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Leafy spurge control in North Dakota - 1988

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Annual picloram plus 2,4-D treatments, leafy spurge control along ditchbanks and optimum application timing of sulfometuron with auxin herbicides have been the emphasis of the leafy spurge control field research in 1988.

Picloram at 0.25, 0.375 and 0.5 lb/A provided 49, 69 and 77% leafy spurge control, respectively, in August 1987 when averaged across the Dickinson and Valley City locations (Table 1). Control had declined by approximately 10% compared to 1986. 2,4-D alone provided approximately 50% control of leafy spurge after biannual applications for 7 years.

Table 1. Leafy spurge control from annual picloram or picloram plus 2,4-D treatments and biannual 2,4-D treatments at two locations in North Dakota.

Herbicide	Rate (lb/A)	Site and 1988 evaluation date		Months after treatment				
		Dickinson	Valley City					
		June	May	12 ^a	24	36	48	60
		(% control)						
Picloram	0.25	30	46	39	48	48	58	49
Picloram	0.375	26	76	65	62	52	77	69
Picloram	0.5	46	74	65	71	81	86	77
2,4-D bian	1	29	28	22	30	38	50	39
2,4-D bian	1.5	28	42	22	24	26	45	49
2,4-D bian	2	25	49	19	30	26	54	54
Pic+2,4-D	0.25+1	63	76	52	66	63	85	73
Pic+2,4-D	0.25+1.5	71	59	58	66	70	85	77
Pic+2,4-D	0.25+2	51	82	57	62	66	83	76
Pic+2,4-D	0.375+1	58	86	69	72	70	90	84
Pic+2,4-D	0.375+1.5	70	81	68	74	76	93	84
Pic+2,4-D	0.375+2	76	85	68	59	76	91	86
Pic+2,4-D	0.5+1	75	91	71	75	84	94	87
Pic+2,4-D	0.5+1.5	80	97	64	73	80	97	91
Pic+2,4-D	0.5+2	78	94	76	75	81	95	91
LSD (0.05)		20	20	18	14	19	14	14

^a Mean values include data from the Sheldon location which was discontinued after 1985.

Leafy spurge control in May, 1988 increased by an average of 29, 25, and 26% when 2,4-D at 1 to 2 lb/A was applied with picloram at 0.25, 0.38, or 0.5 lb/A, respectively, when compared to the same picloram rate applied alone (Table 1). Picloram at 0.5 lb/A plus 2,4-D provided an average of 90% leafy spurge control 60 months after treatment (MAT) but had declined slightly compared to the previous year. The greatest enhancement with 2,4-D plus picloram seems to be with 2,4-D at 1.5 lb/A or less and picloram at 0.375 lb/A or less. In general, leafy spurge control has been similar at all sites and does not seem to be influenced by soil types, pH, or organic matter. However, leafy spurge control at Dickinson had declined in 1988 compared to 1986 and 1987 which probably was due to above average precipitation and excellent growing conditions in 1986 following several years of below average precipitation.

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. There were four replicates per treatment and the experiment was a randomized complete block design. 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 82% leafy spurge control 12 and 24 months after treatment (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 at 8 lb/A provided 90 and 74% leafy spurge control 12 and 24 MAT but also 57% grass injury. No other fosamine treatment provided satisfactory control and evaluation varied considerably from plot to plot indicating this herbicide may provide inconsistent control.

Table 2. Leafy spurge control along ditchbanks, Fargo, North Dakota.

<u>Treatment</u>	<u>Rate</u> (lb/A)	<u>Evaluation date</u>				
		<u>Aug 86</u>	<u>May 87</u>		<u>Aug 87</u>	<u>June 88</u>
		<u>Control</u>	<u>Control</u>	<u>Grass injury</u> (%)	<u>Control</u>	<u>Control</u>
Amitrole	2	99	69	23	80	63
Amitrole	4	100	91	64	95	82
Amitrole	8	100	87	81	96	78
Fosamine	2	5	14	3	59	54
Fosamine	4	19	58	10	55	59
Fosamine	8	40	90	57	82	74
LSD (0.05)		19	17	42	28	23

An experiment to evaluate leafy spurge control with sulfometuron plus 2,4-D, dicamba or picloram was established at Chaffee and Dickinson, North Dakota in 1986. The treatments were applied annually in the spring or fall at each location. Leafy spurge control and grass injury was evaluated prior to retreatment.

Sulfometuron alone did not control leafy spurge regardless of application date (Table 3). Grass injury from sulfometuron at 1 and 2 oz/A averaged 16 and 31%, respectively, following 2 annual spring applications but increased to 79 and 94%, respectively, when fall applied. Leafy spurge control was better when picloram was applied with sulfometu-

ron, then with dicamba in the spring, but both treatments provided 98% control following two fall applications. Sulfometuron plus 2,4-D provided poorer leafy spurge control than the other treatment mixtures and was similar to sulfometuron at 2 oz/A alone. Grass injury was 20 and 86% when averaged over all sulfometuron spring and fall treatments, respectively.

Table 3. Leafy spurge control with sulfometuron in combination with dicamba, picloram and 2,4-D applied annually in the spring and fall at two locations in North Dakota.

Treatment and application date	Rate	Evaluation date						
		Sept 1986		June 1987	Aug 1987		May 1988	
		Control	Grass injury	Control	Control	Grass injury	Control	Grass injury
	-(oz/A)-	-(%)						
Spring								
Sulfometuron	1	4	12	4	0	32	0	16
Sulfometuron	2	9	9	4	23	46	4	31
Sulfometuron+picloram	1+8	82	10	33	64	38	52	18
Sulfometuron+dicamba	1+32	27	17	0	45	35	30	21
Sulfometuron+2,4-D	1+16	58	6	3	52	40	10	13
Fall								
Sulfometuron	1	---	---	18	3	11	38	79
Sulfometuron	2	---	---	65	2	35	62	94
Sulfometuron+picloram	1+8	---	---	83	26	24	98	94
Sulfometuron+dicamba	1+32	---	---	61	13	25	98	90
Sulfometuron+2,4-D	1+16	---	---	56	3	16	69	74
Picloram	32	---	---	92	70	30	99	42
LSD (0.05)		11	12	26	27	27	18	29

An experiment to evaluate the optimum timing for application of sulfometuron combination treatments for leafy spurge control was established at Chaffee, North Dakota in 1987. Treatments were applied 8 times during the growing season to leafy spurge in various growth stages (Table 4). Control was evaluated visually on May 23, 1988 when leafy spurge was in the yellow bract growth stage.

Leafy spurge control with sulfometuron averaged less than 10% regardless of the auxin herbicide mixture when applied in the vegetative growth stage (Table 4). Control gradually increased and averaged 92% or more when applied from August 3, to September 15, 1987. Sulfometuron applied with picloram or dicamba provided better leafy spurge control than when applied with 2,4-D regardless of treatment date. However, the late summer and fall sulfometuron + 2,4-D treatments provided similar leafy spurge control to picloram at 16 oz/A but at approximately 25% of the cost.

Table 4. Leafy spurge control with sulfometuron plus an auxin herbicide applied at various leafy spurge growth stages.

1987 application date	Leafy spurge growth stage	Treatment/application rate (oz/A)			
		Sulfometuron + 2,4-D 1.25 + 16	Sulfometuron + dicamba 1.25 + 32	Sulfometuron + picloram 1.25 + 8	Picloram 16
		(% control)			
11 May	Vegetative-yellow bract	0	0	8	53
26 May	Flower development	14	24	59	70
8 June	True flower - seed set	21	31	72	67
29 June	Filled seed	14	44	82	67
17 July	Seed dispersal	42	79	96	93
3 August	Summer dormancy	85	95	99	91
26 August	Dormancy-regrowth	78	99	99	95
15 September	Fall regrowth	90	96	99	73
LSD (0.05)				20	