Containerized Loblolly Pines Promising for Erosion Control Planting

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Loblolly pine seedlings grown and planted in pointed plastic containers survived as well as but grew less than bare-root seedlings when outplanted on erosive sites in northern Mississippi. They were hand planted about twice as fast as bare-root seedlings.

Pines are being planted on thousands of acres of sparsely stocked cull upland hardwood stands in the South to slow runoff, check erosion, and restore land productivity. Terrain, existing vegetation, or fragile soils often make machine planting undesirable or impractical, and scarcity of labor is making hand planting increasingly expensive. For these areas, containerized seedlings should increase hand planting rates (2) and may permit extension of the present planting season and adoption of machines that cause negligible site disturbance. This note compares survival and growth of containerized seedlings with those of bare-root loblolly pine *(Pinus taeda L.)* seedlings planted on an erosive site in northern Mississippi.

Methods

A scrub upland hardwood forest area on the Tallahatchie Experimental Forest in Lafayette County, Miss. was chosen for the study. Soils were Coastal Plain sediments overlain with a thin layer of loess, and the predominant tree species were blackjack oak *(Quercus marilandica* Muenchh.), post oak *(Quercus stellata* Wangenh.), and hickory *(Carya sp.)*.

Six 1-acre plots were located on the area. They were prescribedburned 1 year before planting and the hardwood overstory was deadened. Three plots were randomly selected for bar-planting with bareroot 1-0 loblolly pine seedlings, and the other three for planting with 8-week-old loblolly pine seedlings grown in 41/2-inch plastic "bullet" containers (fig. 1) (3).

The bare-root seedlings were lifted from the Mississippi State Forestry Commission Nursery at Winona in February and refrigerated until outplanted.

Container seedlings were grown at the Forest Hydrology Laboratory in Oxford, Miss. in a medium of two parts fine soil from existing pine plantations, one part fine sand, and one part organic matter. Fertilizers were incorporated into the mixture at the rate of 1.45 grams ammonium nitrate, 1.20 grams superphosphate, and 0.67 gram potash per 100 bullets.

After the containers were filled and seeded, they were placed in an

1 Stationed at the Forest Hydrology Laboratory, maintained in Oxford, Miss., by the Southern Forest Experiment Station in cooperation with the University of Mississippi. This study was done in cooperation with the Yazoo-Little Tallahatchie Flood Prevention Project.

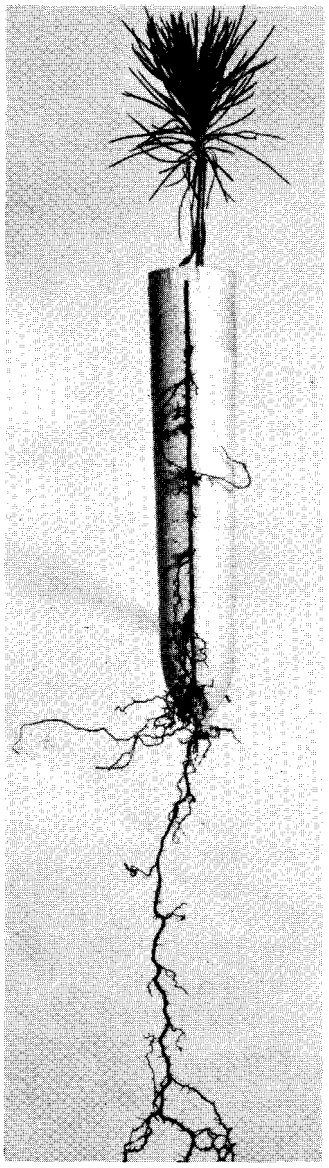


Figure 1.—An 8-week-old loblolly container seedling.

enclosed shelter for 6 weeks. Temperatures were kept near 75°F for germination and early growth. Two weeks before outplanting, the container seedlings were moved outdoors for field conditioning.

All seedlings were outplanted in early April 1970 on a 6- x 8-foot spacing. The planter used two types of container carriers. One was a modified cloth planting bag holding 65 containers; the other, a tray with a capacity of 200 containers (fig. 2). A large supply of container seedlings was centrally located on each plot, and times spent planting and refilling during an 8hour period were recorded.

When the planting disturbance had subsided, the heights of the five seedlings nearest each of 20 sampling points on each plot were measured to the nearest 0.1 foot. Survival was counted and heights were remeasured on the same seedlings in September 1970 and 1971.

Results and Discussion

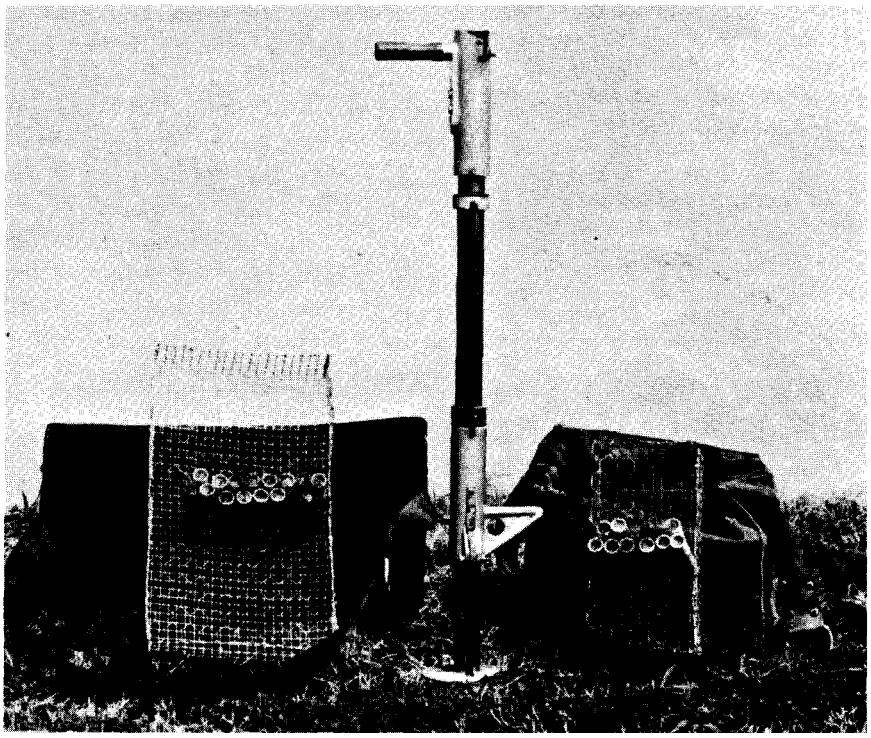
Survival at the end of the first growing season averaged 91 percent for container seedlings and 85 percent for bare-root seedlings. The difference was not statistically significant at the 0.05 level.

Between September 1970 and September 1971, 50 percent of all container seedlings suffered some rabbit damage (1) ; 20 percent died. Rabbit damage was evident in only one bare-root plot, where 25 percent of the seedlings were clipped and 4 percent died. Thus, susceptibility to rabbit depredation may be an added hazard with containerized stock:

Differences between bare-root and container seedlings in either the actual or adjusted (exclusion of seedlings killed by rabbits) second-year survival were not statistically significant. As would be expected, amount of animal damage varied widely by plot (table 1) .

Between September 1970 and March 1971, during what could be classed a mild, wet winter, mortality averaged 15 percent for container seedlings and 12 percent for bare-root seedlings. The major cause of mortality among the container seedlings was rabbit dam-

Figure 2.—Planting "gun" and two types of seedling carriers. Tray at left holds 200 seedlings but it is cumbersome. Modified planting bag at right holds 65 seedlings and requires frequent refilling.



age. With the bare-root seedlings, mortality due to rabbit damage was negligible and the major cause unknown.

By September of 1971, an additional 20 percent of the seedlings planted in containers died, with rabbit damage again the major cause. During this same period, mortality increased by only 8 percentage points on the bare-root plots.

At the end of the first year, average net growth of the container seedlings was identical to that of the bare-root seedlings: 0.3 foot. This growth rate was lower than expected for bare-root loblolly seedlings but, from previous unpublished studies, normal for containerized loblolly seedlings.

Because of extensive rabbit clipping of container seedlings, meaningful second-year growth comparisons are difficult. It appears, however, that the bare-root seedlings have the advantage of greater initial growth (table 1) .

Using the modified planting bag (fig. 2), one man consistently planted 65 container seedlings every 9 minutes. The frequent refillings necessary with this carrier averaged 3 minutes each. The overall planting rate was 5.4 seedlings per minute or over 2,000 seedlings per man-day, about twice the average hand planting rate attainable with bare-root stock.

Planting rates of over 3,000 container seedlings per man-day were possible with the 200-container tray, due to less refilling time. However, the large tray was hard for the planter to carry and hindered movement through the underbrush.

TABLE 1.—*Seedling survival and net growth at end of second growing season*

Seedling type and plot no.	Survival		Net growth	
	Actual	Adj.[1]	Actual	Adj.[2]
	Percent		*Feet*	
Container				
1	48	75	0.6	1.6
2	72	77	.9	.9
3	47	57	.6	.6
Average	56	70	0.7	[3]0.8
Bare root				
1	59	61	1.1	1.2
2	70	70	2.1	2.1
3	66	66	2.0	2.0
Average	65	66	1.7	[3]1.9

[1] Excludes mortality from rabbit damage.
[2] Average of undamaged seedlings only.
[3] Weighted average.

Some difficulty was encountered in maintaining the proper spacing between rows with container seedlings. Their small size made them difficult to see once planted.

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News CY Reviews

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More on Trees and Shrubs for Noise Abatement

It's no guesswork practice anymore. Enough research has been accomplished already to give the forester many guidelines based on scientific studies by David I. Cook and David F. Van Haverbeke of the University of Nebraska and USDA Forest Service respectively. Examples: To reduce noise from high-speed car traffic in rural areas, plant 65- to 100-foot-wide belts of trees and shrubs . . . edge of the belt should be within 50 to 80 feet of center of the nearest traffic lane ... closer to the noise source the better. Where possible, use taller varieties of trees which have dense foliage and relatively uniform ver
tical foliage distribution. Trees and shrubs should be planted as close together as practical to form a continuous, dense barrier. Remember, a reduction of noise level only 5 to 8 decibels would, in many instances, reduce the noise level from "disturbing" to "not disturbing", according to Cook and Van Haverbeke. Research Bulletin 246, "Trees and Shrubs for Noise Abatement", is available from the Department of Information, College of Agriculture, University of Nebraska, Lincoln, Neb. 68503.

Pilot Plantings o f Containerized Seedlings

The latest survival check by Yazoo-Little Tallahatchie Project foresters showed disappointing results on containerized seedlings planted in summer of 1971. Of 1000 seedlings planted in the open in 1 inch by 8 inch spiral Kraft paper tubes, only 19 percent had survived last August. Survival of