

ROOT PRUNING AND TOP SHEARING OF SEEDLINGS

Session I

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When growth of seedling tops is greater than desired for best top-to-root balance, the use of either root or top pruning may produce higher quality seedlings. I noted a recent advertisement of one of the larger private tree nurseries in Pennsylvania which stated that their seedlings were root pruned. They called them "semi-transplants." I am sure that we could all debate the relative merits of a pruning system on seedlings to actual transplanting (only a few of our state nurseries, however, grow transplants). Therefore, root pruning and/or top pruning can be a useful and important technique in nursery management.

I envy the states whose nurseries are established on stone-free soil where root pruning is possible. Since the Pennsylvania state forest tree nurseries have a copious quantity of rock and stone which hinder successful root pruning, we have resorted to top pruning. Even in nurseries where root pruning is practiced, it may also be advisable, with some species, to top prune.

Since we are not able to root prune, I shall limit my discussion to top pruning as practiced in the Pennsylvania state nurseries. The species with which we have been most concerned (for better balance of root-to-shoot) is Japanese larch. This species accounts for approximately one-fourth of our production. On most sites where the soil fertility is near optimum (for production of two-year spruce, red pine, and white pine), the two-year larch has exhibited height growth as much as 3 to 4 feet. A rotary mower has been used in mid-September to reduce the height to approximately 18 to 24 inches. Less fertile areas of the nursery enable the mowing height for larch to be held to between 12 to 16 inches. This is a suitable height for good top-root balance.

Two systems of pruning have been used: (1) Mowing the tops in the spring before the second year growth starts. This reduces the height to 2 to 3 inches. The stouter individuals still grow more rapidly than the others. They crowd the others to the point of death or low vigor. (2) This year, mowing was postponed until the larger individuals reached a height of about 15 inches, then they were mowed back to 8 or 9 inches. Of the individual trees whose tops were clipped off, there was a delay of a week or more before the uppermost bud unfolded and terminal growth continued. This permitted the smaller individuals to elongate, keeping up in height and diameter nearly as well as the stouter ones which had been pruned.

This same system of mowing in mid-season is practiced with black locust. Without pruning, many marginal seedlings were badly crowded, appeared healthy at the time of fall inventory, but failed to survive the winter. Top pruning momentarily delays the vigorous growth of the larger trees and the smaller ones are given a change to reach above the clipped level to maintain growth with the pruned individuals.¹¹

The three pine species which we top prune in mid-season (about July 10 to 15), are pitch pine, jack pine, and Virginia pine. These species usually attain a height growth of 12 to 15 inches in two years. Since the maximum height of non-deciduous seedlings accepted for planting on mine spoil banks is 9 inches, the two-year seedlings of these three species are top pruned to a height of approximately 7 to 9 inches. Austrian pine has also been top pruned to reduce the shoot height of taller individuals.

This past spring we were forced to carry over two-year white pine, red pine, and some Norway spruce to three-year seedlings. Pruning the pines during the third week of June was very successful, with good bud set. The spruce, however, was not pruned until the first week in July. This appears to be too late for an acceptable appearance. Since the stems had already hardened, there was difficulty in mowing with the rotary mower. It shredded the stem to some extent. This was not detrimental, but the brown color gave an undesirable appearance.

Two hardwood species, tulip poplar and European alder, show various height growths within a seed bed. This can be caused by variations in fertility and/or time of germination. Mowing in mid-September has been done successfully; however, it resulted in some stripping of bark of the upper stem. We were anxious to note any detrimental effect such as multiple leaders. On outplanting the pruned individuals, some top buds did initially produce multiple leaders; however, one leader soon expressed dominance.

In summary, in our Pennsylvania nurseries, top pruning has been a useful nursery technique for nearly all species where better root-shoot balance is desired. Timing the mowing is important. This varies with soil fertility, climatic conditions, and the height desired. The tractor-mounted rotary mower has been very satisfactory for top pruning.

1/ We have used both rotary and hammer-knife mowers. The rotary mower has the advantage in that the clippings are thrown in the aisles. The rotary mowers used are 5-foot, tractor-mounted on a three-point hitch.