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In Cooperation with the University of Wisconsin

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VENEER CUTTING AND DRYING PROPERTIES OF TUPELO[1]

There are three commercially important tupelo species: Water tupelo (Nyssa aquatica), black tupelo (N. sylvatica), and swamp tupelo (N. sylvatica var. biflora). Water tupelo and swamp tupelo, as the names indicate, are water-loving trees and grow principally in the fresh-water swamps and along the edges of streams and ponds in southeastern United States. Black tupelo, which has a much larger range, grows throughout most of the eastern half of the United States.

The wood of the various tupelos is similar, and no attempt to separate the species is made by commercial lumber inspectors. The heartwood is light brownish grey, and the sapwood is nearly white. Black tupelo and swamp tupelo sometimes have darker colored heartwood than water tupelo. The wood is diffuse porous and has a close, uniform texture. It has a very interlocked grain, which prevents it from splintering under heavy wear and makes it difficult to split.[2] The interlocked grain tends to cause warp during the seasoning of the lumber.[3] The wood is rated as moderately heavy and moderately strong and hard.

Tupelo lumber is used principally for shipping containers, flooring, and furniture. Rotary-cut tupelo veneer is used mainly for the interior plies of stock panels and for wirebound boxes. Because of its light color, moderate strength, and resistance to splitting tupelo is a preferred box wood. Some tupelo is used for pulpwood, railway ties, and cooperage.

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[1] This is a reprint of Report No. 1766-9 dated September 1953.

[2] Betts, H. S. Tupelo. Amer. Wood Ser., Forest Serv., U.S. Dept. of Agr. 1945.

[3] McMillen, J. M. Kiln Drying Water and Swamp Tupelo. Proc. Forest Prod. Res. Soc. 1953.

Selection, Handling, and Preparation of Logs for Cutting

One 16–foot and four 8–foot logs of water tupelo and a similar sample of swamp tupelo were used in Laboratory tests of the rotary veneer cutting and drying properties of these species. This material was part of a shipment sent to the Laboratory through the co–operation of the Southern Forest Experiment Station and the Mississippi Products Com–pany. The logs came from Livingston County, La., in the Bayou Barbary Swamp 25 miles southwest of Hammond, La. They were reported to be of veneer or good saw–log quality.

The test logs were from 15 to 31 inches in diameter at the small end. The specific gravity of the test material varied from 0.31 to 0.51; the lower value represented the sapwood from a swelled butt log.

Judging from defects observed in the 10 test logs, fire scars, ring shake, and swelled butt logs should be avoided when selecting tupelo for veneer cutting.

Tupelo veneer of moderate quality can be cut from bolts at room temperature. Bolts heated in water at 160° F. yielded smooth, tight rotary veneer 1/16 and 1/8 inch thick.

A temperature of 140° F. at a core diameter of 8 inches can be attained in 8–foot bolts of different diameters by heating them in water at 160° F. according to the following schedules:

Average log diameter Inches	Heating time Hours
12	7
24	42
36	94

Veneer Cutting

Burls were common in 8 of the 10 test logs. They did not seriously interfere with cut–ting, but sometimes rough veneer was cut in the short grain areas around them. Inter–locked grain also resulted in occasional patches of rough cutting.

Fire scars or shake occurred in two–thirds of the logs cut. They caused breakage at the lathe and a corresponding reduction in veneer recovery.

Knots were not a big problem in the test logs. About one-half of the test bolts were cut almost to the core diameter before knots were encountered. When knots were encountered, they did not seriously interfere with cutting, nor did they degrade a large percentage of the veneer.

In general, good-quality veneer was cut from the tupelo test bolts that had been heated at 160° F. by using the lathe settings[4] given in table 1. Veneer cut from bolts heated at 200° F. was fuzzy and subject to "shelling," or separation of the springwood from the summerwood.

Veneer Drying

The heartwood of the swamp tupelo had an average moisture content of about 115 percent, and the remainder of the test material had an average moisture content of about 145 percent.

Temperatures of 250° and 320° F. were satisfactory for drying tupelo veneer in a small roller-conveyor dryer. Table 2 lists the drying schedules used.

For practical purposes, 1/16-inch veneer, both heartwood and sapwood, of water tupelo and swamp tupelo can be dried on the same schedule. Similarly 1/8-inch sapwood veneer of both species can be dried on the same schedule. To obtain the most favorable drying schedules, however, 1/8-inch heartwood and 1/8-inch sapwood, and possibly 1/8-inch heartwood of the two species, should be separated and dried on different schedules.

During drying the sapwood veneer of both tupelo species sometimes developed a dark-brown surface discoloration. This stain was shallow and could be sanded off.

The heartwood veneer, but not the sapwood veneer, sometimes buckled slightly during drying.

Tangential shrinkage during drying to a moisture content of 2 to 4 percent averaged 5 to 7 percent of the green width.

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[4] Fleischer, H. O. Experiments in Rotary Veneer Cutting. Proc. Forest Prod. Res. Soc. 1949.

Veneer Yields

The total yield of dry veneer from 10 test logs was 2 percent greater than the log scale (International Log Rule). Approximately one-half of the veneer was of grade 1 or face veneer when graded according to Commercial Standard CS 35-49 for hardwood plywood. The yield from the swamp tupelo was better in quantity and quality than that from the water tupelo.

The favorable veneer recovery indicates that some tupelo veneer could be used for such products as interior wall panels and furniture.

Other Factors

Tests on tupelo blocks indicate that good glue joints can be made with this wood.[5]

Interlocked irregular grain, common in tupelo veneer, may cause tupelo plywood to warp more than plywood made from straight-grained species.

Table 1.--Lathe settings used to cut tupelo veneer

Veneer thickness	Knife angle	Horizontal nosebar opening	Vertical nosebar opening
Inch	Degrees - Minutes	Inch	Inch
1/16	90 - 30	0.050	0.016
1/8	89 - 45	.110	.028

[5] Truax, T. R. The Gluing of Wood. U.S. Dept. of Agr. Hull. Nu. 1500. 1929.

Table 2.--Drying schedules for tupelo veneer

Veneer thickness	Heartwood or sapwood	Temperature in dryer	Time in dryer	Final moisture content
Inch		° F.	Minutes	Percent
		Water tupelo		
1/8	Heartwood	320	30	2-4
	Sapwood	320	18	2-4
	Heartwood	250	60	2-4
	Sapwood	250	40	2-4
1/16	Heartwood	320	9	2-4
	Sapwood	320	8	2-4
	Heartwood	250	18	2-4
	Sapwood	250	16	2-4
		Swamp tupelo		
1/8	Heartwood	320	24	2-4
	Sapwood	320	20	2-4
	Heartwood	250	50	2-4
	Sapwood	250	40	2-4
1/16	Heartwood	320	8	2-4
	Sapwood	320	8	2-4
	Heartwood	250	16	2-4
	Sapwood	250	16	2-4


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