EFFECTS OF SEEDLING SIZE AND DEPTH OF PLANTING ON EARLY SURVIVAL AND GROWTH OF SLASH PINE

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Larger seedlings had the better survival and growth. Seedling growth was increased by deep planting; survival was not. These conclusions are part of the results from a continuing study of the effects of site preparation on seedling performance initiated in southwestern Alabama and southeastern Mississippi in 1959-60 and repeated in 1960-61.

The study includes 6,000 slash pine seedlings on 516 permanent sample rows in large areas; the site was prepared and planted by machine (see cover). Sample units, consisting of the seedlings occurring on 100-foot row segments, are located on a wide range of soil and slope conditions in seven counties.

Chi-square analyses of the first and second year measurements for the 1959-60 sample units showed that the large- and medium-size seedlings had significantly better survival than the small seedlings, whereas the variation between the large and medium seedlings was not significant (table 1 and figure 1). In like manner, the large and medium seedlings in the 1960-61 planting did not survive significantly different, and the large seedlings performed significantly better than the small. However, the survival difference between the medium and small seedlings was not significant.

Regardless of the year of measurement or planting, depth of planting had no significant effect on seedling survival (table 2).

Two-year growth by seedling size ranged from 20.3 inches for the large seedlings to 12.9 inches for the small, indicating a 57-percent growth advantage for the large seedlings (table 1). The average first-year growth was 100 percent greater for the large seedlings on the 1960-61 plots--8.6 vs. 4.3 inches for the large and small seedlings.

TABLE 1.--Survival and growth of slash pine, as affected by seedling size

Size	Survival, December 1961		Growth to December 1961	
	1960-61 planting	1959-60 planting	1960-61 planting	1959-60 planting
At root collar:				
Large:	*Percent*	*Percent*	*Inches*	*Inches*
3/16 inch or more.....	[1] 91	82	[2] 8.6	20.3
Medium:				
1/8 to 3/16 inch.....	89	73	6.5	16.1
Small:				
Less than 1/8 inch.....	82	65	4.3	12.9

[1] Any two means not included in a single bracket differ significantly at the 5-percent probability level.
[2] All growth differences were significant at the 1-percent level.

TABLE 2.--Survival and growth of slash pine, as affected by depth of planting

Depth of planting	Survival, December 1961		Growth to December 1961	
	1960-61 planting	1959-60 planting	1960-61 planting	1959-60 planting
	Percent	*Percent*	*Inches*	*Inches*
Deep up to bud.....	[1] 89	70	[2] 6.9	16.2
Normal nursery depth.....	86	71	5.3	14.4

[1] Survival differences were not significant.
[2] All growth differences were significant at the 1-percent level.

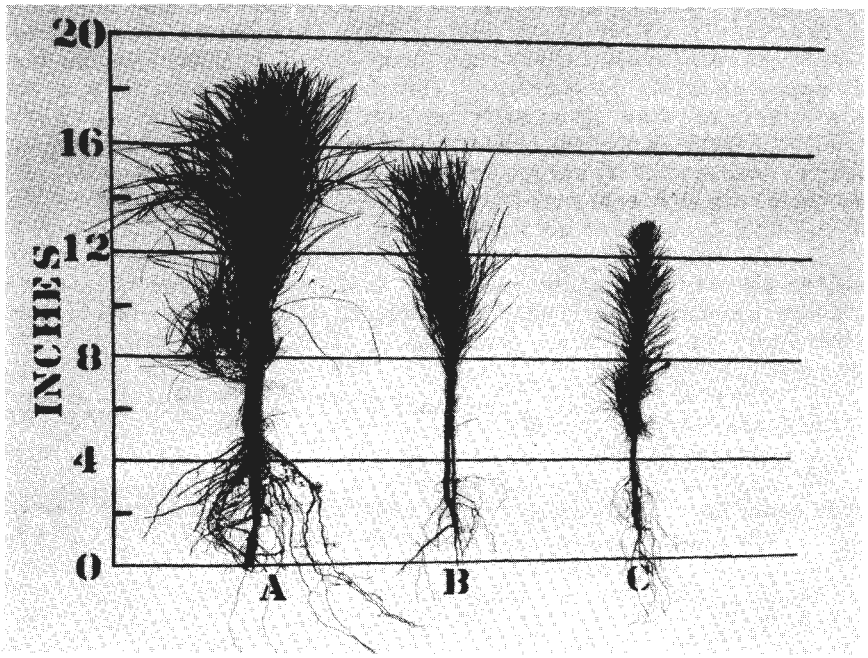

Figure 1.--Slash pine seedlings representative of the three size classes at root collar: A, large, 3/16 inch or more; B, medium, 1/8 to 3/16 inch; and C, small, less than 1/8 inch.

In contrast to the effect of depth of planting on survival, the deep planted seedlings had outgrown those planted normally by 1.6 inches, or 30 percent at the end of one growing season, and by 1.8 inches or 13 percent based on 2 years cumulative growth (table 2).

The findings reported in this article indicate that early survival and growth of planted slash pine can be improved by:

1. Increasing the average size of planting stock. Include only medium-large seedlings. This can be accomplished through improved nursery practices and stricter culling rule s.

2. Planting the seedlings deeper than nursery depth. Greater benefits are believed to be obtained by this procedure when the large wildland planters are used. The bigger seedlings cannot be properly planted in a deep position with many of the small planting machines.