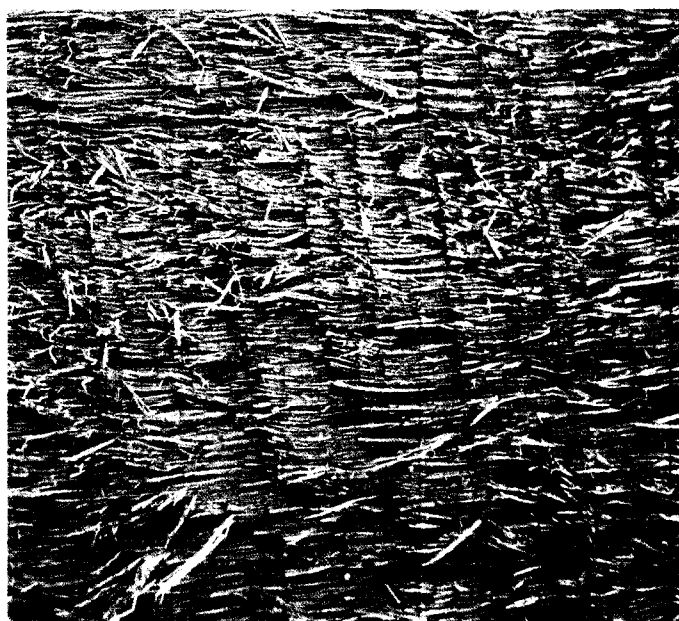
**Table 1** Mechanical properties of sentang and rubberwood

Property	Sentang		Rubberwood	
	Green	Air-dry	Green	Air-dry
Moisture content (%)	55	14.5	52	17.2
Density (kg m <sup>-3</sup> )	744.0	618.0	800.0	640.0
Modulus of elasticity (N mm <sup>-2</sup> )	6770	9525	8800	9240
Modulus of rupture (N mm <sup>-2</sup> )	55.54	77.96	58	66
Compression parallel to grain (N mm <sup>-2</sup> )	31.15	40.46	25.3	32.3
Shear parallel to grain (N mm <sup>-2</sup> )	2315	2939	9.0	11.0
Hardness (N)	8.18	25.17	3030	4320

Sources: Noraini (1997), Shukari (1999)

### *Wood working properties*

It is generally easy to work, taking a good finish. The boring properties are rated as good, and planing and shaping as moderately good. Tests in Sabah showed that the timber peels well without pretreatment and the veneer dries well without serious degrade. For plantation-grown timber in which harvesting is carried out at a very young age, wooliness of the surface is expected (Figure 6). Therefore, extra efforts in planing and sanding are required.



**Figure 6** Surface wooliness

#### *Seasoning properties*

The timber seasons fairly rapidly, with only slight twisting and end checking as the main sources of degrade. Boards of 13 mm take approximately two months to air dry, while 38 mm boards take four months. Shrinkage is very low with both radial and tangential shrinkages averaging 0.5% but Boupha (1998) reported that 41-year-old sentang had shrinkage values of 3.73 and 1.92% for tangential and radial surfaces respectively.

For plantation-grown timber which is normally harvested at a young age, excessively high shrinkage is expected due to the presence of a high proportion of juvenile wood. Distortion due to drying such as spring and bow are expected to occur and due care should be taken during the drying process to minimize the distortion mentioned.

#### *Gluing properties*

Mohd. Hamami *et al.* (1999) reported that sentang wood could be glued rather satisfactorily. Flat-sawn materials appeared to exhibit a stronger glue line than the quarter-sawn materials.

#### *Natural durability*

The timber is non-durable when exposed to the weather. Mohd. Hamami *et al.* (1999) reported that sentang wood was the least preferred wood species as compared with rubberwood, pine and kempas when it was subjected to the 'choice feeding test' on termites. However, when used internally and under cover, sentang is expected to last a considerable period of time.

#### **Uses**

The timber is suitable for high-class joinery works, furniture manufacture, interior finishing for shops, houses and boat, panelling, partitioning, sliced veneers and plywood, particleboards, medium density fibreboard, flooring, carving, fancy articles and turneries. In the Philippines, sentang wood is used for piano cases, matches, decorative engraving

and cigar boxes. In Papua New Guinea, the wood has been used for the production of louvered door and canoes.

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