

NEEDLE CLIPPING RETARDS GROWTH OF PLANTED LONGLEAF PINE

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Clipping the needles of longleaf pine seedlings immediately before planting reduced vigor and rate of early growth in three tests conducted in central Louisiana. Survival was unaffected in two tests, but was reduced in the third when seedlings encountered an early summer drought.

The tests were part of a series whose purpose was to find ways of increasing long-leaf survival, which is usually erratic and often low. Earlier work^{1,2} had shown that needle clipping reduces initial mortality on droughty sites.

Methods

The tests were installed during 1953, 1955, and 1956 near Alexandria, La. In each year, Grade I seedlings, having needles at least 12 inches long and grown at nursery bed densities of 10, 20, and 30 per square foot, were clipped just before planting. Needle length after clipping was 5 inches. Field plots were replicated 25-tree rows on sites judged to be average for longleaf. Survival was recorded annually until most trees were in height growth.

During 1955 the 1953 test was prescribe-burned to control brown spot. In the two later trials, seedlings were sprayed twice a year with bordeaux.

Results

Survival.--A brief but intense drought occurred in June 1953. Survival after that summer averaged 61 percent for clipped seedlings and 69 percent for unclipped (table 1).

TABLE 1.--Survival of clipped and unclipped seedlings within three nursery density groups 1 and 4 years after planting

Nursery density (trees per square foot)	Foliage treatment	1953 test		1955 test		1956 test	
		Age 1	Age 4	Age 1	Age 4	Age 1	Age 4
10.....	Clipped	69	63	92	90	95	94
	Not clipped	77	71	85	84	96	96
20.....	Clipped	61	53	93	90	88	88
	Not clipped	71	66	91	90	90	90
30.....	Clipped	52	42	87	84	84	84
	Not clipped	58	52	90	86	90	88
Average, all densities.....	Clipped	61	53	91	88	89	89
	Not clipped	69	63	89	86	92	92

¹ Allen, R. M. Foliage treatments improve survival of longleaf pine plantings. Jour. Forestry 53: 724-727, illus. 1955.

² _____ and Maki, T. E. Foliage treatments reduce early mortality of longleaf pine planted on adverse sites. Jour. Forestry 49: 115 pp. 1951.

These differences, as well as those existing 4 years after planting, were significant at the 1-percent level of probability. Seedling size, as governed by nursery density, did not influence the effect of clipping on survival. Large seedlings from beds maintained at densities of 10 per square foot were adversely affected to about the same extent as smaller seedlings grown at higher densities.

The 1955 and 1956 plantings received normal rain in their first growing seasons. Survival was high, averaging about 90 percent in both tests, and differences between clipped and unclipped seedlings were not statistically significant.

Growth.--In the 1953 planting, the percent of first-year survivors that appeared very vigorous (capable of initiating height growth the following year, barring heavy brown-spot infection) was 51 for unclipped and 35 for clipped seedlings. Differences were most pronounced for the large seedlings grown at 10 per square foot, but they were important for all seedlings. Similar differences were found at age 4 years, despite a burn at age 2 for disease control.

Closer evaluations of seedling growth were made in the later tests, where the confounding influence of brown spot was eliminated by spraying. After 2 years in plantation, unclipped seedlings were consistently larger in diameter than clipped ones, regardless of which nursery bed densities were being compared (table 2). This early superiority in diameter resulted in a higher proportion of trees beginning height growth in the second to fourth years (fig. 1), and in greater mean height when the final measurements were taken at 5½ years.

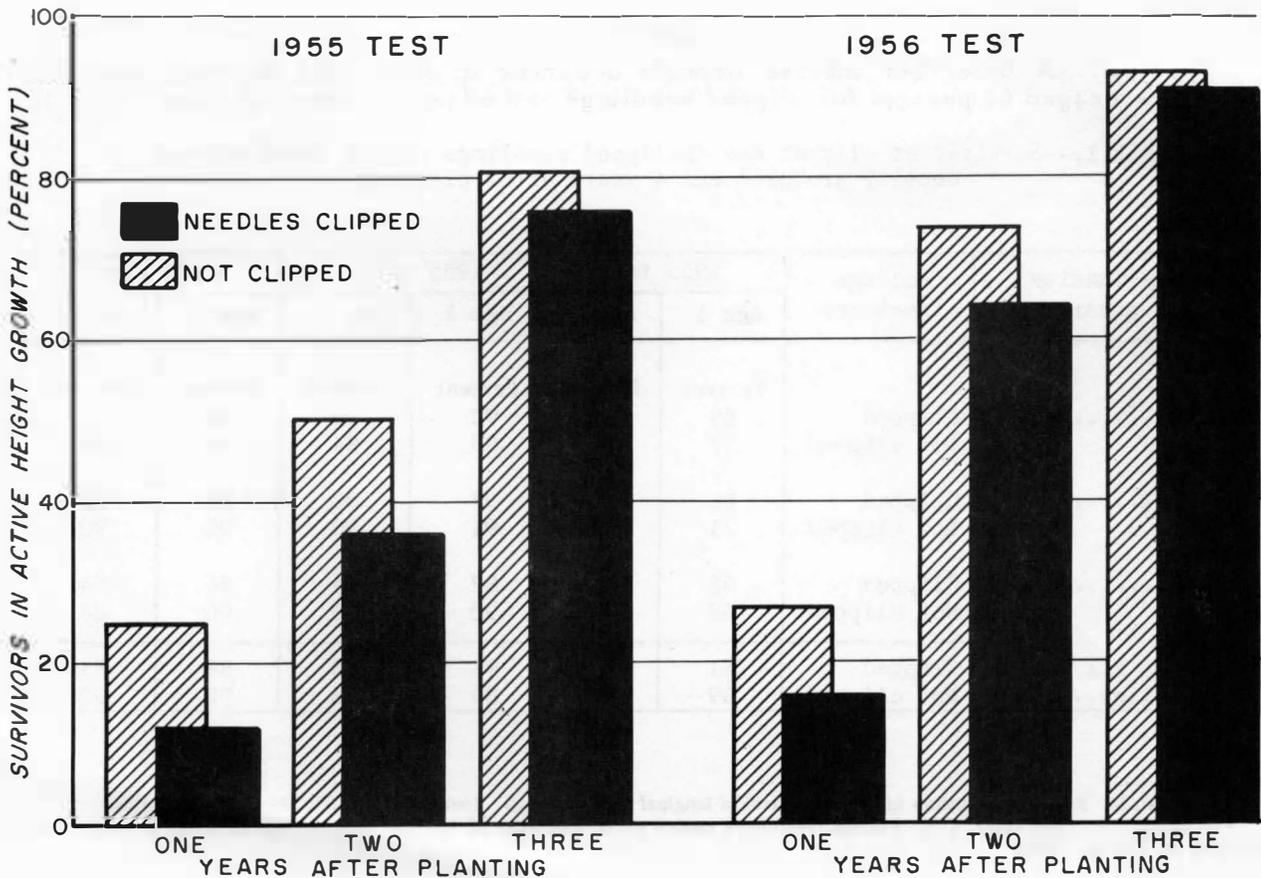


Figure 1.--Proportion of needle-clipped and unclipped seedlings in active height growth at 2, 3, and 4 years after planting.

TABLE 2.--Effects of needle clipping on growth of longleaf pine in two separate tests

Nursery density (trees per square foot)	Foliage treatment	1955 test		1956 test	
		Average stem diameter of all trees at 2 years	Average height at 5 1/2 years	Average stem diameter of all trees at 2 years	Average height at 4 1/2 years
		<i>Inch</i>	<i>Feet</i>	<i>Inch</i>	<i>Feet</i>
10.....	Clipped	0.79	3.6	0.89	4.3
	Not clipped	.89	4.1	.95	4.6
20.....	Clipped	.75	3.4	.77	3.4
	Not clipped	.85	3.8	.81	3.7
30.....	Clipped	.76	3.4	.69	2.9
	Not clipped	.78	3.6	.80	3.7
Average, all densities.....	Clipped	.77	3.4	.79	3.6
	Not clipped	.84	3.8	.86	4.0

Conclusions

The effect of needle clipping on survival of longleaf pine appears to be unpredictable for seedlings planted on favorable sites. Clipping was recommended by Allen and Maki² for longleaf planting on adverse sites, and was generally recommended by Allen¹ after extensive tests in 1951 and 1952 demonstrated it to be effective on a variety of sites from Florida to Louisiana. Therefore, negative results from the single test in 1953 should not discourage its use, especially on sites where a reduction of transpiration may be beneficial even in normal years. At the same time, the small but consistent loss in vigor and growth reported in this article suggests that stock destined for good sites should be clipped only when the planter is willing to sacrifice some juvenile growth for the convenience of handling clipped seedlings.