EFFECTS OF VARIOUS POWDERS ON THE FIELD GERMINATION OF WHITE SPRUCE AND JACK PINE SEED

Demonstration MS-2

by

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INTRODUCTION

Greenhouse experiments have shown that some fungicides and repellants increase total seed germination but also cause abnormal germinant development (Waldron and Cayford 1965). Additional studies showed that seed coated with baby powder resulted in increased germination without causing any detrimental effects on subsequent germinant development (Waldron and Cayford 1966).

In the summer of 1966 field tests at Hadashville and the Riding Mountain Forest Experimental Area were set up to determine whether or not the addition of baby powder could increase the germination of field sown white spruce (Picea glauca (Moench) Voss.) and jack pine (Pinus banksiana Lamb.) seed.

FIELD METHODS

Seedbed preparation

At the Hadashville location the sandy soil (moisture regime 1) had been exposed with a V-shaped fireline plow. The three-foot-wide furrows thus created were seeded with red pine which failed to germinate satisfactorily and subsequently were planted with three-year-old red pine transplants by the Manitoba, Department of Mines and Natural Resources.

The study site in the Riding Mountain Forest Experimental Area was scalped, with a bulldozer equiped with a straight blade, exposing the clay-loam-textured mineral soil (moisture regime 3).

Seed treatment

The white spruce seed collected at the Riding Mountain Experimental Area in 1962, had a viability of 60% in 1966. The jack pine seed collected in southeast Manitoba in 1961 had a viability of 90%.

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All seed used in this experiment was dewinged. Excluding the seed used for the control plots each seed lot was treated with either Captan 50W, a mixture of Arasan 75, Endrin 75W and aluminum flakes (A.E.A.), or baby powder. Dow latex 512R was used as the sticker at one part to nine parts of water.

Captan 50W was applied at a rate of approximately 27% by weight, A.E.A. application was according to Ontario Department of Lands and Forests rates as follows:

Arasan 75 - 2.6 lbs. per 100 lbs. of seed

Endrin 75W - 1 lb. per 100 lbs. of seed

Aluminum Flakes - 1 lb. per 100 lbs. of seed

Baby powder was applied to the maximum adhering dosage.

Plot layout and seeding techniques

At the Hadashville location 40 one foot square plots marked with numbered wooden stakes were laid out in the furrows on mineral soil.

On May 27, 1966, fifty jack pine seeds from each seed lot were randomly chosen and sown so that each seed treatment was replicated on ten plots. In addition four strips approximately four feet long were each seeded with 1 oz. of jack pine seed from each seed lot. These strips located on mineral soil were established for visual observation and comparative purposes. Germination counts were made on June 8 and October 10, 1966.

At the Riding Mountain location plot layout and seeding method were the same as at Hadashville, but in addition, forty plots were established and seeded with white spruce.

On June 10, 1966 each plot was seeded. Four strips were seeded with 1 oz. of white spruce from each seed lot. Germination counts were made on July 4 and August 8, 1966.

Weather

Weather data for the Hadashville area, which is collected at Rennie, Manitoba, indicated that the temperature and moisture requirements (68 - 86°F and 40 - 50% moisture content of seeds) for germination very likely were not met until after June 9 (Waldron and Cayford 1966). During the period May 27 - June 8 the daily mean maximum temperature was 64.9°F; the daily mean minimum temperature was 38.1°F and the total rainfall was 0.83 inches. From June 9 - August 8 the daily mean maximum temperature was 76.6°F, the daily mean minimum temperature was 52.1°F and the total rainfall was 13.22 inches (Canada Department of Transport 1966).

Weather data for the Riding Mountain Forest Experimental Area taken at the south gate of the Riding Mountain National Park for June 10 - July 4 showed a total rainfall of 2.72 inches, daily mean maximum temperature of 72.6°F, and a daily mean minimum temperature of 49.0°F. During the period of July 5 - August 8 the total rainfall was 6.64 inches, daily mean maximum temperature of 74.5°F and daily mean minimum temperature of 53.2°F (Canada Department of Transport 1966).

RESULTS AND DISCUSSION

Seed germination for both species at the two locations was low (Table 1 and 2) but no abnormally developed germinants were found.

Seed treatment improved jack pine germination at the Hadashville location (Table 1). At the Riding Mountain location jack pine germination was higher than white spruce but seed treatment did not improve the germination of either species (Table 2). In no instance did baby powder treatment significantly improve germination over other treated seed.

On the seeded strips at the Hadashville location Captan 50W and A.E.A. treated (jack pine) seed appeared to have the best germination followed by baby powder and control. At the Riding Mountain location in the seeded (white spruce) strips, control seed appeared best followed in descending order by baby powder, A.E.A. and Captan 50W.

Seed being washed out of the plots at the Riding Mountain location caused some problems (Table 2).

FUTURE WORK

In the summer of 1967 the experiment will be replicated. An attempt will be made to control the effect of rain washing seed out of the individual plots.

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