

Top-pruning increases survival of pine seedlings

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Some landowners prefer natural-looking loblolly pine seedlings and ask nursery managers to grow the trees without top-pruning, but these customers may regret that request. AAES research has shown that multiple top-pruning is a consistently effective way to improve the survival of pine seedlings after transplanting.

This method of controlling seedling height in the nursery bed produces short, well balanced seedlings that are better prepared to cope with stressful growing conditions. Previous studies showed that a three-stage, top-pruning system is more effective than a single pruning. The single-pruning method proved ineffective as top-pruned seedlings grew in the nursery to be slightly taller than the nonpruned seedlings.

AAES top-pruning studies were established at nurseries in Florida, Mississippi, and South Carolina. Seedlings were first top-pruned in mid-July to a height of four inches. This treatment cut only a small percentage of the seedlings. The second clipping was in early-August; the third, late-August. August prunings were at a height of six inches.

Seedlings were lifted from seedbeds in late November in Florida and Mississippi and mid-December in South Carolina and were stored for up to six weeks before outplanting on cutover sites. Seedlings were planted at one of two depths: normal planting depth (root collar placed 0.5 to 4.7 inches below the surface) and deep planting depth (3.7 to 6.5 inches below the surface).

The top-prunings were effective in reducing seedling height by one to two inches (see table). Reducing shoot mass resulted in seedlings with a slightly better balance between roots and shoots. For the normal planting depth, top-pruning improved survival by 12% to 24%. Deeper planting increased survival of nonpruned seedlings, but had little effect on top-pruned seedlings.

When soil moisture is high and environmental conditions for survival are favorable, there will be little or no improvement in survival by planting top-pruned seedlings. However, when seedlings are exposed to stress, top-pruned seedlings typically exhibit improved survival. In addition, a recent Auburn University study indicates that top-pruned loblolly pine seedlings are less susceptible to freeze injury.

There are several alternative methods of height control including undercutting roots, and reducing fertilization and irrigation. But these methods have drawbacks. Undercutting roots can be beneficial and will improve root fibrosity, however, stressing seedlings by frequent undercutting plus withholding irrigation can reduce both height and diameter growth. Undercutting is also non-selective and affects all seedlings while top-pruning can be a selective treatment. Reducing irrigation is not effective when rainfall is plentiful. Several studies have shown that cutting back on nursery fertilization results in smaller diameter seedlings as well as slower growth after outplanting. In general, nurseries that do not top-prune tend to use height control methods that produce small diameter seedlings with small root systems. Although tree planters prefer small seedlings because they are easy to plant, properly planted large-diameter seedlings with plenty of roots have a better rate of survival and growth.

Despite the advantages of top-pruning, some planters still prefer a more "natural" seedling with a single terminal bud. Some still believe the myth that long-term seedling performance is directly

related to the presence of a terminal bud. In addition, some believe that a top-pruned seedling will grow to produce a forked tree. However, one cannot discern the difference between pruned and nonpruned trees at three years of age.

Informed customers will not be overly concerned with the appearance of the shoot tip. They will seek a well-balanced seedling with a large root-collar diameter (6 mm or 0.25 inch) and a fibrous root system.

Table 1. Effects of Multiple Top-Pruning and Planting Depth on Survival of Loblolly Pine from Three Nurseries.

			Normal planting depth	Normal planting depth	Deep planting	Deep planting
	Top-prune Nursery height	Control Nursery height	Top-prune	Control	Top-prune	Control
Nursery	Inch	Inch	%	%	%	%
Florida	10	12	82	70	85	82
Mississippi	8	9	72	60	74	69
South Carolina	10	12	88	64	85	74

Figure 1. Top-pruning loblolly pine seedlings with a rotary mower.



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