



1964

U.S. FOREST SERVICE RESEARCH NOTE

SO-14

Forest Service, U. S. Dept. of Agriculture

T-10210 FEDERAL BLDG.

701 LOYOLA AVENUE

NEW ORLEANS, LA. 70113

ROT CULL IN BLACK WILLOW

E. Richard Toole¹

SOUTHERN FOREST EXPERIMENT STATION

In stands on the batture of the lower Mississippi River, the proportion of volume rendered cull by rot increased with stand age but was less than 1 percent after 30 years, by which time most pure stands were breaking up.

Black willow (*Salix nigra* Marsh.) is an important hardwood along the lower Mississippi River, being cut extensively for pulpwood and other products. As growth is fast and the trees are intolerant, considerable top dieback and mortality occur at an early age, often in the second decade. In addition, rot fungi gain entrance through insect holes, top breaks, branch stubs, and butt wounds. The study reported here measured the proportion of volume destroyed by rot in natural stands of various ages, and identified the important rot fungi.

METHODS

Forty-four plot centers were located at random in pure, well-stocked, unthinned willow stands along the Mississippi River in Arkansas and Mississippi. At each center, all live trees that qualified when viewed through a wedge

prism with a factor of 10, and that were at least 5 inches d.b.h., were measured, felled, and bucked into 4-foot pulpwood bolts. Minimum bolt diameter was 4 inches, inside bark. The total sample of 694 trees represented stands ranging from 7 to 34 years in age and from 122 to 184 square feet per acre in basal area. Unthinned willow stands characteristically break up at relatively early ages, and in this study no fully stocked pure stands over 34 years of age were found. No attempt was made to estimate volume in trees that were dead when the stands were sampled.

RESULTS

Cull volume increased significantly (0.01 level) with stand age (fig. 1), but the volumes of cull were small. In the 34-year-old stands, the average amount was 41 cubic feet per acre (table 1)—about 1 percent of the stand volume, and therefore not of practical importance. Essentially no rot occurred in trees less than 12 years of age.

Most of the cull volume resulted from infections that had originated at branch stubs. Broken tops were the next most important infection court, followed by butt wounds and insect

¹ Stationed at the Southern Hardwoods Laboratory, which is maintained at Stoneville, Mississippi, by the Southern Forest Experiment Station in cooperation with the Mississippi Agricultural Experiment Station and the Southern Hardwood Forest Research Group.

Table 1.—Basal area and volumes (inside bark, to a 4-inch top) of sample stands

Age (years)	Plots	Average basal area per acre	Gross volume per acre	Cull volume per acre	Proportion of cull volume by infection court			
					Insect holes	Top breaks	Branch stubs	Butt wounds
	Number	Sq. ft.	Cu. ft.	Cu. ft.	Pct.	Pct.	Pct.	Pct.
7	5	122	1,135	0.0	...	...	...	...
12	9	160	3,065	.65	62	28	10	0
20	10	184	4,945	4.38	0	11	68	21
28	10	144	4,167	35.44	5	29	45	21
34	10	161	4,714	40.78	12	21	66	1

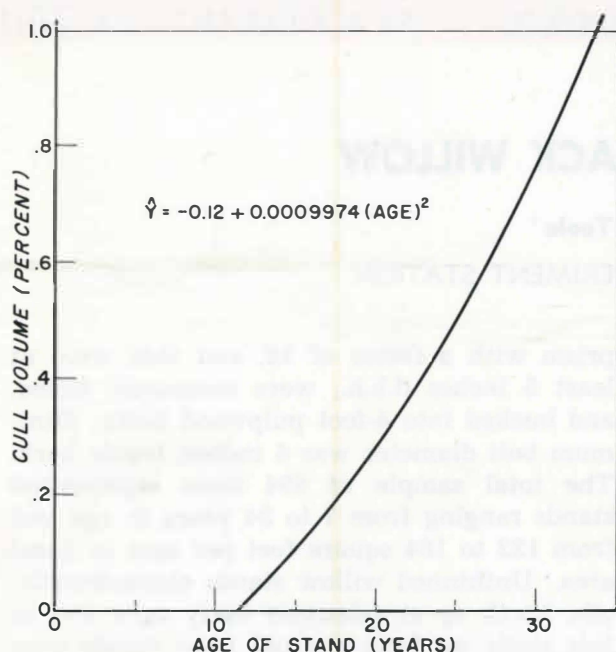


Figure 1.—Cull volume in willow stands along the Mississippi River.

holes. The stands were on moist sites where fire is rare, hence butt wounds ranked low as infection courts. On other hardwood sites fire wounds are the chief point of entry for rot fungi. Pulpwood utilization enhances the importance of rot from branch stubs and top breaks, because bolts are cut from portions of the crown that would be ignored in logging for other products.

The bolts, which were chiefly sapwood, yielded isolates of 19 rot fungi. Those identified were *Daedalea confragosa* (Bolt.) Fr., *Lentinus tigrinus* (Bull.) Fr., *Pleurotus corticatus* Fr., *P. ostreatus* (Jacq.) Fr., *Polyporus supinus* (Swartz) Fr., *P. versicolor* (L.) Fr., and *Schizophyllum commune* Fr. Many of these are important sap rotters on other hardwood species. Most of them formed sporophores on some of the sampled trees.

The scarcity of cull on the sample plots suggests that the breakup of willow stands is due to causes other than the action of rot fungi.