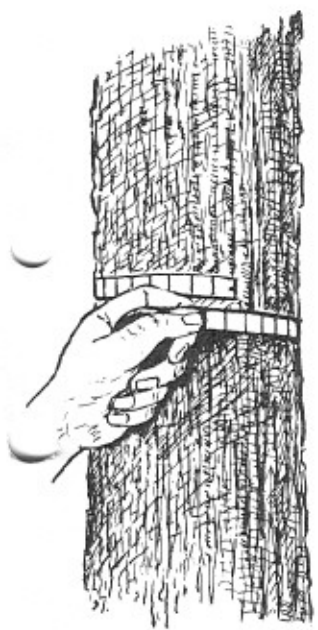
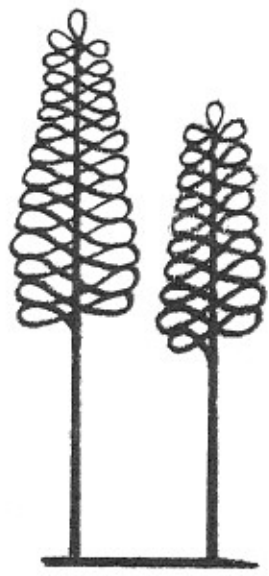
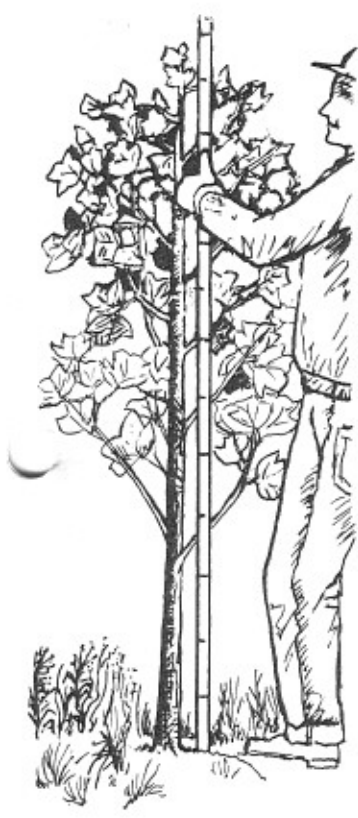


HEIGHT GROWTH OF PLANTED AND DIRECT SEEDED LOBLOLLY PINE

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Height Growth of Planted and Direct Seeded Loblolly Pine

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ABSTRACT

One year old loblolly pine seedlings were planted around exterior boundaries of direct seeding study plots during late winter of the year the seeding was done. The seeding studies were installed in 1964, 1965, 1966 and 1967. Sample seedlings were measured annually for eight seasons.

After four years, planted seedlings were from 2.6 to 3.2 feet taller than direct seeded seedlings on the four studies. After eight years, the differences ranged from 2.7 to 4.7 feet. For one study the height difference flattened off after four years. For the other three studies it was still increasing at eight years, but at a reduced rate.

DESCRIPTION OF STUDY

Direct seeding studies were installed in 1964, 1965, 1966 and 1967 to test different dates of sowing, different seeding rates, and the effect of seed stratification. The 1964 plots were on the Buckingham State Forest in the central Piedmont, and were 1/4 acre in size. The 1965, 1966 and 1967 plots were on the Pocahontas State Forest on the upper edge of the coastal plain, and were 1/5 acre in size.^{1/}

Sample trees were selected for annual height measurement using systematically located mil acre plots. The tallest seedling on each mil acre plot at the end of the first season (second season for the 1964 study) was the one measured. Stocking on the direct seeding plots varied, but averaged around 3,000 seedlings per acre. By measuring only the seedling that was tallest after the first season, it was felt that the height comparison with the planted seedlings would be more meaningful. The same seedlings were measured each year, even though on some of the direct seeded mil acre plots other seedlings later outgrew the seedlings that were tallest initially.

Mil acre plot centers were 10 feet inside plot boundaries for direct seeded seedlings and 10 feet outside plot boundaries for planted seedlings. This was done to minimize site differences between seeded and planted. Site preparation was the same for both: clearing by dozing, followed by discing. The number of seedlings measured was 75, 75, 60 and 85 each of planted and direct seeded in 1964, 1965, 1966 and 1967, respectively. Heights were measured to the nearest 0.1 foot for the first six years and to the nearest foot for the last two years. For the last two years it was possible to make "reasonable" estimates of crown class, and each sample tree was classified as dominant, codominant, intermediate, or suppressed.

^{1/} See Occasional Reports No. 25 and 38 for a description of these studies and their results. See also Occasional Report No. 23 for another study comparing height growth of planted and direct seeded seedlings on earlier direct seeding study plots.

RESULTS

Results are shown in Table I and Figure I. Planted seedlings grew faster than direct seeded seedlings. The differences increased at a near linear rate for the first 3 to 4 years in all four studies. For the 1967 study, the difference leveled off after four years, but for the other three studies it has continued to increase at a reduced rate through the eighth season.

Differences were reduced slightly when only dominant and codominant trees were used in calculating mean heights at 7 and 8 years, because more of the direct seeded seedlings had fallen behind to an intermediate or suppressed crown class.

Table I. Average Height in Feet^{2/}

	Age (Years Since Planting or Sowing)								
	1	2	3	4	5	6	7	8	
<u>1964</u>									
Planted	-	2.9	5.1	8.7	11.6	15.1	17.4 (18.7)	20.2 (21.8)	
Seeded	-	1.6	3.1	5.9	8.6	11.3	13.5 (15.1)	15.5 (17.4)	
Diff.	-	1.3	2.0	2.8	3.1	3.8	3.9 (3.6)	4.7 (4.3)	
Conf. Int. ^{3/}	-	.3	.6	.9	1.0	1.2	1.4 (1.3)	1.5 (1.2)	
<u>1965</u>									
Planted	1.4	3.2	6.0	8.8	12.0	15.0	18.4 (18.8)	21.3 (21.9)	
Seeded	.6	1.6	3.5	5.9	8.7	11.5	14.4 (15.5)	17.4 (18.9)	
Diff.	.8	1.6	2.5	2.9	3.4	3.5	3.9 (3.2)	3.9 (3.0)	
Conf. Int.	.2	.3	.6	.7	.9	1.0	1.1 (1.0)	1.0 (1.1)	
<u>1966</u>									
Planted	.8	2.2	4.3	7.1	10.3	13.5	16.5 (17.3)	19.3 (20.1)	
Seeded	.3	.9	2.0	3.8	6.6	9.4	12.0 (13.5)	14.6 (16.6)	
Diff.	.5	1.3	2.3	3.3	3.6	4.2	4.5 (3.8)	4.7 (3.6)	
Conf. Int.	.1	.3	.4	.6	.9	1.1	1.0 (.8)	1.6 (.9)	
<u>1967</u>									
Planted	1.2	2.7	5.0	8.1	11.5	14.6	17.5 (18.7)	20.4 (21.8)	
Seeded	.5	1.3	2.9	5.5	8.8	11.8	15.0 (16.6)	17.7 (19.5)	
Diff.	.7	1.4	2.1	2.6	2.7	2.8	2.5 (2.2)	2.7 (2.3)	
Conf. Int.	.1	.3	.5	.7	.9	1.1	1.3 (.8)	1.3 (.8)	

^{2/} Figures in parenthesis for ages 7 and 8 are for dominant and codominant trees only.

^{3/} 95% confidence interval for the difference.

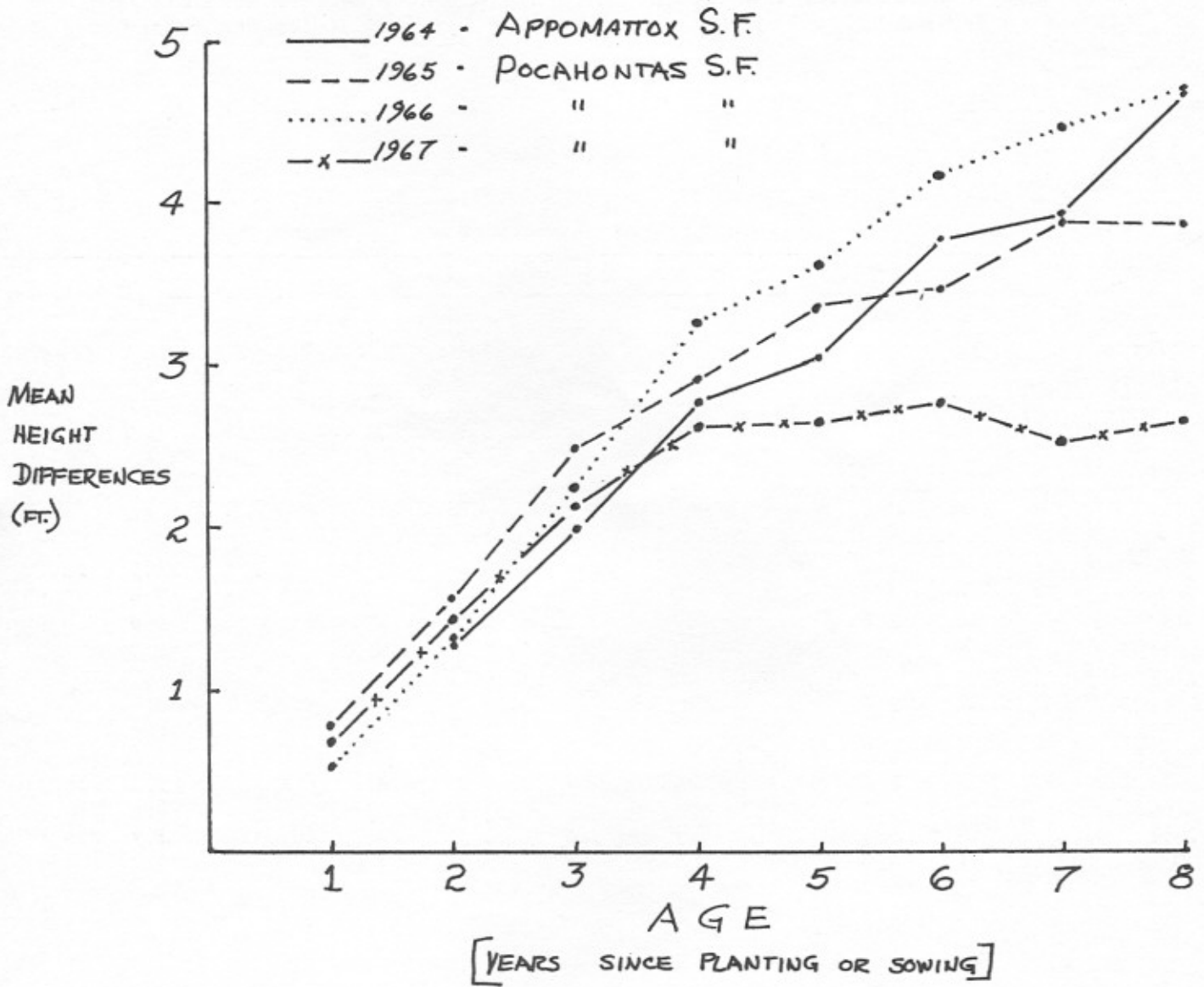


Figure I. Mean height differences between planted and seeded seedlings.