

Deep Planting of Slash Pine in the Carolina Sandhills

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ABSTRACT.—Planting slash pine (*Pinus elliottii* Engelm. var. *elliottii*) seedlings to the depth of the terminal bud in old-field sandy soils increased survival and early height growth of both grade 2 and 3 stock over that of seedlings planted at normal root-collar depth. Deep planting had no detrimental effect on either tree height or diameter at age 10, but grade 3 stock grew less than grade 2, and growth of both grades decreased as depth to a fine-texture soil horizon increased.

DEEP PLANTING of slash pine (*Pinus elliottii* Engelm. var. *elliottii*) seedlings on droughty sandhills soils has been shown to increase survival and slightly improve first-year height growth over that of seedlings planted at the normal root-collar depth (2). This improved growth is probably related to the greater exposure that deep-planted seedlings receive to the scant water supply in these soils. Height measurements made at the end of five growing seasons, however, indicated that the deep-planted trees averaged ½-foot shorter than did those planted at the normal depth (1). Concern that the initial height disadvantage imposed by deep planting might persist and become important prompted a remeasurement of the trees at age 10.

The original purpose of the study was to investigate the possibility of increasing survival of low-grade slash pine nursery stock by planting the seedlings deeper than normal. Morphological grade 2 and 3 seedlings, as defined by Wakeley (4), were hand-planted in furrowed old fields at three depths: to the terminal bud, halfway between the bud and root-collar, and to the root-collar. At the time of planting the difference in height between the seedlings planted to the bud and those planted to the root-collar averaged about 10 inches. The plantings were replicated three times on each of three soil types, deep sand (depth to clay = 4 feet), loamy sand (depth to clay = 2 feet), and sandy loam (depth to clay = 1 foot).

Details of early survival and growth are given in two previous reports (1, 2). Survival of seedlings planted to the bud was highest (89 percent), and seedlings planted to half-stem survived better (77 percent) than did those planted to the root-collar (65 percent).

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Table 1.—Diameter and Total Height of Slash Pine Ten Years after Planting, by Grade of Planting Stock, and Soil Type

Soil type	Diameter		Total height	
	Grade 2	Grade 3	Grade 2	Grade 3
	inches		feet	
Deep sand	3.6	3.2	30.3	28.3
Sandy loam	4.2	3.5	31.3	28.5
Loamy sand	4.5	4.0	32.8	30.7

Grade had no effect on survival of deep-planted seedlings. When planted to the normal root-collar depth, however, survival was highest in the grade 2 stock (88 percent as opposed to 63 percent for grade 3 seedlings).

The stock planted to the terminal bud averaged 2 inches more in height growth during the first year than did the stock planted at root-collar depth. At the end of the first year, differences in average total height had decreased from 10 inches (at time of planting) to 6 inches. Regardless of depth planted, grade 2 stock grew significantly more than did grade 3 stock.

The effects of deep planting and grade on survival had apparently been firmly established by the fifth growing season (1). Analysis of the ten-year data revealed that no important changes had occurred during the intervening years, although average survival over all treatments had decreased by 6 percent.

The diameter breast height of all trees and the height of three dominant or codominant trees in each treatment were measured. Variance analysis of both height and diameter showed that only soil type and morphological grade were significant factors; depth of planting had no influence. The initial reduction in total height due to deep planting was no longer significant. As shown in Table 1, the grade 2 trees were still consistently larger than the grade 3 trees. As the purpose of grading seedlings is to identify poor-risk planting stock, this result was not unexpected. Also shown in Table 1 is the poorer growth, regardless of grade, of the trees planted on the deep sand site. This poorer growth was to be expected because of the known importance of depth to clay or a fine-texture horizon to growth of slash pine in the sandhills (3).

The essential point of the study results is that regardless of grade or soil type, deep planting of slash pine, at least on these sandhills soils, significantly improves early survival without having later detrimental effects on tree height. Because of the greater height growth of the grade 2 seedlings, however, the use of low-grade or cull stock is not desirable even though its adequate survival can be assured.

Literature Cited

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