MINNESOTA FORESTRY NOTES
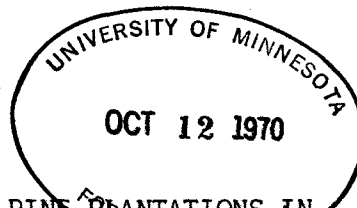
HEIGHT GROWTH OF YOUNG RED PINE PLANTATIONS IN SOUTHEASTERN MINNESOTA AS RELATED TO CERTAIN SITE FACTORS

Donald H. Scott and Donald P. Duncan[1]

Red pine (*Pinus* *resinosa*, Ait.) was widely planted in Southeastern Minnesota by the Civilian Conservation Corps between 1935 and 1942. It is currently the most popular tree species planted in the state. A study of the effect of certain site factors upon the height growth of red pine in the older plantings is timely, particularly when consideration is given the added impetus provided tree planting by the conservation reserve program.

During the summer of 1956, 84 plots were established in 18 plantations ranging in age from 14 to 18 years. These were located in Washington, Scott, Goodhue, Wabasha, Fillmore, and Houston Counties. Only pure stands having at least four rows of trees were considered acceptable, but all plantations meeting the requirements were used. Plots within plantations were selected to obtain a wide range and reasonable distribution of the site variables under study.

The five dominant or codominant trees nearest the plot center, excluding trees in outside rows and those showing leader damage, were measured for height growth during the last seven years in the life of the plantation. Growth was averaged providing a single figure for each plot which was then used in the analyses.

Site variables measured for each plot include percent slope, topographic position, aspect, degree of erosion of the A horizon, and depth to rock. In addition, soil samples were taken from each plot for the A, B, and C horizons. These were analyzed in the laboratory for clay and silt plus clay content by the Bouyoucos method.

Analysis of the data was undertaken as a multiple regression-correlation involving six independent variables (the site variables above) and one dependent variable (mean annual height growth during the last seven years). Silt plus clay content of the A horizon, of the B horizon, and of the C horizon, were used independently and substituted as one of the independent variables in three different regression equations. These analyses were performed by matrix algebra[2]. Since

---

[1] Research Assistant, and Associate Professor respectively, School of Forestry, University of Minnesota.

[2] The mathematical analyses were undertaken by Donald Meyer, a graduate student in the College of Education.

the aspect variable could not be quantified reasonably, it was finally dropped from the regression analyses and later tested by a Chi^2 test.

Conclusions reached on the basis of this sample are as follows:

1. Annual height growth of red pine is greater** on level sites such as upland or terrace than on slopes;

2. Annual height growth of red pine is greater* on upland and upper slope locations than on bottomland or lower slopes;

3. Annual height growth of red pine is greater* on soils having relatively high silt plus clay content (within the range tested) than on soils having lower silt plus clay contents. Since the soils tested did not exceed 50% silt plus clay in the A, the B, or the C horizon, all soils were sandy in texture.

** highly significant statistically
 * significant statistically