TOP PRUNING OF PONDEROSA PINE

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The Mt. Shasta-Nursery decided to see if a better balanced tree for field planting could be produced by cutting off a portion of the tops of 3-0 pine seedlings. This experiment was started in the summer of 1963, when the ponderosa pine seedlings were 3 years old.

Method

The 3-year-old seedlings were top-pruned to a height of 6 inches. The pruning was done with a rotary lawn mower mounted on a tractor.

Three hundred seedlings were measured, weighed, and examined in the fall of 1964. Comparative notes were taken of the other growing stock (table 1). All the roots were trimmed to a length of 9 inches, and all the stock had been side-pruned.

In the spring of 1964, 2,000 top-pruned seedlings were planted by machine on the McCloud District, Shasta-Trinity National Forest, Calif.

Discussion

The lawn mower did an excellent job of toppruning. Its use was both fast and efficient.

At first we were concerned about what would happen to the structure of the toppruned seedling and later to the older tree. Observations at the end of the first growing season after top pruning showed that two or three leaders were competing to assume dominance and form the tree. At that time it was already evident that very few if any trees would develop into so-called "Schoolmarms." The scars from the pruning were healed in one season. There was no evidence of insect damage or disease.

Even though the 3-0 top-pruned seedlings weighed more than the 3-0 stock that was

TABLE 1.--Comparative growth data of ponderosa pine

Age	No. of seedlings	Treatment	Average measurements				
			Stem diameter	Top length	Top weight	Root weight	Top-root ratio
			Inch	*Inches*	*Grams*	*Grams*	
2-0.....	100	None	0.128	3.8	5.7	2.5	2.28:1
3-0.....	100	None	.172	6.5	11.9	5.0	2.37:1
4-0.....	93	Top pruned as 3-0	.207	7.5	12.6	6.1	2.07:1

Figure 1.--Top-pruned ponderosa pine 1-½ years after top-pruning and 1 year after planting.

Figure 2.--Top-pruned ponderosa pine 1-½ years after top-pruning and 1 year after planting.

not top-pruned, the top-root ratio was significantly much better, better even than the 2-0 stock. The stem diameter on the older stock was of course much larger than on the 2-0. The cull percentage on the 3-0 root-pruned stock was less than 2 percent. This in itself will lower the cost of seedlings and compensate to some extent for the added expense of planting larger stock.

The top-pruned 3-0 ponderosa pine was all machine planted. Reports from the planting crew and the foreman said that the stock was just right for machine planting.

Figure 3.

The following remarks pertaining to 3-yearold planting stock are from an abstract of an article by K. Illingsworth of the British Columbia Forest Service.[1]

> "The general objective of these trials was to test certain techniques which might effect an improvement in the survival of ponderosa pine in the East Kootenay. These included mechanical methods of eliminating vegetative competition, shading, residual effects of nursery treatments, planting stock age-classes, and morphological grades. [Illingsworth also takes root pruning into account.] The relatively poor survival of 1 + 2 stock in 1962 is tentatively attributed to the poorly balanced type of plant comprising the 1 + 2 class that year. Both the 1 + 2 and 3 + 0 classes were characterized by heavy tops (approximately 18 centimetres) and low root-top ratios . . . . [T]he annual variability in the quality of the planting stock classes necessitates caution in drawing generalizations about the performance of age classes. [A very interesting statement.] . . Within particular classes of stock, the survival of large grades (based upon

[1] Illingsworth, K, Abstract of "Planting Trials with Ponderosa Pine, Nelson Forest District, 1960-62," Forest Research Review (Victoria, B.C., Canada), pp. 64-65. 1964.

top length and stem diameter at the ground-line) was very significantly better than that of small grades, although the difference was only of the order of 10 per cent."

On June 18, 1965, we took pictures of individual seedlings planted in the spring of 1964 (see figs. 4 and 5). All the trees we looked at were living and vigorous. Neither insect damage, damage resulting from top-pruning, nor deformed trees was detected in the plantation.

We examined the top-pruned seedlings again in November 1965 and found that nearly all evidence of top-pruning had disappeared. The seedlings were well-established, with a 98 percent survival among the 2,000 trees in the experiment.

The practical application of a combined bottom-, side-, and top-pruning operation would be that trees otherwise considered unbalanced or too large for field planting could be "tailor made" into excellent planting stock. The cost would be about 4 cents per 1,000 trees.

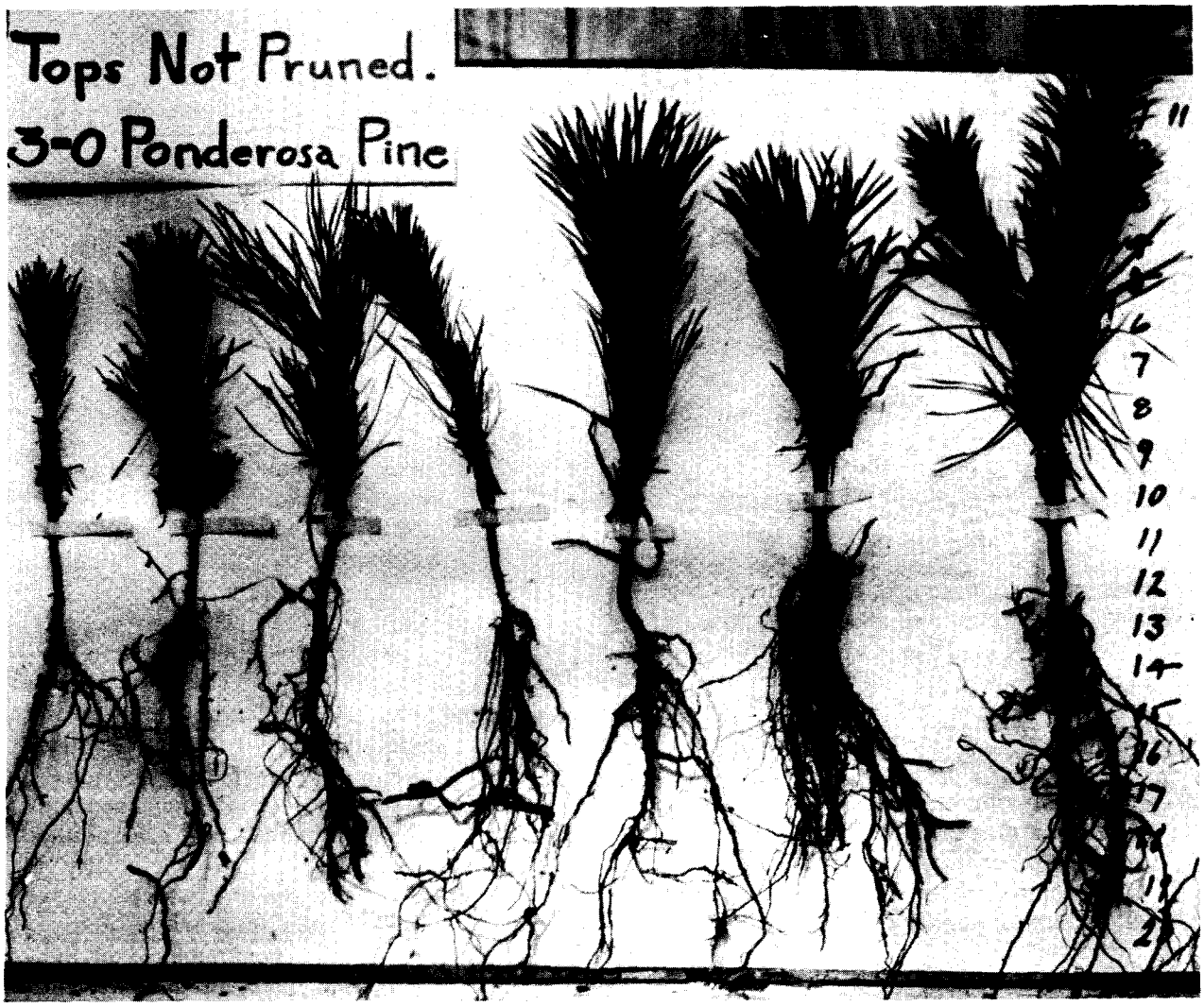

Figure 4.

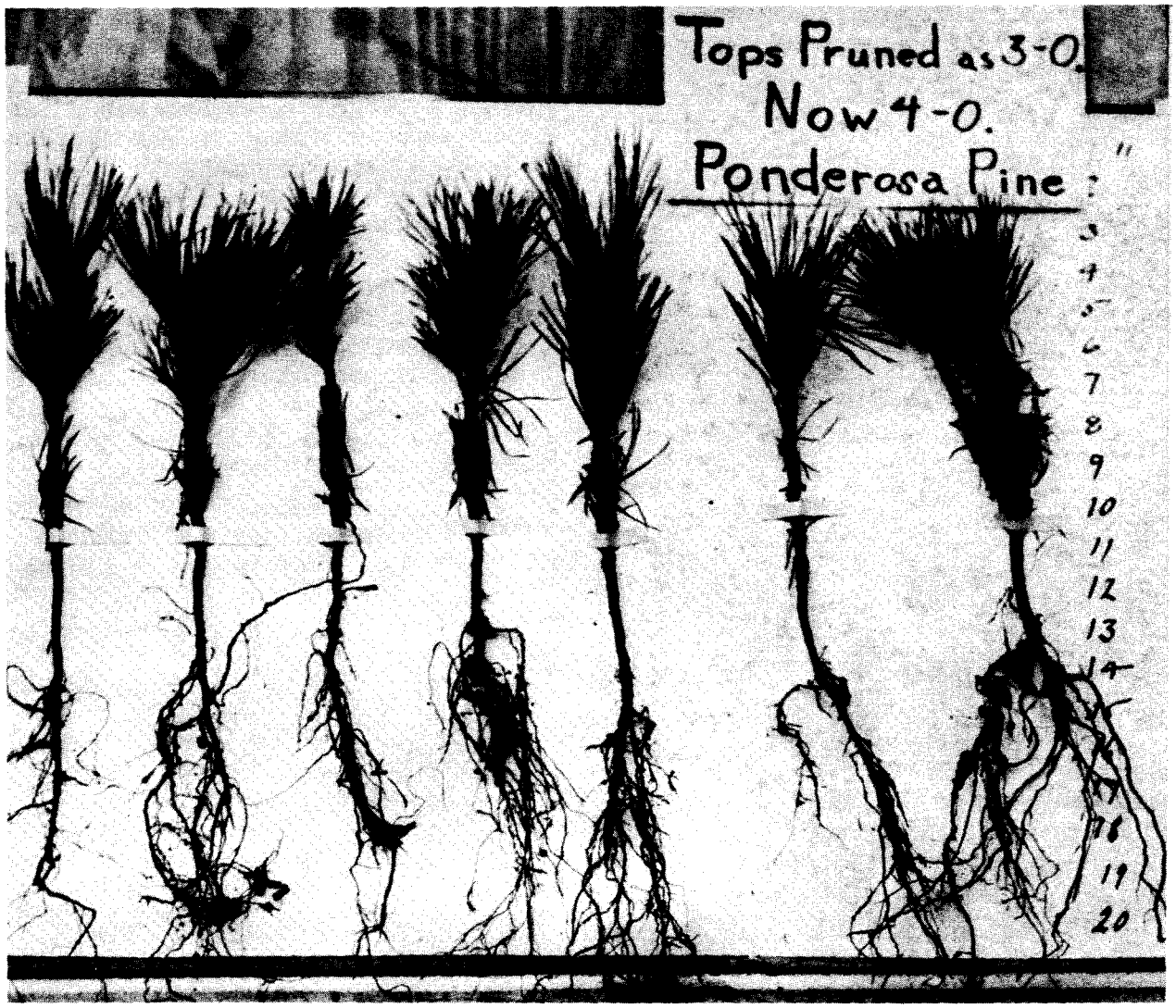

Figure 5.