

FOREIGN WOOD SERIES



**AGBA**

**Gossweilerodendron balsamiferum**

**(Verm.) Harms**

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FOREST PRODUCTS LABORATORY  
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UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

In Cooperation with the University of Wisconsin

AGBA  
Gossweilerodendron balsamiferum (Verm.) Harms  
Leguminosae (Caesalpinaceae)

By

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Introduction

Agba is a large West African tree that grows in the tropical rain forest areas of southern Nigeria, French Equatorial Africa, western Congo, and Cabinda. In the Congo and Cabinda, the common name tola is applied to this species. Earlier references to agba or tola may be found in the literature under the synonymous botanical name Pterygopodium balsamiferum Verm.

The Tree

One of the largest trees in the rain forest, Agba may attain a height of 200 feet with a diameter of 7 feet. The trees are straight and cylindrical, without basal swelling or buttresses. The trunk may be free of branches as high as 80 to 100 feet.

The Wood

The heartwood of agba is generally a uniform light brown in color. The wood is straight grained and without figure. The texture (size of pores) is similar to that of okoume (Aucoumea klaineana) and slightly coarser than that of birch (Betula). The wood contains a resin that may cause some difficulty in cutting the green logs and also in kiln drying the lumber. This is generally not regarded as being serious, because the good qualities of the wood more than compensate for the difficulties that might be encountered. The heartwood has a slightly resinous odor.

Specific Gravity and Weight

Specific gravity values for agba, determined at the British Forest Products Research Laboratory (1)<sup>2</sup>, are 0.425 based on the oven-dry weight and green volume and 0.446 based on the oven-dry weight and moisture content at 12 percent. Agba shows relatively little variation in weight. It averages about 32 pounds per cubic foot at a moisture content of 12 percent and about 50 pounds per cubic foot when freshly converted.

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<sup>1</sup>Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

<sup>2</sup>Numbers underlined in parentheses refer to Literature Cited at the end of the report.

### Shrinkage and Movement

Determinations (2) of shrinkage from the green condition to a moisture content of 12 percent gave values of 3.0 percent for the tangential direction and 1.5 percent for the radial direction. When maintained at a temperature of 77° F. and at a relative humidity of 90 percent, the wood reached an average moisture content of 19 percent. Under conditions of 77° F. and a relative humidity of 60 percent, the equilibrium moisture content was about 12 percent. The corresponding movement between the above relative humidities and moisture contents is 1.8 percent tangentially and 0.8 percent radially. This degree of movement is regarded as small.

### Mechanical Properties

Mechanical properties of agba that were determined at the British Forest Products Laboratory (1) are given in table 1, and are compared with Central American mahogany (*Swietenia macrophylla*). Agba is somewhat lighter in weight than mahogany and the properties in general reflect this difference, except that the two species are similar in impact bending and side hardness. Agba is superior to mahogany in the seasoned condition with respect to shear parallel to the grain.

### Seasoning

Agba seasons easily and without difficulty. Because the trees vary in the amount of resins present, it is advisable not to use too high a temperature or the resins will melt and exude to the surfaces of the lumber. The British Laboratory's (2) schedule J (table 2) is recommended for the kiln drying of lumber up to 6/4 in thickness.

### Steam Bending

Agba is reported to have moderately good bending qualities, and during steaming, some resin exudation is to be expected. Although rated as moderately good, it is inferior in bending characteristics to such well known species as ash, oak, or elm.

### Workability

Agba is easily worked with hand and machine tools, exhibiting clean edges in all operations. The wood takes stains and finishes readily, although gum, when present, may affect these applications.

### Durability

Decay tests carried out in Great Britain (3) on Nigerian wood indicate that agba is very resistant to decay by both white rot and brown rot fungi. The results show that after 4 months of exposure to four wood-destroying fungi, the test specimens exhibited negligible weight loss because of decay. Field tests in Nigeria show that agba heartwood is decay resistant, and, it is also classified as resistant to subterranean termites.

The heartwood is very resistant to preservative treatment by both pressure and non-pressure methods.

### Availability and Uses

The wood is available in large sizes free of defects. It is suitable for exterior as well as interior use because it combines light weight and easy working properties with

high natural durability. Agba is particularly well suited for purposes that require a plain wood, and because of its decay resistance, it has a considerable advantage in boat construction.

#### Identification

The most important distinguishing feature of agba is its gum ducts. Through a hand lens, these appear on smoothly cut transverse sections as white spots diffused throughout the section. The growth rings are narrow and defined by bands of darker colored fibers. In the finished condition, agba would be very difficult to distinguish from any other wood of similar texture.

Literature Cited

1. Armstrong, F. H.  
1955. The Strength Properties of Timber. Bul. No. 34, Dept. of Sci. and Indus. Research, Forest Products Research Laboratory, Princes Risborough, Aylesbury, Bucks, England.
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1956. A Handbook of Hardwoods. Dept. of Sci. and Indus. Research, Forest Products Research Laboratory, Princes Risborough, Aylesbury, Bucks, England.
3. Findlay, W. P. K.  
1938. The Natural Resistance to Decay of Some Empire Timbers. Empire Forestry Journal 17:249-259.
4. Kukachka, B. Francis.  
1959. Mahogany (Swietenia macrophylla King). U.S. Forest Products Laboratory Report No. 2167.

Table 1.--Mechanical properties of agba (Gossweilerodendron balsamiferum) compared with Central American mahogany (Swietenia macrophylla)

Properties	Agba <sup>1</sup>	Mahogany <sup>2</sup>
	Green : 12 : percent	Green : 12 : percent
Specific gravity		
Ovendry weight-volume at test.....	0.425	0.446
Static bending		
Maximum bending strength.....p.s.i..	7,140	10,960
Modulus of elasticity.....1,000 p.s.i..	930	1,200
Work to maximum load.....in.-lb./cu. in..	8.6	9.69
Impact bending		
Height of drop causing complete failure (50 lb. hammer).....in..	26	23
Compression parallel to grain		
Maximum crushing strength.....p.s.i..	3,390	6,320
Hardness		
Side.....lb..	620	780
Shear parallel to grain		
Maximum shearing strength.....P.s.i..	980	1,530
Number of mechanical tests.....	1,605	1,246

<sup>1</sup>Data from British Forest Products Research Laboratory (1).  
<sup>2</sup>Data from U.S. Forest Products Laboratory (4).

Table 2.--Kiln schedule J (2) for  
drying agba lumber up  
to 6/4 thickness

Moisture content	Temperature	
	Dry bulb	Wet bulb
<u>Percent</u>	<u>°F.</u>	<u>°F.</u>
Green	135	123
50	135	119
40	140	118
30	150	121
20	170	127