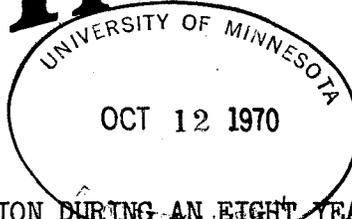




# MINNESOTA FORESTRY NOTES

COPY 2



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## WHITE PINE REGENERATION DURING AN EIGHT YEAR PERIOD FOLLOWING CHEMICAL BRUSH RELEASE <sup>1/</sup>

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During recent years considerable use has been made of herbicides in forest management activities. Most of this has been for the purpose of releasing conifers from competing hardwood trees and shrubs. The selective nature of such herbicides as 2,4-D and 2,4,5-T make them especially suitable for such use.

The present project was one of the early tests of chemical brush control to induce natural regeneration of conifers. It was designed to test the hypothesis that excessive brush is a deterrent to pine regeneration and that the release of brush competition by herbicidal treatment can aid in the successful establishment of such regeneration. Results from this project now span an eight year period, and the trends shown indicate some of the possibilities of herbicides for this type of use.

Plots were established in Itasca State Park near the Forestry and Biological Station in an area where an overstory of old growth white (Pinus strobus L.) and red pine (Pinus resinosa Ait.) assured an ample seed source and where a dense understory of brush was present. Four plots each one-tenth acre in size and with a 20 foot isolation border between them were laid out. Two of these were sprayed using the ethyl ester of 2,4-D mixed at the rate of 5.6 pounds of acid equivalent per 100 gallons of water. Spraying was done at the rate of 100 gallons per acre on July 24, 1948. Two plots were kept as controls. Except for 1954, intensive annual records were kept of the changes in size and abundance of the tree reproduction, the brush and the herbaceous cover.

Brush was uniformly abundant on all plots before spraying with an average total of 25,875 stems per acre of both beaked hazel (Corylus cornuta Marsh) and American hazel (Corylus Americana Walt) on the spray plots and 21,125 on the control. The combined total of all other brush species was less than 2000 stems per acre.

Before treatment the spray plots had a total of about 3000 white pine seedlings of all sizes per acre and the control 4250. However, there were only a few of these as old as 5 years or as large as 6 inches tall (Fig. 1). It was apparent that while conditions permitted germination and initial survival of seedlings, they were not able to survive more than a few years.

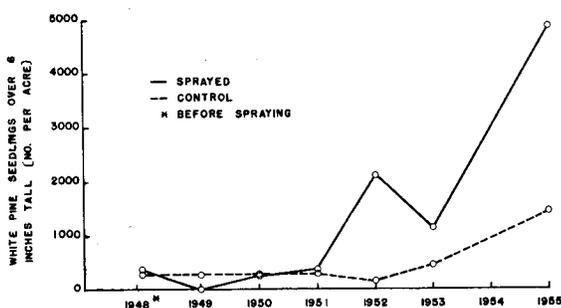
It was felt that the number of seedlings attaining a height of over 6 inches would best express the effectiveness of the treatments in inducing seedling establishment.

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After 8 years the number of such white pine seedlings had increased from about 375 to about 4875 per acre on the sprayed plots (Fig. 1). During the same period the number had increased from about 290 to 1430 per acre on the control plots. This represents a 13 fold increase on the sprayed plots and only a 5 fold increase on the non-sprayed plots.

The effect of spraying on the hazel brush is indicated in Figure 2. These data indicate that the hazel was given a complete top kill and that in 1955 the total number of stems of regrowth was still only half that on the control plots. None of these stems had attained the 6 foot height class. The spraying appears to have given an effective release over a period of at least 8 years.



Data collected annually over an 8 year period following spraying of hazel brush under virgin white and red pine substantiate the following conclusions.

1. Excessive brush can be an effective deterrent to the successful establishment of white pine regeneration even though conditions permit the germination of seeds and initial survival of seedlings.
2. The application of an appropriate herbicidal treatment can greatly improve conditions for the more permanent establishment of white pine seedlings.
3. The application of a midsummer foliage spray of 5.6 pounds of an ethyl ester of 2,4-D in 100 gallons of water per acre resulted in a complete top kill of hazel brush, a striking increase in white pine seedling establishment and a release from brush competition which has been effective over an 8 year period.

ABUNDANCE OF HAZEL (THOUSANDS OF STEMS PER ACRE)

