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Nine-year Louisiana study

Planted Pines Grow Better Than Seeded Pines

On Hardwood-Dominated Site

Planted loblolly and slash pines grew faster than seeded pines on an upland site in Louisianna that was dominated by low-quality hardwoods before the seedlings were released. For both species, the height difference at age 9 years was equivalent to about 1 year's growth.

Ever since direct seeding became operational, landowners have debated how the growth rates of planted and seeded stands compare. When loblolly and slash pines are established on grassy sites that have had no mechanical preparation, planted trees excel in early years. But for direct seeding, preparation by furrowing or disking is recommended as standard practice, and seeded trees on prepared sites grow as fast as 1-0 seedlings planted in a grass rough 2,3.

When it became clear that reduction in grass competition was desirable, another question arose. How would growth of planted and. seeded pines compare on sites where inferior hardwoods had suppressed grasses and weeds? A study was therefore installed on a good pine site that had reverted to cull hardwoods. This article summarizes results after 9 years.

Procedure

The test was made in central Louisiana on a rolling, upland area with a sandy loam topsoil about 20 inches deep. Mixed hardwoods dominated by oaks formed a dense stand. They ranged from 1 to 8 inches in d.b.h. and averaged 838 trees per acre, with 58 square feet of basal area. Brush and grass were sparse.

A burn in the fall of 1961 left a clean seedbed, with mineral soil exposed. The following February plots were hand-planted with 1-0 nursery stock at a spacing of 6 by 8 feet or broadcast-sown at the rate of 1 pound of seed per acre.

Eight 0.1-acre plots with 0.5chain isolation strips were estab-

1 Stationed at the 1102 TMR Project, Alexandria Forestry Center, Pineville, La.

2 Hatchell, G. E. A look at 9-year-old seeded loblolly pine. Forests and People

11 (3) : 25, 44-45. 1961.

3 Campbell, T. E., and Mann, W. F., Jr. Site preparation boosts growth of direct seeded slash pine. ITSDA Forest Service Res. Note SO-115, 4 p. 1971.

lished for slash pine-four randomly assigned to seeding and four to planting. Eight similar plots were intended for loblolly pine, but direct seeding failures reduced the number of replications to two.

All hardwoods were injected with a chemical in May 1962; kills were excellent.

Number of trees and total height of all trees were measured at ages 1, 3, and 5 years. At 9 years, diameter of all trees and total height of sample dominants and codominants were measured.

TABLE 1.—*Stand and stock data per acre at age 9 years*

Treatment	Trees per acre	Total height, dominant stand	Average diameter per acre: All trees	Average diameter per acre: 100 largest
		Slash pine		
	Number	*Feet*	*Inches*	*Inches*
Planted	432	26.2	4.0	5.0
Direct-seeded	548	23.0	3.2	4.4
		Loblolly pine		
Planted	765	26.2	4.0	5.2
Direct-seeded	1,740	22.9	2.7	4.2

Results

Slash Pine

At age 9, stocking of slash pine was reasonably comparable for both methods of regeneration (table 1) , but trees on seeded plots tended to be in clusters. Differences in stand density probably had no influence on heights of dominant trees.

Planted trees were taller than seeded ones at each inventory. Differences in mean total height of all trees were 0.6 foot at age 1 and 2.6 feet at age 5 years. At age 9, dominants and codominants on planted plots averaged 3.2 feet (or 14 percent) taller than comparable trees on direct-seeded plots. The difference, statistically significant at the 0.05 level, is roughly equivalent to 1 year's growth.

Average diameters were also greater on planted plots. The differences at age 9 years, 0.8 inch for all trees and 0.6 inch for the 100 largest trees per acre, were significant. This superiority was reflected in diameter distributions (table 2) . There were three times more 5- and 6-inch trees on planted than on direct-seeded plots. In trees 4 inches d.b.h. and over, the planted plots had a 50-percent superiority. Stocking of trees 3 inches d.b.h. and larger was almost the same for both methods of regeneration.

Loblolly Pine

Insufficient replications precluded statistical analysis of loblolly pine data. At age 9 years, directseeded plots had twice as many trees as planted ones (table 1) . This difference probably had more influence on average diameters than on heights of dominants.

As with slash pine, planted trees were taller and larger in diameter than direct-seeded ones. Differences in height were 0.8 foot at age 1, 3.9 feet at age 5, and 3.3 feet at age 9 years. The differences in average diameters were 1.3 inches for all trees and 1.0 inch for the 100 largest trees per acre. There were about

seven times as many 5- and 6-inch trees and more than twice as many as 4-inch trees on planted as on direct-seeded plots. Stocking of trees 3 inches d.b.h. and over was about the same.

Conclusions

When pines are planted and seeded at the same time, nursery stock has a 1-year advantage in age from seed. As a result, planted pines are taller after the first year in the field, and this superiority is retained whether or not grass competition is a factor in early years. On either grassy sites or those dominated by hardwoods, planted trees get off to a start that cannot be overcome by seeded pines.

TABLE 2.—*Cumulative numbers of trees per acre, at age 9 years, by 1-inch d.b.h. classes*

Treatment	Diameter class, inches: 1	2	3	4	5	6
			Slash pine			
Planted	432	412	385	280	110	20
Direct-seeded	548	513	375	190	35	7
			Loblolly pine			
Planted	765	740	700	540	170	15
Direct-seeded	1,740	1,325	695	215	25	—