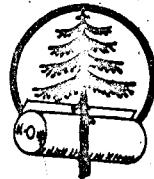


**ABSTRACTS
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MAXIMIZING VOLUME AND DRY MATTER YIELDS OF LOBLOLLY PINE

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Growth and development of naturally regenerated loblolly pines (Pinus taeda L.) were observed on 20 1/10-acre plots in the lower coastal plain of South Carolina from age 3 through 14 years. Annual measurements were made of survival, diameter, and height in each of four replications of five density classes that were thinned to 1000, 2000, 4000, 8000, and 16,000 stems per acre at age 3. Total above-ground dry matter (oven-dry weight) was sampled at age 14 only.

Mortality induced by competition for growing space was first noted in the 16M-plots. There was a sharp reduction in numbers of trees on these plots beginning at age 9, and by age 14 mortality had reduced the number from 16,000 to 3,875 per acre. Significant density-dependent mortality began in the 8M- and 4M-plots during the 10th year and in the 2M-plots during the 13th year. By age 14 number of trees per acre in these density classes had decreased from 8000 to 3313; 4000 to 2438; 2000 to 1516; and from 1000 to 828.

The effect of competition on average tree diameter was slight through the 8th year but gradually intensified thereafter. At 14 years the average diameters varied from 4.5 inches on the 1M-plots to 2.6 inches on the 16M-plots. Competition first affected height at age 10 when the trees on the 8M- and 16M-plots were 2 feet shorter than those on the lower-density plots. At age 14 the average heights varied from 39 feet on the 1M-plots to 32 feet on the 16M-plots. Basal area at age 10 varied from 55 square feet per acre on the 1M-plots to 121 square feet on the 16M-plots. By age 14 the basal area on the 1M-plots had almost doubled, to 104 square feet, while on the 16M-plots mortality and growth rate were such that basal area had increased only to 160 square feet. Basal area was maximum on the 16M-plots at all ages.

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Total per-acre volume (inside bark) of all stems at age 10 was at a minimum of 516 cubic feet on the 1M-plots and a maximum of 1009 cubic feet on the 16M-plots. At age 14 the volumes had increased to 1596 cubic feet on the 1M-plots and to 2034 cubic feet on the 16M-plots. Volume, however, had leveled off at 2070 cubic feet on the 4M-plots. As with volume, dry matter yield reached a plateau on the 4M-plots of 79,000 pounds per acre. The 1M-plots yielded 58,000 pounds, and the 16M-plots yielded 81,000 pounds. Stem wood accounted for 68 percent of these yields, stem bark 15 percent, and crowns 17 percent. Yield leveled off on the 4M-plots rather than on the 16M-plots because of the density-related decrease in height on the 16M-plots. Average height on these plots was 3 feet less than the height on the 4M-plots.

We concluded that competition for growing space limited the maximum possible density in numbers of trees per acre and was age-related. As a consequence, the maximum biological yield could be expected to occur at or somewhat below this maximum density for a given age. In our study, this maximum density for loblolly pine on SI 90 at age 14 was estimated to be about 4,000 trees per acre having a dry matter yield of about 80,000 pounds.

Figures changed by O. S. Langdon 3/20/74.