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ON EARLY SURVIVAL AND GROWTH
OF PLANTED WHITE SPRUCE**

by

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THE EFFECT OF PREPLANTING GROUND TREATMENT ON EARLY ¹ SURVIVAL AND GROWTH OF PLANTED WHITE SPRUCE

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In 1952 an experiment was begun at the Riding Mountain Forest Experimental Area in Manitoba to test the effectiveness of two preplanting ground treatments on the early survival and growth of white spruce (*Picea glauca* (Moench) Voss) transplants planted on a moderately well-drained, grey-wooded soil with a clay-loam texture (moisture regime 3 according to Hills' classification of site) (1). The planting site, a slope facing south, supported a few scattered, mature white birch (*Betula papyrifera* Marsh.) and a continuous, strongly developed cover of beaked hazelnut (*Corylus cornuta* Marsh.) (fig. 1).

Ground treatments were scalping to mineral soil and discing with an Athens plough. Both treatments plus a control were randomly assigned to one of three 50-foot-square plots. Treatments were replicated three times. Two ages of transplants were used--2-2 stock averaging 6 inches in height and 3-2 stock averaging 9 inches in height.

A total of 1,944 white spruce were planted in rows with 4-foot spacing, using the centre-hole method. The weather during planting, in mid-May, was dry, and precipitation remained below normal until late August.



Figure 1.--An example of the dense cover of beaked hazelnut which occurred on the planting area prior to preplanting ground treatments in 1952.

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First-year mortality of the 2-3 stock was higher than that of the 2-2 stock (table 1). Mortality of the 2-2 stock was the same for the three preplanting ground treatments. Mortality of the 2-3 stock was significantly higher on the scalped and disced plots than on the undisturbed plot because of increased evapo-transpiration stress on the larger 2-3 transplants effected by the removal of the protective plant cover.

Between 1953 and 1961, transplant mortality was highest on the undisturbed plots and lowest on the scalped plots. These data reflect intensity of vegetative competition on the plots. In 1961 this competition was greatest on the undisturbed plots and least on the scalped plots.

In 1961, 10 years after planting, transplant survival was highest on the scalped plots and roughly equal on the disced and undisturbed plots (fig. 2). Survival of 2-2 stock was higher than that of 2-3 stock because of the former's lower mortality in the first year (1952). The 2-2 stock on scalped plots had the highest survival (67 percent).

TABLE 1.--Effect of preplanting ground treatment and age of stock on mortality of planted white spruce

Preplanting ground treatment	Transplant mortality					
	1952			1953-1961		
	2-2	2-3	Average	2-2	2-3	Average
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Scalped.....	14	43	28	19	18	18
Disced.....	20	49	34	34	28	31
Undisturbed.....	16	23	20	44	42	43
Average.....	17	38	27	32	29	31

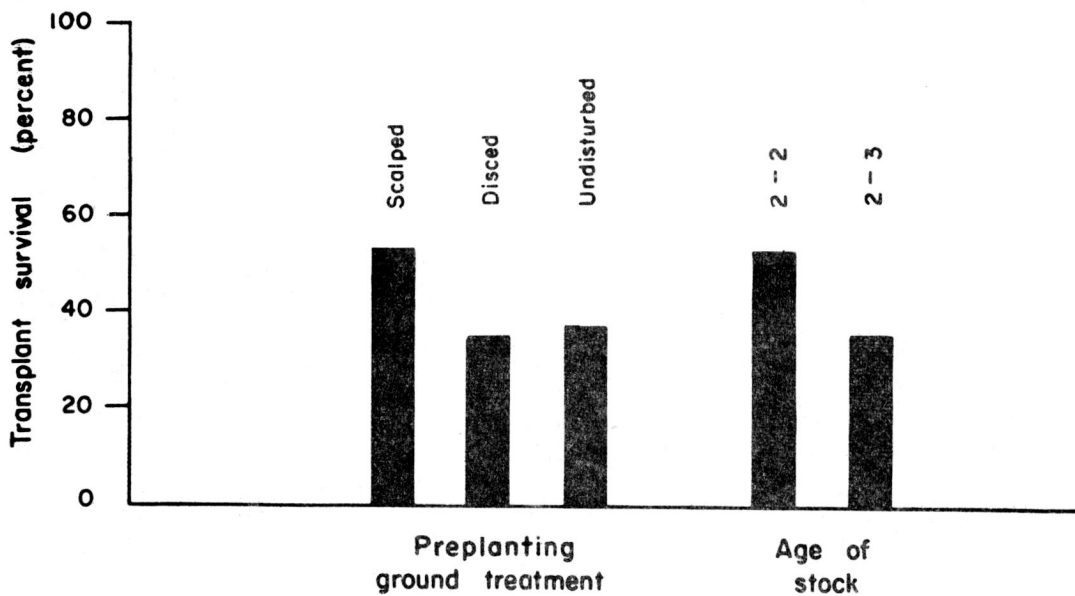


Figure 2.--Effect of preplanting ground treatment and age of stock on 10-year survival of planted white spruce.

The transplants averaged 3.6 feet in height in 1961. The overall height was not related to the age of stock or type of preplanting ground treatment.

The above results suggest that in dry years and on exposed, well-drained clay-loam sites on the Riding Mountain Forest Experimental Area, planting small stock on machine-made scalped plots will enhance the possibilities of obtaining well-stocked plantations.

Literature Cited

- (1) Hills, G. Angus. 1950. The use of aerial photography in mapping soil sites. *Forest Chron.* 26: 4-37.