SURVIVAL AND GROWTH OF 2-0 LONGLEAF AND LOBLOLLY SEEDLINGS IN THE FIELD

E. S. Lyle, Jr., A. R. Gilmore, and Jack T. May Agricultural Experiment Station of the Alabama Polytechnic Institute Auburn, Alabama

Will 2-0 southern pine seedlings survive better or grow faster than 1-0 seedlings? This is a question that has been considered by many people connected with forest regeneration. In order to partially clarify this question, the Forestry Department of the Agricultural Experiment Station, Alabama Polytechnic Institute in cooperation with the U. S. Forest Service at Marianna, Fla. , and the St. Regis Paper Company, Pensacola, Fla., made experimental outplantings during the 1953-54 planting season of 2-0 and 1-0 longleaf and loblolly seedlings. There is little information concerning the behavior of 2-0 southern pine stock, but it seems possible that certain second year developments could improve survival or growth. Longleaf will develop a larger root collar, which is indicative of its ability to survive. Food reserves of both species could become greater over a 2-year period: thereby, promoting survival and early growth.

The 5 treatments selected for comparisons were: 2-0 longleaf, root and top pruned; 2-0 longleaf, top pruned only; 1-0 longleaf, normal stock; 2-0 loblolly, root and top pruned; 1-0 loblolly, normal stock. The 2-0 longleaf and 2-0 loblolly seedlings used in the experiment were grown in the State Nursery at Auburn, Ala. , during the 1952 and 1953 growing seasons. Some of both species were root pruned near the end of the 1952-53 winter.. It was thought that this root pruning would produce more fibrous and compact root systems. All 2-0 stock was top pruned in the spring of 1953 to retard height and diameter growth and to facilitate planting.

Since planted longleaf does not ordinarily begin height growth until the root collar reaches a diameter of approximately one inch, observations were made on the number of longleaf seedlings making height growth in the nursery beds. Some seedlings began height growth during the second year in the nursery, even though the average diameter at the root collar was 0. 377 inch for 1-0 longleaf, 0.464 inch for root and top pruned 2-0 longleaf, and 0.653 inch for top pruned 2-0 longleaf. The percentage of longleaf seedlings making height growth in each treatment was 0. 10, 0.06, and 0.08, respectively Even though some roots of the 2-0 seedlings had been pruned in the nursery beds, it was necessary to prune all 2-0 seedling roots again after lifting.

Soil texture of the areas planted ranged from sands at Marianna and Pensacola, Fla. , and Autauga, Ala. , to a sandy loam at Fayette, Ala. , and a stiff clay at Auburn, Ala. All planting was done by hand during the 1953-54 planting season.

The 5 treatments were arranged in a latin square design at each of the 5 sites. Each plot within the latin square was planted with 10 rows of 10 seedlings each at a spacing of 2 by 2 feet. Close spacings with no isolation strip were used because plans called for discontinuing the experiment before the seedlings began competing among themselves.

At all locations, height growth of each seedling and survival percentages for each plot were determined annually for the first three growing seasons. Growth and survival data were taken during August of 1957 for the Autauga and Auburn sites. Survival percentages alone were determined for the Pensacola site. Although the results cited in this paper are those obtained in August of 1957 from the Auburn, Autauga, and Pensacola plantings, the same results could be obtained from the 1956 measurements taken at Marianna, Fla. and Fayette, Ala.

Generally, all 2-0 stock gave poorer survival than 1-0 stock; however, there was little difference between the 2-0 and 1-0 loblolly. In the Autauga plantings, the survival of 2-0 loblolly stock was greater than the 1-0 loblolly by 3.8 percent (table 1). Only on the Auburn site was the survival difference for loblolly large. In no instance did 2-0 longleaf do as well as 1-0 longleaf. Height growth followed much the same pattern as survival for loblolly. Again, the height growth at Autauga was slightly greater for 2-0 loblolly than for 1-0 loblolly. In two instances the 2-0 longleaf showed greater height growth than 1-0 longleaf but neither of these was significantly greater. Another aspect of the experiment was to compare the three longleaf treatments in respect to their ability to~ stimulate early height growth. The results indicate that 2-0 stock that has not been root pruned may give earlier height growth; but, again the differences are not significant.

According to the above results, there is no basis for planting 2-0 longleaf and loblolly stock on a commercial scale. None of the 2-0 treated stock survived or grew better with any degree of consistency than the 1. 0 stock. Of even greater importance is the fact that not even in an isolated instance did 2-0 stock perform well enough to justify the additional expense. Of course, the results of this experiment are applicable only within the scope of the experiment; however, they are conclusive enough to indicate that the same results would be found within the greater part of the species range.

Table 1. Survival and growth data for 2-0 and 1-0 longleaf and loblolly pines

SURVIVAL

Treatment	Auburn	Autauga	Pensacola	Average
	Percent	Percent	Percent	Percent
2-0 longleaf root and top pruned	9.4	9.0	4.8	7.7
2-0 longleaf top pruned	12.8	18.4	4.0	11.7
1-0 longleaf	46.0	42.6	13.8	34.1
2-0 loblolly root & top pruned	59.0	24.6	30.8	38.1
1-0 loblolly	87.4	20.8	31.0	46.4

AVERAGE HEIGHT

	Feet	Feet	Feet	Feet
2-0 longleaf root and top pruned	0.86	0.91	-	0.88
2-0 longleaf top pruned	1.04	1.18	-	1.11
1-0 longleaf	.87	1.24	-	1.06
2-0 loblolly root & top pruned	6.96	4.10	-	5.53
1-0 loblolly	7.29	3.79	-	5.54

SURVIVING LONGLEAF OUT OF GRASS STAGE

	Percent	Percent	Percent	Percent
2-0 longleaf root & top pruned	60.06	53.40	-	56.73
2-0 longleaf top pruned	69.56	68.00	-	68.78
1-0 longleaf	51.79	72.60	-	62.19
2-0 loblolly root & top pruned	-	-	-	-
1-0 loblolly	-	-	-	-