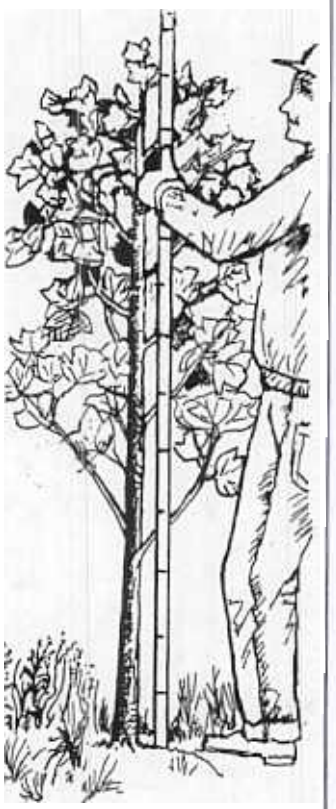

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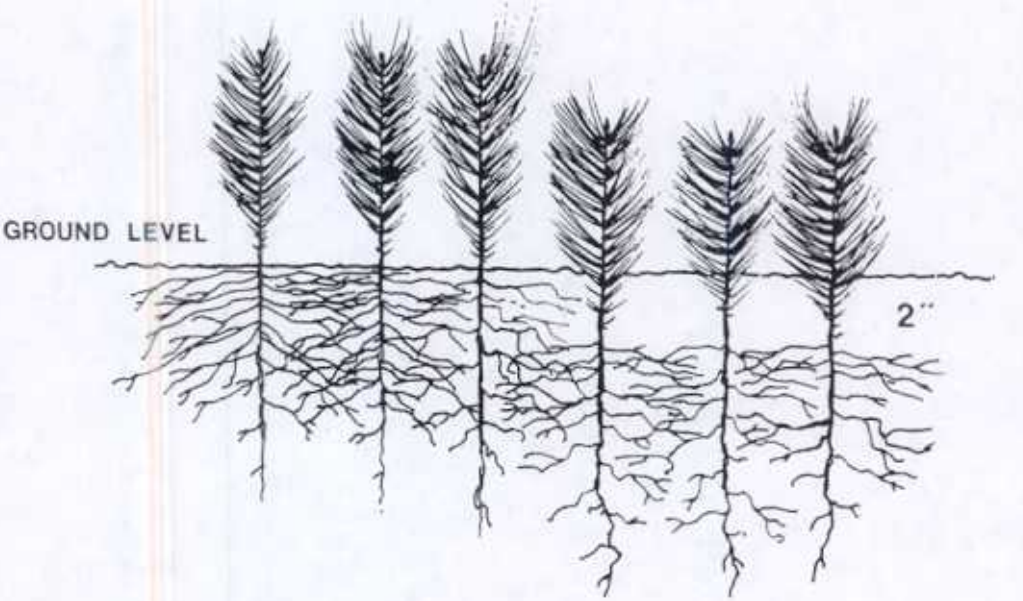
DEPTH OF PLANTING STUDY



Virginia Division of Forestry
Department of Conservation and Economic Development

A COMPARISON OF "NORMAL DEPTH" WITH "DEEP PLANTING" OF LOBLOLLY PINE SEEDLINGS

by

Thomas A. Dierauf[1/]

ABSTRACT

Seedlings planted so that their lowest needles were at groundline (about an inch deeper than they grew in the nursery) did not survive as well as seedlings planted about two inches deeper. The difference in survival, three years after planting, was 7, 2, and 6 percentage points for seedlings with initial root collar diameters of 3/32, 4/32 and 5/32 inch respectively. After three years, there were no differences in height related to planting depth, but height was related to initial root collar diameter.

INTRODUCTION

Shallow planting can have an adverse effect on seedling survival. For years, we have been recommending that loblolly pine seedlings be planted at least two inches deeper than they grow in the nursery, so that some green needles are buried. It has been our observation over the years that "deep planting" in this manner provides some protection against: (1) severe winter weather that completely kills exposed seedling tops following early planting, and (2) soil settling after planting and leaving some of the root system exposed. Green needles beneath the ground surface can, and often do, initiate buds which allow top-killed seedlings to survive. The same applies to instances where rabbits or deer cut off seedlings close to the ground. We have often seen seedlings that appear to be dead, survive because buds develop below the ground surface.

We recommend using a planting bar with a blade at least 7 inches and preferably 8 inches long, and that a hole be made the full depth of the blade. We recommend that seedlings be planted so that roots extend to the bottom of the planting hole, even if it means burying most of the seedling top when planting very short seedlings (being careful not to bury the terminal bud). With an 8 inch deep hole, and a root system pruned to a length of 5 or 6 inches, planting in this manner will result in seedlings being planted at least 2 to 3 inches deeper than the root collar (assuming that the root collar is the point immediately above where the first roots originate on a seedling - there is about an inch or more of bare stem between the first roots and the first needles).

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This study was installed to provide more information on the effect of depth of planting on seedling survival.[2/]

PROCEDURES

The seedlings used in this study were taken on December 11, 1979 from a 1,000-seedling package that had been operationally graded and root pruned at the New Kent Nursery. The roots had been pruned to an average length of 5 to 6 inches, but root length varied. No seedlings were used on which the roots were pruned to less than a 3 inch length. The seedlings in the package were separated into 1/32 inch root collar diameter classes. We obtained enough seedlings to plant four replications of 3/32, 4/32 and 5/32 inch seedlings.

The seedlings were planted on December 12 so they would have to withstand any severe winter weather that might follow. They were planted in the afternoon of a clear, warm day with a temperature close to 70°. Soil moisture was close to ideal. The site was a well-drained ridgetop and upper-slope on the Buckingham State Forest in the Central Piedmont of Virginia.

There were six treatments: three root collar diameters planted at two planting depths. We planted a 20 seedling row of each treatment in each of four replications, for a total of 80 seedlings in each of the six treatments. The "deep planting" was done according to our usual recommendations, placing the seedlings so that roots extended to the bottom of planting holes about 8 inches deep, unless this would mean burying the terminal bud. For the "normal depth" planting, seedlings were planted so that the lowest needles were about at the groundline, which means that they were planted about an inch deeper than they grew in the nursery.

Survival was tallied and seedling heights were measured at the end of the first, second and third growing seasons.

[2/] See Dierauf and Garner, 1978. Root Pruning. Occasional Report #52.

RESULTS

Average survival and seedling height after three growing seasons are presented in Tables 1 and 2.

Table 1. Average survival percent after three growing seasons

	Initial Root Collar Diameter			
	3/32	4/32	5/32	Means
Normal	79	84	84	82
Deep	86	86	90	87
Differences	7	2	6	5

Table 2. Average height in feet after three growing seasons.

	Initial Root Collar Diameter			
	3/32	4/32	5/32	Means
Normal	4.1	4.4	4.8	4.4
Deep	4.1	4.5	4.9	4.5
Differences	0	.1	.1	.1

Average survival was 5 percentage points better for "deep planted" seedlings, but the difference was not statistically significant. Deep planted seedlings were about one-tenth foot taller after three growing seasons, which means they grew slightly faster considering that they were planted deeper initially. This study reinforces our belief that seedlings should be planted at least two inches deeper than they grow in the nursery. This recommendation does not apply to poorly drained soils, where water stands through the winter and into the spring. On wet sites it is better to plant at about the same depth as the seedlings grow in the nursery, and also to plant only on "high spots" or hummocks, in order to keep the roots above the water table as much as possible.