

ROOT PRUNING IN SOUTHERN PINE NURSERIES

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Advantages and limitations of root pruning longleaf substantially, but produces erratic southern pine seedlings in the nursery bed were determined in seven studies conducted

in Louisiana from 1955 to 1960. The studies showed that pruning increases survival of

responses from loblolly and slash. The technique has limited application for controlling excessive height growth. It seems, therefore, that it should be used only in special situations.

Treatments Tested

The combined studies evaluated single prunings in June, August, September, October, November, December, and January, and some double prunings.

Many aspects of root pruning were investigated. One preliminary test determined how nursery bed density influenced responses, and another established lifting and handling procedures for pruned stock. The remaining experiments measured the effects of time and depth of pruning in the nurseries on seedlings grown under normal management at densities of 20 to 25 per square foot for longleaf and 30 to 40 per square foot for loblolly and slash. The elapsed time between pruning and lifting ranged from 2 weeks to 7 months. Pruning depths of 4 and 7 inches were studied. Survival responses were also measured in six of the studies, and in three tests the effects of pruning on seedling size and grade were also determined.

Details of individual experiments are reported in U.S. Forest Service Research Paper SO-5 (3). This article synthesizes results and current recommendations without reference to specific studies.

Results and Recommendations

LONGLEAF PINE

Root pruning that preceded lifting by at least 1 month boosted field survival of longleaf substantially in five of the six studies—usually by more than 20 percent. In the remaining test 90 percent of the unpruned stock survived, so the opportunity for improvement was small.

One study showed that the gain in survival from pruning increased as the nursery bed density was raised from 18 to 27 seedlings per square foot. It did not indicate, however, that root pruning would permit bed densities to be increased above the 20 to 25 seedlings per square foot recommended for longleaf.

These results were confirmed by other studies in the Carolina sandhills (2).

Root pruning in the nursery bed is a practical technique for increasing survival of longleaf pine. The preferred procedure is to prune once at a depth of 7 inches in October or November. June, August, and December prunings are also effective. However, summerpruned stock produces new roots that must be repruned during processing, and late pruning is often inconvenient because it coincides with preparations for lifting the seedling crop. Similarly, shallower pruning increases survival, but short-rooted seedlings are more difficult to plant. Shallow (4-inch) pruning in June followed by deep (7-inch) pruning in November is only slightly more effective than single pruning and probably does not compensate for the expense of the additional treatment.

LOBLOLLY AND SLASH PINE

Loblolly survival was improved by pruning in two studies and was unaffected in three. Pruning increased slash survival in only one of five tests and produced no response in the others. Thus, root pruning is not a reliable method of increasing survival of loblolly and slash pines—benefits are too uncertain. If used to control height, however, single and double prunings should not reduce field survival of these species.

Growth of loblolly and slash seedlings was retarded by root pruning at 7 inches in early August and was further reduced if seedlings were repruned at the same depth in mid-September. The yield of plantable seedlings was unchanged by pruning, for reductions in the number of oversized seedlings were offset by increases in undersized plants.

Loblolly and slash seedlings which are uniformly large by mid-August or earlier may be salvaged by two prunings at a depth of 7 inches about 5 weeks apart. More prunings at shorter intervals might arrest growth more, but this theory has not been tested. Darby (1) reported that seedling size was controlled in Georgia nurseries by root pruning as often as necessary to prevent additional stem elongation after plants attained desired heights.

ALL THREE SPECIES

Routine pruning for height control is not recommended. Treatments should be limited to beds that contain more large seedlings which might be salvaged than small seedlings which would reach plantable size if not pruned.

Pruning should be done when the soil is moist; when the soil is dry it tends to fracture, exposing and injuring many lateral roots. Even moist beds should be well irrigated immediately following pruning to settle the soil and provide the seedlings with ample moisture.

Positive control of the blade is imperative (fig. 1). A properly oriented blade slices through moist soil with very little disturbance. But it must be watched closely, because a slight change in the pitch will give a lifting action that can cause heavy mortality. Blade depth should be controlled by a double-acting hydraulic cylinder capable of maintaining the desired setting within ± 1.5 inches. Pruning should not be less than 5 nor more than 8 inches below the bed surface.

Root-pruned seedlings require no more careful lifting and handling than regular nursery stock.



Figure 1.--Root-pruning blades mounted on implement bar of tractor. The blade is 54 inches long, 5 inches wide, and three-eighths inch thick. The leading edge is beveled and sharpened.

Literature Cited

1. Darby, S. P., Jr. 1962. Intensified nursery practices--the key to high-quality, custom-grown, field-graded forest tree seedlings. U.S. Forest Serv. Tree Planters' Notes 52: 7-11, illus.
2. Shipman, R. D. 1958. Planting pines in the Carolina sandhills. U.S. Forest Serv. Southeast. Forest Expt. Sta. Paper 96, 43 pp., illus.
3. Shoulders, Eugene. 1963. Root-pruning southern pines in the nursery. U.S. Forest Serv. South. Forest Expt. Sta. Res. Paper SO-5, 6 pp., illus.