

PRODUCTION OF SOUTHERN PINE GRAFTING STOCK IN 1 YEAR

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At TVA's Clinton, Tenn., nursery, seedbed densities of 1 to 36 seedlings per square foot failed to produce enough loblolly, shortleaf, and Virginia pine grafting rootstocks in one growing season. Tests were then conducted to determine the grafting success that could be obtained with seedlings of the three species planted in seven seedbed densities.

Procedure

The test involved seedbed densities of 1, 4, 6, 8, 12, 24, and 36 per square foot for each of the three species.

In the spring of 1963, one 400-foot nursery bed was prepared and seeded for each species according to standard nursery procedures. In June each bed was divided into three equal sections, or replications, and then further divided into seven equal treatment areas, one for each seedling density. Treatment areas were then thinned to the predetermined density, the largest seedlings being retained where possible.

One inch of rainfall per week was obtained artificially. Ammonium nitrate--8.5 pounds per bed--was added in May, June, July, and August. Weeding was done by hand when necessary, and all seedlings were root-pruned in August.

Results

Wider spacing did result in production of larger seedlings. Also, best grafting results were obtained when seedlings were approximately 8 mm. in diameter at the root collar. Few seedlings were that large at the end of one growing season. (Shortleaf pine had the most graftable seedlings.) (table 1). However, the seedlings did increase 2 to 4 mm. in diameter in April. Thus, seedlings that were 5 to 6 mm. in March were large enough for grafting in May. Shortleaf pine scions were grafted on both 1-0 and 1-1 rootstocks; 85 and 75 percent success was obtained.

TABLE 1.--Cumulative percentages of seedlings by diameter class at end of one growing season

		Number of seedlings per square foot						
Diameter (mm.)	Loblolly pine							
	1	4	6	8	12	24	36	
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	
2....	100	--	--	100	100	100	100	
3....	99.4	100	100	98.9	99.4	98.3	98.9	
4....	97.2	97.7	97.7	92.1	93.8	81.9	76.3	
5....	91.5	85.3	86.4	70.6	66.7	41.8	33.9	
6....	70.6	62.1	62.1	37.9	24.9	5.6	5.1	
7....	34.5	24.9	24.9	12.4	4.0	1.1	--	
8....	7.3	6.2	7.3	2.8	--	--	--	
9....	1.1	1.7	--	1.1	--	--	--	
10....	--	--	--	--	--	--	--	
11....	--	--	--	--	--	--	--	
12....	--	--	--	--	--	--	--	

		Number of seedlings per square foot						
Diameter (mm.)	Shortleaf pine							
	1	4	6	8	12	24	36	
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	
2....	--	--	--	--	--	100	100	
3....	100	100	--	100	100	99.4	99.4	
4....	98.3	98.3	100	99.4	97.2	92.8	95.0	
5....	94.4	96.7	99.4	95.6	89.4	78.3	78.9	
6....	83.9	90.0	87.8	82.2	68.9	51.1	36.7	
7....	55.0	68.9	71.1	58.3	37.8	17.2	10.6	
8....	29.4	33.3	31.1	28.3	7.8	1.7	1.1	
9....	9.4	11.1	7.8	9.4	--	.6	.6	
10....	1.7	3.3	1.7	1.7	--	--	--	
11....	1.1	1.1	--	--	--	--	--	
12....	--	.6	--	--	--	--	--	

		Number of seedlings per square foot						
Diameter (mm.)	Virginia pine							
	1	4	6	8	12	24	36	
	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	Per- cent	
2.....	100	100	--	100	100	100	100	
3.....	98.9	96.0	100	98.9	98.9	99.4	97.1	
4.....	93.7	89.7	95.4	91.4	90.8	76.4	73.6	
5.....	78.7	64.4	77.6	67.2	59.8	33.9	26.4	
6.....	43.1	25.3	38.5	33.3	13.8	3.4	2.9	
7.....	12.1	4.6	8.6	8.0	--	.6	--	
8.....	.6	--	.6	.6	--	.6	--	

Conclusions

The results of this test suggest two possibilities: increasing production of rootstocks and improving grafting success. If in early summer, there is a need for many more grafts the following spring than previously planned, the limiting factor is usually the number of available rootstocks. By thinning production beds to a density of 4 to 6 seedlings per square foot, additional rootstocks could be obtained by late spring. As evidenced by

better grafting success, 1-0 seedling rootstocks are more vigorous than transplanted material.

This method will again be used here to produce additional rootstocks if the need arises.

More southerly nurseries, which have longer growing seasons, should have less difficulty growing larger seedlings. However, nurseries to the north should make their own tests to insure an adequate number of graftable seedlings.