

## Selecting Pine Species for Flatwoods Sites

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*In a pulpwood rotation of 26 years on a poorly drained flatwoods site in northeast Florida, slash pine stands had the greatest volume of merchantable wood, loblolly was second, and longleaf ranked last.*

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Longleaf (*Pinus palustris* Mill.), slash (*P. elliottii* Engelm.), and loblolly (*P. taeda* L.) pines all occur naturally in the flatwoods of northeastern Florida and southeastern Georgia. Natural forests of this area were dominated by longleaf pine. Slash pine was generally confined to the margins of swamps, and loblolly grew mostly along the major rivers. When planting trees to establish stands became an accepted forestry practice, the question was naturally raised: Which species should be used? Slash pine was invariably chosen over longleaf because planted longleaf had poor survival and slow early growth. Slash pine was usually preferred to loblolly because it seemed better suited to the poorly drained flatwoods sites, a decision supported by later studies (3, 4). The study described here was established in December 1953 on the Olustee

Experimental Forest in Baker County, Fla., to compare the survival and growth of slash, loblolly, and longleaf pines on a flatwoods site.

### Methods

An imperfectly drained area of Leon fine sand, a common flatwoods soil, was chosen for the study. Before planting, the area was cleared and then disked several times. One-year-old seedlings, obtained from the Florida Division of Forestry's Olustee Nursery, were planted by hand at an 8- by 8-foot spacing. Four plots of each species with 10 rows of 10 trees each were planted in a randomized block arrangement.

### Results

Slash and longleaf pine had nearly equal survival (66 and 64 percent, respectively) 26 years after planting. Survival of loblolly was a slightly lower 51 percent (table 1). Loblolly plots still contained an average of 345 living trees per acre, which is adequate stocking. Thus, all species had acceptable survival 26 years after planting.

Average diameters of slash and loblolly pines were essentially equal. The average for longleaf pine was about 2 inches less. Basal area per acre for slash pine was slightly higher than for loblolly pine,

but the difference was not statistically significant. Longleaf stands had a lower basal area than either slash or loblolly and are somewhat understocked with 72 square feet per acre. On the average, slash pines were tallest, loblolly pines next, and longleaf pines the shortest.

At 26 years, slash pine was most productive, followed by loblolly pine, with longleaf pine last (table 1). Loblolly pine has a lower specific gravity than slash pine, while longleaf pine is generally heavier. Thus, on a weight basis, slash pine appears even more productive than loblolly.

These results are supported by another unpublished study on the Olustee Experimental Forest. In that study on the same soil type, slash and loblolly pines had equally good survival 22 years after planting, but the slash pines were 6 feet taller and 0.6 inches larger in diameter than the loblolly. Slash pine produced 1,580, loblolly 1,380, and longleaf 740 cubic feet per acre of wood in merchantable stems.

### Discussion

Because of its superior performance, slash pine would be the preferred species for planting on Leon and similar soil types in the flatwoods region of northeast Florida and southeast Georgia. If one wished to create

**Table 1.**—Survival, growth, and yield data for 26-year old slash, loblolly, and longleaf pine growing on a poorly drained flatwoods site

Parameter	Species		
	Slash	Loblolly	Longleaf
Survival (percent)	66a <sup>1</sup>	51 b	64a
Average d.b.h. (in)	7.29a	7.55a	5.35b
Basal area (ft <sup>2</sup> /acre)	136a	115a	72b
Average height (ft)	62a	57b	48c
Volume (ft <sup>3</sup> /acre)	3,120a <sup>2</sup>	2,450b	1,760c
Biomass (tons/acre)	51.6a <sup>3</sup>	36.7b	29.6c

<sup>1</sup> Within columns, means followed by the same letter do not differ significantly at the 0.05 level.

<sup>2</sup> Volumes for slash and loblolly are inside bark; that for longleaf is outside bark. Slash regression:  $Y = -0.693239 + 0.002135 D2H$  (2). Loblolly regression:  $Y = -0.21617 + 0.0019281 D2H$  (1). Longleaf regression:  $Y = -0.21766727 + 0.0027880456 D2H$  (6). Y = volume in cubic feet, D = diameter at breast height and H = total height.

<sup>3</sup> Obtained by multiplying volume estimates by weight per cubic foot based on densities from Wahlgren and Schumann (5).

species diversity, loblolly pine would be a viable alternative. It has the potential to produce reasonable yields on a pulpwood rotation of 25 to 30 years. Even though longleaf pine was

once the predominant species on many of these sites, it is a poor third choice for pulpwood production because of its slow early growth.

#### Literature Cited

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