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Leafy spurge control under trees and along waterways[1]

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Leafy spurge is difficult to control with herbicides near trees or open water such as ponds, ditches, and rivers because of potential damage to desirable vegetation or water contamination. However, these areas provide a constant source of seed for infestation of nearby and downstream areas if no control measures are initiated. The purpose of these experiments was to evaluate several herbicides for both leafy spurge control and potential to damage desirable vegetation.

Three experiments for leafy spurge control under trees were established in a shelter belt located in a waterfowl rest area near Valley City, ND. The plots were located in a dense stand of leafy spurge growing under mature ash and elm trees that had been planted five feet apart in 12-foot rows. The herbicides were applied either with a hand-held single-nozzle sprayer delivering 40 gpa or with the controlled droplet applicator (CDA) which applied approximately 4 gpa. The hand-held sprayer treatments were applied as a premeasured amount of herbicide:water per plot to assure the correct rate and three passes were made across each plot to assure adequate coverage. The CDA treatments covered each plot only once. The experiment starting dates and leafy spurge stage at treatment were: June 26, 1986, flowering and beginning seed set; September 3, 1986, post-seed set and chlorotic leaves; and June 16, 1987, yellow bract to flowering growth stage. There were four replications per treatment in a randomized complete block design and the plots were 12 by 24 feet. Evaluations were based on percent stand reduction as compared to the control.

Initial leafy spurge control was poor when glyphosate was applied alone, regardless of rate or treatment date (Table 1). Control improved to over 90% 12 months after treatment (MAT) following a June but not September application. Grass injury was nearly 100% with all glyphosate treatments.

Sulfometuron alone did not control leafy spurge satisfactorily (Table 1). However, control at 12 MAT increased by an average of 10 and 35% when applied with glyphosate in the spring and fall, respectively, compared to glyphosate alone. Leafy spurge control averaged 97% with sulfometuron + 2,4-D at 1 or 2 + 17 oz/A but grass injury was over 50%. Picloram, applied with the CDA at a picloram:water concentration of 1:7, provided

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nearly 100% leafy spurge control with no grass injury. Several ash trees had some leaf curling but no visible permanent damage from this treatment.

The experiment to evaluate leafy spurge control with herbicides that can be used near water was established on June 27, 1986 along a ditchbank in Fargo. The experimental design and application methods were similar to the tree experiment. All plots were treated with 2,4-D at 1 lb/A in June 1987 to control leafy spurge seedlings.

Amitrole at 4 lb/A provided 91 and 95% leafy spurge control 12 and 15 MAT, respectively, but there was 64% grass injury (Table 2). Increasing the application rate to 8 lb/A increased grass injury but not leafy spurge control. Unfortunately, amitrole is no longer cleared for use near water. Fosamine provided 90% leafy spurge control 12 MAT but also 57% grass injury. No other fosamine treatment provided satisfactory control and evaluations varied considerably from plot to plot indicating this herbicide may provide inconsistent control.

Table 1. Leafy spurge control under trees (Lym and Messersmith).

Application date and treatment	Rate	Evaluation date: Aug 86 Control	May 87 Control	May 87 Grass injury	Aug 87 Control	Aug 87 Grass injury
	(oz/A)	(%control)				
June 26, 1986						
Glyphosate	8.5	9	92	88	79	…
Glyphosate	17	41	96	98	94	…
Sulfometuron	0.5	15	0	0	29	…
Sulfometuron	1	9	0	0	19	…
Sulfometuron	2	9	28	15	19	…
Sulfometuron +glyphosate	0.5 + 8.5	13	98	98	90	…
Sulfometuron +glyphosate	1 + 8.5	13	96	99	95	…
Sulfometuron +glyphosate	2 + 8.5	24	99	96	85	…
Picloram (CDA)	1:7[a]	99	95	0	85	…
LSD (0.05)		19	8	14	23	…
September 3, 1986						
Glyphosate	17	…	65	99	54	…
Sulfometuron +glyphosate	2 + 17	…	99	99	89	…
Sulfometuron +2,4-D	2 + 17	…	69	66	51	…
Picloram (CDA)	1:7[a]	…	86	9	66	…
LSD (0.05)		…	26	17	31	…
June 16, 1987						
Glyphosate	8.5	…	…	…	13	98
Glyphosate	17	…	…	…	30	98
Sulfometuron +glyphosate	0.5 + 8.5	…	…	…	9	83
Sulfometuron +glyphosate	1 + 8.5	…	…	…	12	86
Sulfometuron +glyphosate	2 + 8.5	…	…	…	36	76
Sulfometuron + 2,4-D	1 + 17	…	…	…	95	48
Sulfometuron + 2,4-D	2 + 17	…	…	…	99	63
Picloram (CDA)	1:7a	…	…	…	96	0
LSD (0.05)					12	25

[a] Solution concentration picloram (Tordon 22K):water.

Table 2. Leafy spurge control along ditchbanks (Lym and Messersmith).

		Control			
		Aug 86	May 87		Aug 87
Treatment	Rate	Control	Control	Grass injury	Control
	(lb/A)	(%)			
Amitrole	2	99	69	23	80
Amitrole	4	100	91	64	95
Amitrole	8	100	87	81	96
Fosamine	2	5	14	3	59
Fosamine	4	19	58	10	55
Fosamine	8	40	90	57	82
LSD (0.05)		19	17	42	28