

PLANTATION TIMBER OF *MAESOPSIS EMINII*

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ANI, S. & AMINAH, H. 2006. Plantation timber of *Maesopsis eminii*. *Maesopsis eminii* (family Rhamnaceae) is a light hardwood timber species. The trees have whitish bole that are straight and cylindrical when grown in plantation and tend to lean towards sunlight when found to grow among other tree species. The sapwood is almost white in colour and the heartwood yellowish when freshly cut, darkening to golden brown or dark brown on exposure. The texture of wood is moderately coarse and even, with interlocked grain that produces a clear figure on quarter-sawn surfaces. The timber air-dry density at 15% moisture content of a 42-year-old tree was found to be 640–720 kg m⁻³ and that of a 6-year-old tree, 575–644 kg m⁻³. Its density suggests that the timber is useful for general utility and other purposes.

Keywords: Timber, growth, wood structure, light hardwood, density, uses

ANI, S. & AMINAH, H. 2006. Kayu *Maesopsis eminii* daripada ladang. *Maesopsis eminii* (famili Rhamnaceae) ialah spesies kayu keras ringan. Pokok ini mempunyai batang berwarna keputihan, lurus dan berbentuk silinder apabila ditanam di ladang dan didapati tumbuh condong ke arah cahaya matahari apabila tumbuh bersama spesies pokok lain. Kayu gubalnya berwarna hampir putih dan kayu terasnya kekuningan apabila masih basah, bertukar menjadi perang keemasan atau perang tua setelah lama terdedah. Tekstur kayu sederhana kasar dan sekata dengan iranya bersilang untuk menghasilkan bentuk corak di permukaan gergajian suku. Ketumpatan kayu pada 15% kandungan lembapan bagi pokok berumur 42 tahun bernilai 640–720 kg m⁻³ dan bagi pokok berumur 6 tahun bernilai 575–644 kg m⁻³. Nilai ketumpatannya menunjukkan bahawa kayu ini boleh digunakan untuk tujuan keperluan am dan kegunaan lain.

INTRODUCTION

The species *Maesopsis eminii* belongs to the family Rhamnaceae. It is best known as musizi in its region of origin, East and Central Africa, where its timber is highly regarded (Desch 1954). This tree was introduced in Peninsular Malaysia in 1952 with seeds obtained from Bogor, Indonesia for reforestation trial (Sandrasegaran 1966).

In West and Central Africa *M. eminii* can reach an average height of 27 m and occasionally 36–43 m (Anonymous 1982). Its bole is straight and cylindrical, and only slightly buttressed. The average length of clear bole is 21 m with a diameter of up to 1.2 m. The timber is soft, variable in colour from yellowish when freshly cut, darkening on exposure to golden brown or dark brown in the heartwood. The sapwood is almost white up to 75 mm wide and distinguishable from its heartwood. The timber from a tree in West and Central African, of unknown age, is soft, light to moderately heavy

with an air-dry density of 460 kg m⁻³. Texture is moderately coarse and even. Grain is interlocked, producing a well-marked figure on quarter-sawn surfaces. Pin knots may sometimes be present and cause local irregularities of the grain. The timber is not durable and not resistant to termite attack in East and West Africa but is easily treated. The timber dries well and fairly rapidly. Though slight distortion occurs, there is no tendency to split or check and the knots remain sound. The timber has good nailing and gluing properties. The timber is useful for general utility purposes, interior use, plywood, boxes and packing cases.

The species grows best in temperatures ranging from 22 to 37 °C and it prefers a mean annual rainfall of 1200–1300 mm. It tolerates a dry season of up to two months. It grows best on deep fertile soils. In Peninsular Malaysia, good growth rate has been obtained on alluvial and sedimentary granite derived soils. However, *M.*

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eminii can tolerate a wide range of soils from medium to light and from neutral to very acidic soils but it does not tolerate waterlogged soils (Sandrasegaran 1966). It yields relatively well on poor soils and can play a role in the reclamation of degraded land. Seeds are available when trees start to fruit from about five years of age.

Saplings are also stunted in the presence of weed competition. Hence a completely cultivated and weed free site is needed in order for trees to have rapid early growth. Besides that, good survival and rapid establishment of newly planted trees can be achieved by breaking any barrier to root growth and optimising soil aeration and drainage.

The success of plantation establishment also depends largely on silvicultural management that includes selection of good planting materials, initial spacings and post planting maintenance. Maintenance after planting such as weeding, thinning, application of fertilizer, fungicide and insecticides needs to be carried out from time to time to ensure good growth performance of trees.

There are more than 4000 trees planted at various spacings at the Forest Research Institute Malaysia (FRIM) (Selvaraj & Muhammad 1980). Very little information is available on the wood of this species. Therefore the aim of this study was to examine the wood anatomical structure of *M. eminii* grown in plantation and its physical properties.

MATERIALS AND METHODS

This study was based on wood samples of *M. eminii* taken from discs of 6- and 42-year-old trees. Wood discs of a 6-year-old tree were taken from a plantation in Kota Tinggi, Johore while those of a 42-year-old tree were taken from Sungai Buloh, i.e. FRIM's trial plantation area that was clear-felled in 1998 to give way for housing development. Fresh samples were used for determination of physical properties and wood anatomical study. Wood samples of 1 cm³ were cut from the discs and boiled in water to soften them. The cubes were then sectioned along the transverse, tangential and radial directions using a sliding microtome. Sections were stained with 1% safranin, left to soak for about 10 min and the excess stain washed off using distilled water, then dried with a series of alcohol concentrations and placed on glass slides before fixing with

Canada balsam.

The determination of fibre morphology was carried out based on macerated samples obtained from small wood slivers mixed in equal parts of 20 volume hydrogen peroxide solution and glacial acetic acid, warmed in a water bath for about 30 min. Macerated tissues were washed with distilled water and stained with 1% safranin prior to preparation of temporary slides.

For density determination, samples measuring 5 × 5 × 2.5 cm were used.

RESULTS AND DISCUSSION

The trees of 6-year-old *M. eminii* grown in Kota Tinggi are straight and cylindrical with whitish bole (Figure 1). Unlike trees from West and Central Africa, they are without buttresses. *Maesopsis eminii* is a very light-demanding species (Sandrasegaran 1966) and lean in search of light when grown among other trees (Figure 2). This shows its light-demanding characteristic. It requires a considerable amount of direct light during the growing stage.



Figure 1 Six-year-old *Maesopsis eminii* grown in plantation



Figure 2 *Maesopsis eminii* grown among other trees

The wood air-dry density at 15% moisture content of the 6-year-old tree ranged from 575 to 644 kg m⁻³ and averaged 605 kg m⁻³ (Table 1). For the 42-year-old tree, air-dry density varied from 640 to 720 kg m⁻³ with an average density of 670 kg m⁻³. An air-dry density range of 400 to 720 kg m⁻³ at 15% moisture content is the range set for light hardwood timbers under the Malaysian Grading Rules for Sawn Hardwood Timber (Anonymous 1984). *Maesopsis eminii* can thus be classified as a light hardwood timber.

Based on the Malaysian Grading Rules for Sawn Hardwood Timber (Anonymous 1984), the timber of 42- and 6-year-old *M. eminii* was comparable to gerutu (*Parashorea* sp.), rubberwood (*Hevea brasiliensis*), kelumpang (*Sterculia* sp.) and ramin (*Gonystylus* sp.) in terms of density range (Table 1). It was denser than perupok (*Lophopetalum* sp.), terap (*Artocarpus* sp.), white seraya (*Parashorea* sp.), pulai (*Alstonia* sp.) and terentang (*Camptosperma* sp.). As density is closely related to strength, *M. eminii* can be considered stronger than these timbers and would be a good substitute for rubberwood for general utility purposes.

Growth rings are indistinct (Figure 3). Figures 4 to 6 illustrate the wood structure at ×10 magnification on transverse, tangential and radial sections respectively. Vessels are with simple perforation, moderately small to large, generally

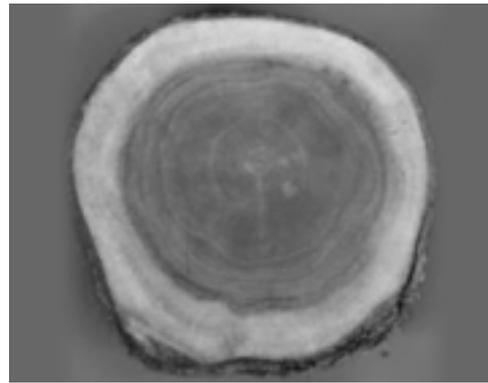


Figure 3 Disc of 6-year-old *Maesopsis eminii*

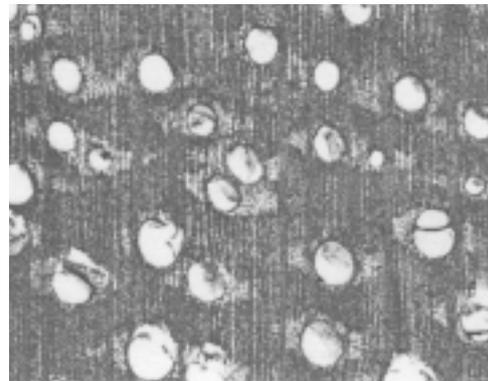


Figure 4 Transverse section of *Maesopsis eminii*



Figure 5 Tangential section of *Maesopsis eminii*

Table 1 Air-dry density comparison of *Maesopsis eminii* with other light hardwood timbers

Timber name	Species	Density range (kg m ⁻³)
<i>Maesopsis</i> (42 years old) FRIM Sungai Buloh plantation	<i>M. eminii</i>	640–720
<i>Maesopsis</i> (6 years old) Kota Tinggi plantation	<i>M. eminii</i>	575–644
<i>Maesopsis</i> (unknown age) West and Central Africa	<i>M. eminii</i>	460 (avg.)
Gerutu	<i>Parashorea</i> sp.	640–770
Rubberwood	<i>Hevea brasiliensis</i>	560–640
Kelumpang	<i>Sterculia</i> sp.	560–640
Ramin	<i>Gonystylus</i> sp.	530–785
Perupok	<i>Lophopetalum</i> sp.	480–640
Terap	<i>Artocarpus</i> sp.	400–560
White seraya	<i>Parashorea</i> sp.	400–655
Pulai	<i>Alstonia</i> sp.	370–495
Terentang	<i>Camptosperma</i> sp.	320–560

moderately few, mostly solitary and in radial multiples of 2; tyloses scarce or absent. Wood parenchyma moderately abundant, paratracheal tending to aliform, incomplete vasicentric, 3–5(–10) cells wide around the pore, in 2–4 celled strands. Rays are of two distinct sizes, moderately fine and medium sized, the latter distinct to the naked

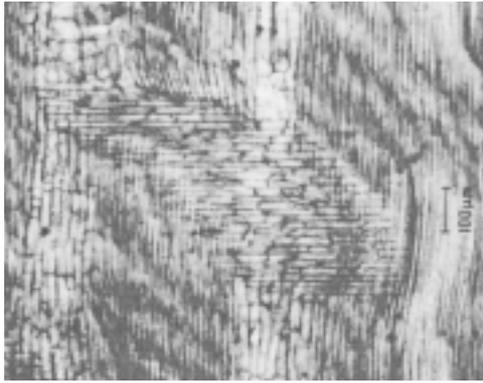


Figure 6 Radial section of *Maesopsis eminii*

eye on cross-section, prominent on a radial surface, 1–4(–5)–seriate, homogeneous with mostly procumbent cells. Fibres are non-septate, 275 μm in length. Cell inclusions are present with fairly abundant prismatic crystals in chambered axial parenchyma strands. Silica absent. Ripple marks and intercellular canals absent.

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