

BLACK SPRUCE TRANSPLANTS UNHARMED BY OVERDOSAGE WITH MINERAL SPIRITS

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Foliage discoloration of 2-2 black spruce, Picea mariana (Mill.) B.S.P., transplants was observed in the fall of 1959 where mineral spirits have been used as a herbicide three times during the 1959 growing season. The application rate was 60 to 70 gallons per acre; this amount exceeds the maximum suggested by Stoeckeler and Jones (1957) for black spruce at least 1 year old. These authors, and also Woodford and Ivens (1950), imply that the susceptibility of conifers to injury may vary with species, age of plants, weather, soil moisture, shade, or rate of application. This prompted an experiment to learn how foliage or growth of 2-2 black spruce would react to overdosage of herbicide.

One hundred healthy 2-2 black spruce, randomly chosen from those of similar colour, size, and vigour, were divided into 25 four-tree groups and planted in a 5 x 5 latin square layout of 2-foot-square plots on June 6, 1960. Experimental trees occupied the corners of a centred square foot in each plot, and adjacent plots were 3 feet apart. Five treatments were applied:

- (1) Control - no herbicide.
- (2) 70 gallons herbicide per acre - applied to weeds.
- (3) 140 gallons herbicide per acre - as in (2).
- (4) 210 gallons herbicide per acre - as in (2).
- (5) 210 gallons herbicide per acre - applied to the spruce foliage as well as the weeds.

Unfortified mineral spirits (varsol - 10 to 15 percent aromatic hydrocarbons) was applied as a mist with a continuous-pressure hand-operated spray gun five times during the 1960 growing season on days of similar atmospheric conditions (table 1). Each time mortality, condition of tree foliage, and amounts of weed growth were noted. In the fall of 1962 the heights of all surviving trees at the end of the 1960, 1961, and 1962 growing seasons were measured to the nearest one-tenth inch.

The 70-gallon treatment practically eliminated weeds, and higher rates were obviously necessary.

Foliage discoloration of black spruce, a slight temporary browning, occurred only in 1960 and only in treatment 5, where the spruce foliage was sprayed. Seven of the experimental trees died during the three seasons--three in treatment 5 and four in treatments 3 and 4. There was no evidence that mortality resulted from treatment, and three of the seven trees, one in each of treatments 3, 4, and 5, probably died from damage incurred during the winter. By 1962 the appearance and growth of all the surviving trees were excellent. Height growth apparently was normal within treatments (table 2), and analyses of variance did not disclose significant differences between treatments in 1960, 1961, or 1962.

Apparently growth of 2-2 black spruce is not affected by overdosage with varsol, even when the foliage is sprayed and damaged, and a wide margin for error in application exists in routine spraying of 2-2, and probably also 2-1, transplant rows. Younger trees are probably more susceptible. Stoeckeler (1949, 1951) found that growth of 2-0 and 1-0 red pine, Pinus resinosa Ait., and white spruce, Picea glauca (Moench) Voss, was significantly reduced although there were no conspicuous injury symptoms. Evidently the presence or absence of visible foliage damage is not a reliable criterion of the effect of varsol on growth.

1 Imperial measure.

TABLE 1.--Dates of application of herbicide and prevailing atmospheric conditions

Item	Application date				
	June 22	July 13	July 28	Aug. 10	Aug. 23
Noon temperature, degrees F..	73	71	70	65	62
Relative humidity.....	58	73	60	66	50
Wind.....	(1)	(2)	(1)	(1)	(1)
Cloudiness.....	(3)	(3)	(3)	(3)	(3)

¹ Light. ² Calm. ³ Clear.

TABLE 2.--Mean tree heights in feet in 1960, 1961, and 1962, by treatments

Growing season	Treatment				
	1	2	3	4	5
1960.....	0.88	0.94	0.95	0.98	0.91
1961.....	1.50	1.48	1.50	1.56	1.23
1962.....	2.43	2.59	2.51	2.69	2.12

Literature Cited

- Stoeckeler, J. H. 1949. Control of weeds in conifer nurseries by mineral spirits. Lake States Forest Expt. Sta., Sta. Paper 17.
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