

Lateral Roots Extending From the Planting Hole: How Serious?

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Planting loblolly pine (Pinus taeda L.) seedlings so that one or more long lateral roots extended from the planting hole and were exposed on the surface did not reduce survival or subsequent height growth. Tree Planters' Notes 49(3): 64-65; 2000.

The undercutting blade of the lifting machine prunes taproots of loblolly pine (*Pinus taeda* L.) seedlings in most instances to 13 to 15 cm (5 to 6 in). Quite often, however, long lateral roots remain because they occupy the soil profile above the depth of the undercutting blade and because they run parallel to lateral pruning blades. Since long lateral roots are difficult to get completely into the planting hole, loblolly pine are operationally root-pruned at the end of the grading table to cut lateral roots to 13 to 15 cm (5 to 6 in). Do lateral roots left exposed on the ground surface after planting have a negative influence on future survival or growth? We are confident they should not be stripped off, but is it worthwhile to prune them off before planting?

Studies were established during the 1986-1987 and 1987-1988 planting seasons. The objective was to determine if survival and growth were reduced by planting with long lateral roots left outside the planting hole.

Methods

On March 4, 1986, we carefully hand-lifted seedlings at the New Kent Nursery in Providence Forge, VA, saving as many long roots as possible. Two days later, on March 6, we selected pairs of seedlings of similar root collar diameters and randomly selected 1 seedling of each pair to be pruned. Root systems were pruned by smoothing all lateral roots down along the taproot and cutting all roots about 13 cm (5 in) below the first lateral root. The other seedling in each pair was not root-pruned. Both types of seedlings were planted according to established standards, that is, by placing the tap root at the bottom of a hole 18 to 20 cm (7 to 8 in) deep and closing the hole properly. For the seedling that was not root-pruned, we left at least 1 lateral root extending out of the hole and lying on the surface. We planted 2 rows at a time, 1 row root-pruned and the other not, with 15 seedlings in each row. This constituted a replication, and we replicated the treatments 3 times, totaling 45 seedlings of each type.

The 1987-1988 study was similar. We hand-lifted seedlings on December 8, 1987, from the Sussex nursery. The next day, on December 9, we installed four 20-seedling rows, 2 rows root-pruned and 2 rows not, following the same procedures as before. Later in the season, on February 16, 1988, we planted 4 more rows, 2 rows of each treatment, using seedlings that had been hand-lifted a few weeks earlier from the Sussex nursery and kept in cold storage.

Obviously, the seedlings that were not root-pruned had more lateral roots than the seedlings that were pruned. This difference in root quantity between the 2 groups, however, was greater than if we had selected the 2 groups from operationally root-pruned seedlings. Operational root pruning removes all or most of the long laterals and does not leave all lateral roots long, as in the unpruned seedlings in these 2 studies. Seedling survival and height were measured annually for 3 years.

Results and Conclusion

We examined the exposed lateral roots 2 or 3 weeks after planting. They had air-pruned to the ground surface by this time. The exposed roots did not reduce survival or height growth (table 1). Three-year survival was actually slightly higher in both studies for seedlings planted with roots exposed, but the differences were not statistically significant (analysis of variance using an arc sine transformation of survival percentages: 1986-1987, $P = 0.70$; 1987-1988, $P = 0.82$). However, if exposed lateral roots air-prune so quickly that they present no problem, then additional lateral roots on unpruned seedlings may have favored survival over the pruned seedlings.

Table 1—Average loblolly pine survival and height after 3 growing seasons in the field

Treatment	Survival (%)			Height (cm, in)		
	1986-1987		1987-1988	1986-1987		1987-1988
	Mar.	Dec.	Feb.	Mar.	Dec.	Feb.
Roots pruned and buried	80.0	95.0	95.0	110, 43	186, 73	182, 71
Roots unpruned, some exposed	82.3	100	97.5	107, 42	192, 75	188, 74

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