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George M. Blake
University of Minnesota

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**A STUDY TO DETERMINE OPTIMUM PLOT SIZE
FOR PROGENY TESTING RED PINE**

GEORGE M. BLAKE
University of Minnesota, St. Paul

The effect of plot size on the efficiency of progeny testing was first recognized by agriculturists in the early 1900's. With the recent development of forest genetics, the forester too has become aware of the importance of plot size in relation to progeny testing. The purpose of this study was to determine the relationship that exists between various plot sizes and their experimental efficiency and statistical validity for progeny testing. The study was limited to a single plantation of nine-year old red pine located in Anoka County, Minnesota.

The method used consisted of 1. measuring and mapping a plantation of red pine, 2. grouping the information into various sized plots—1—tree, 4—tree, 9—tree, 16—tree, and 25—tree, and 3. analyzing using two criteria to determine optimum plot size: a. variance as an indication of efficiency, and b. skewness and kurtosis as an indication of normality.

This study has shown that there is a close relationship between plot size and the experimental efficiency and statistical validity of the results derived from progeny tests of forest trees. This study has demonstrated that small plots are more efficient than large plots, and that normality will vary with different plot sizes. Generally speaking, then, the best results will be obtained from tests using a large number of small plots. For the specific area of the study the 4—tree plot was the optimum plot size which could be used to obtain statistically valid inferences on growth per unit area. A general recommendation for plot size for progeny tests of red pine can not be made, as this study was limited to a specific area.

In this particular study the results indicated that 1—tree plots were more efficient than multiple-tree plots. Although the 1—tree plot was not normally distributed, it can still be satisfactorily used with a complete randomized design for tests to determine the heritability of specific characteristics.