

CHEMICAL WEED CONTROL FOR ROOTING OF POPLAR AND WILLOW CUTTINGS

Weed control was good to excellent following applications of chloroxuron and linuron but only fair for trifluralin.

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Approximately 2 million rooted plants of poplar and willow are produced annually at the PFRA Tree Nursery, Indian Head, Saskatchewan, for the farm shelterbelt program in the Canadian prairie region. These species are planted as dormant cuttings on approximately 10 to 15 ha and harvested in the fall as 1-0 rooted plants. Their culture requires good weed control practices for maximum growth during a growing season of approximately 90 days. Although chloroxuron has been used for several years at the PFRA Tree Nursery on the basis of prior research, no registered weed control method was available for recommendation to nurserymen. The following research was consequently undertaken on the PFRA Tree Nursery at Indian Head and the Provincial Forest Nursery at Prince Albert to provide data for registration of a suitable herbicidal treatment.

Methods and Materials

One-year-old shoots of poplar (*Populus x deltoides* 'Northwest') and willow (*Salix acutifolia* 'Acute') were harvested in late fall and cut into 15 cm cuttings, which were stored overwinter at 1 °C. These cuttings were planted on May 14, 1975, and May 12, 1976, at Prince Albert and on June 9, 1975, and May 20, 1976, at Indian Head.

Trifluralin (Treflan) was applied at 1.1 kg/ha on a loamy sand soil at Prince Albert and at 1.7 kg/ha on a clay loam soil at Indian Head and immediately incorporated to a depth of 5 cm just prior to planting of the cuttings.

Chloroxuron (Tenoran) at 5.6 kg/ha and linuron (Lorox or Afalon) at 1.7 kg/ha at Prince Albert and 2.2 kg/ha at Indian Head, were also applied, but immediately after plantings. All herbicides were applied in a spray volume of 600 l/ha at 1.4 kg/cm² with a knapsack sprayer.

The treatments were arranged in a randomized block design with four replications. Each plot measured 1.4 m x 3.0 m and was planted with 10 cuttings of the two species. All experimental plots were irrigated after planting and/or after herbicidal applications. Weed control data were recorded in early July; data for top growth and yields of rooted cuttings were recorded in late August or early September.

Results

Crop Tolerance and Growth. Trifluralin (table 1) reduced the yield of rooted cuttings for 'Northwest' poplar in 1976 and for 'Acute' willow in 1975. On the other hand, yields of both species at the two test sites were not adversely affected by chloroxuron or linuron in either year. Top growth of shoots was not reduced from the herbicidal treatments but was consistently higher than that for the weedy check at Prince Albert. Poplar and willow leaves were free of any phytotoxic symptoms.

Weed Control. The main weed species at Prince Albert were common groundsel, shepherds purse, green fox-tail, perennial sow thistle, and stink-

Table 1.—Growth and yield of rooted cuttings for 'Northwest' poplar and 'Acute' willow as affected by three herbicidal treatments in 2 years at Prince Albert and Indian Head, Saskatchewan

Treatments by location	Rate (kg/ha)	Average shoot growth		Yield of rooted cuttings			
		Poplar (cm)	Willow (cm)	Northwest 1975	Poplar 1976	Acute 1975	Willow 1976
				- - - - - Percent - - - - -			
Prince Albert							
Check weeded	—	—	—	95	—	100	—
Check not weeded	—	68	83	100	95	100	100
Trifluralin	1.1	76	99	95	73 ¹	98	98
Linuron	1.7	77	102	98	90	100	95
Chloroxuron	5.6	86	91	95	88	100	85
Indian Head							
Check weeded	—	46	74	86	82	100	100
Check not weeded	—	44	72	70	82	96	100
Trifluralin	1.7	58	72	72	80	86 ¹	100
Linuron	2.2	58	68	80	88	96	98
Chloroxuron	5.6	55	71	82	80	92	98

¹ Significantly less than check weeded, P = 0.05.

weed; at Indian Head, the major weeds were purslane, redroot, and prostrate pigweed. Annual weeds were controlled adequately by chloroxuron and linuron at the two locations (tables 2 and 3). At Prince Albert, trifluralin gave poor control of common groundsel and less overall weed control than linuron or chloroxuron. This herbicide ordinarily does not control stinkweed and shepherds purse, although fair control of these weed species was obtained in one test possibly because of its mechanical incorporation.

Conclusions

Yields of rooted cuttings for 'Northwest' poplar and 'Acute' willow were satisfactory following linuron and chloroxuron herbicidal treatments at both sites, but those for trifluralin were not consistently acceptable. Top growth of cuttings from the two species was not adversely affected by any herbicidal treatment. Weed control was good to excellent following applications of chloroxuron and linuron, but only fair for trifluralin. Chloroxuron at 5.6 kg/ha, and linuron at 1.7 kg/ha for loamy soils and (2.2 kg/ha) for medium-textured (clay loam) soils, proved to be suitable herbicidal treatments for nursery plantings and rooting of hardwood poplar and willow cuttings in Western Canada.

Table 2.—Weed control for three herbicidal treatments at Indian Head, Saskatchewan, averaged for 2 years

Treatment	Weed species ¹ and control						
	Rate	A	B	C	D	E	F
	(kg/ha)						
Check not weeded	—	0.0 ²	0.0	0.0	0.0	0.0	0.0
Chloroxuron	5.7	8.8	9.0	9.0	9.0	9.0	9.0
Linuron	2.2	8.9	9.0	9.0	9.0	9.0	8.9
Trifluralin	1.7	8.6	2.2	9.0	9.0	9.0	7.8

¹ A-purslane, B-shepherds purse, C-redroot pigweed, D-prostrate pigweed, E-spear-leaf goosefoot, F-overall weed control in 1976.

Table 3.—Weed control for three herbicidal treatments at Prince Albert, Saskatchewan, averaged for 2 years

Treatments	Weed Species ¹ and Control						
Herbicide	Rate	A	B	C	D	E	F
	(kg/ha)						
Check not weeded	—	0.0 ²	0.0	0.0	0.0	0.0	0.0
Chloroxuron	5.7	8.9	9.0	8.8	9.0	9.0	8.8
Linuron	1.7	8.7	9.0	8.8	9.0	8.7	8.9
Trifluralin	1.1	4.4	7.3	9.0	6.3	6.2	5.8*

¹ A-common groundsel, B-stinkweed and shepherds purse, C-green foxtail, D-flixweed, E-lamb's-quarters, F-overall weed control in 1976.

*Significantly less than for best weed control at P = 0.05.