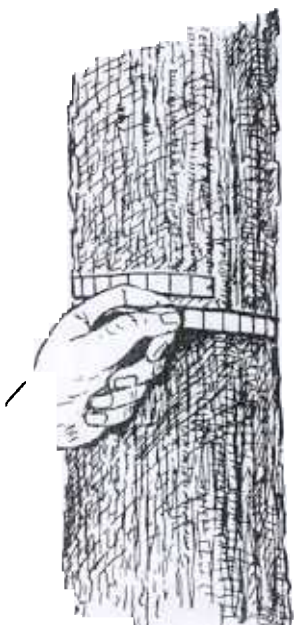
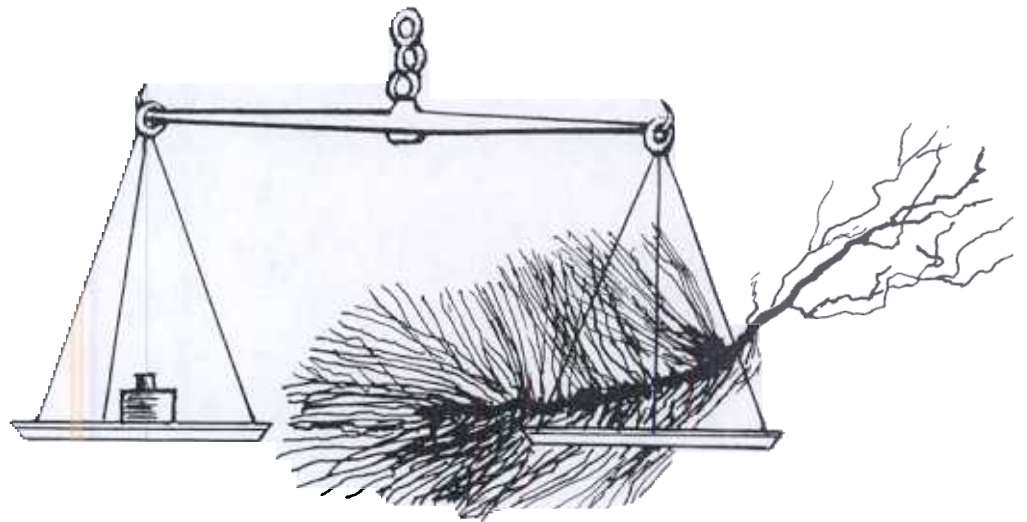


Changes in Loblolly Pine Seedling Dry Weight and Top to root Ratio between October and March



Virginia Division of Forestry



Department of Conservation and Economic Development

*Changes in Loblolly Pine Seedling Dry Weight
and Top to Root Ratio Between
October and March*

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ABSTRACT

Loblolly pine seedlings were lifted from nursery beds at monthly intervals from October 1, 1973 to March 1, 1974. They were allowed to thoroughly air dry before weighing.

Average root weight almost tripled between October 1 and March 1. Average top weight increased by about one-half during October, and leveled off after November 1. As a result, top to root ratios steadily decreased (improved) from 5.5 to 2.8 between October 1 and March 1.

Procedure

Seedlings were lifted from 11 different locations in the nursery on the first day of each month from October 1, 1973 to March 1, 1974. On each date, a 6-inch wide sample across the bed was lifted at each of the 11 locations. Undersize seedlings (less than $2\frac{1}{32}$ inch root collar diameter) were removed from each sample. Each sample was washed, tied in a bundle, and hung from the ceiling in a storage building to air dry. The number of seedlings in the various samples ranged from 38 to 97.

In the fall of 1974, after the seedlings were completely air dry, the seedlings were weighed. The total weight of the seedlings in each sample was obtained. Then each seedling was cut at the root collar and only the roots were weighed. The weight of the tops was obtained by subtraction. The average seedling root weight and top weight were calculated for each sample, and these average weights were used to calculate the top to root ratio for each sample.

Results

Results are shown in Table I and Figure I.^{1/} Mean root weight steadily increased from .28 grams on October 1 to .81 grams on March 1, almost a threefold increase. Mean top weight increased about one-half during October, from 1.53 grams to 2.37 grams, then more or less leveled off for the rest of the season. Ratios of mean top weight to mean root weight steadily decreased, from 5.5 on October 1 to 2.8 on March 1.

Table I. Mean Top and Root Weights in Grams, and Mean Top/Root Ratios

<u>Lifting Date</u>	<u>Mean Weight in Grams</u>		<u>Mean Ratios, Tops/Roots</u>
	<u>Tops</u>	<u>Roots</u>	
October 1	1.53 c	.28 e	5.49 d
November 1	2.37 ab	.47 d	5.06 c
December 1	2.23 b	.55 c	4.05 b
January 1	2.53 a	.66 b	3.84 b
February 1	2.13 b	.71 b	3.02 a
March 1	2.22 b	.81 a	2.76 a

Discussion

Root systems continued to increase in weight throughout the fall and winter. Volumes were not measured, so it is not known how much of the weight gain was due to an increase in the size of root systems (either new roots or growth in length and diameter of roots present on October 1) and how much to an increase in density. When the seedlings were weighed, however, the root systems did not appear to be larger on March 1 lifted than October 1 lifted seedlings. This would suggest that most of the weight increase was due to an increase in root density, resulting from storage of carbohydrates in the roots.

^{1/} Analyses of variance were performed on mean top weights, mean root weights, and the ratios of mean top weight to mean root weight for the 66 lots of seedlings (6 lifting dates x 11 sample locations). Duncan's New Multiple Range Test was used to test differences between lifting dates. In Table I, means not followed by the same letter are significantly different at the .01 level of significance.

LOBLOLLY PINE SEEDLING DRY WEIGHT

TOP-ROOT RATIO

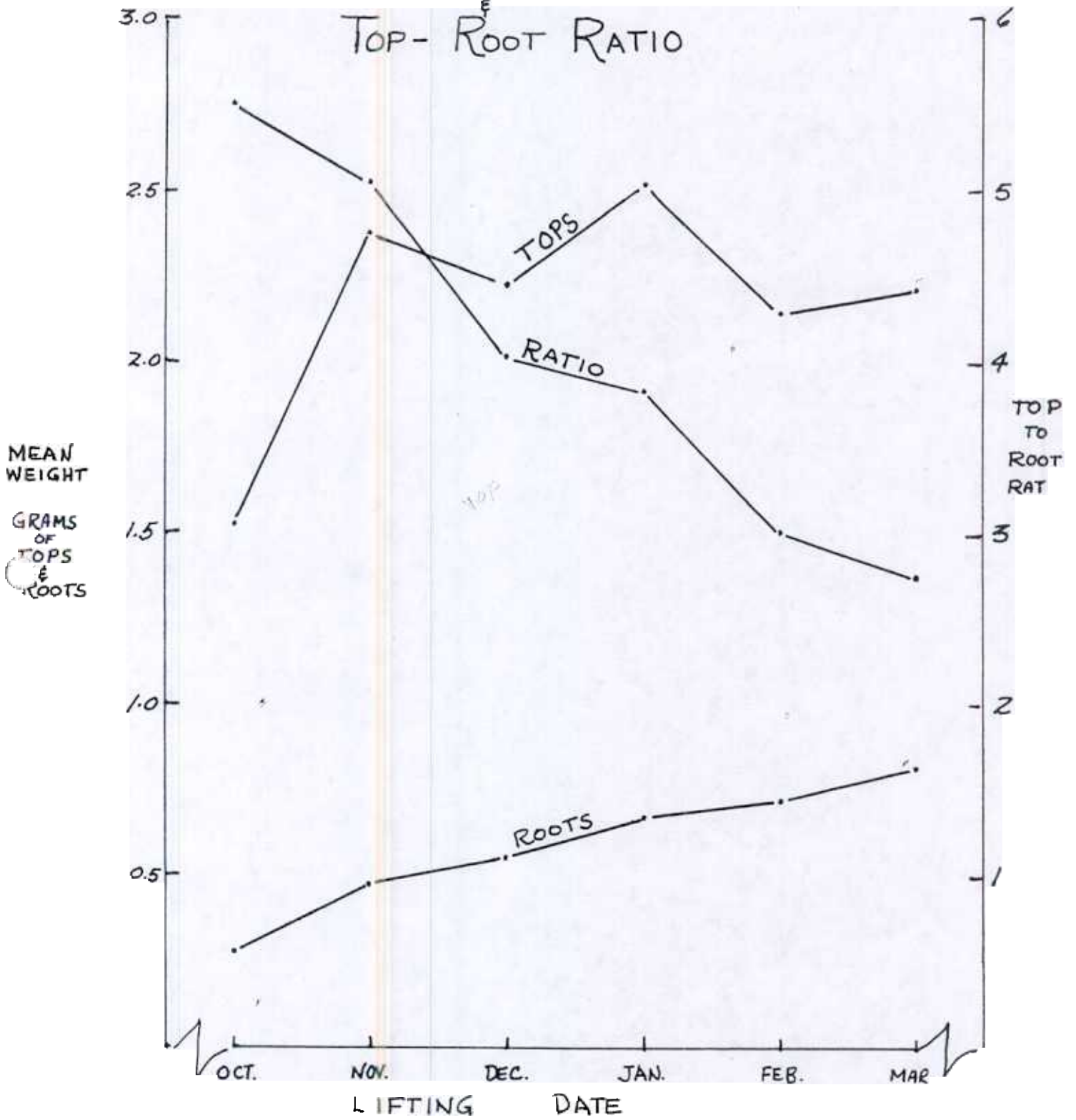


FIGURE MEAN WEIGHTS TOPS AND ROOTS AND TOP/ROOT RATIOS
LIFTING DATE