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Sulfometuron applied alone or with auxin herbicides followed by picloram retreatments for leafy spurge control¹

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Previous research at North Dakota State University has shown that sulfometuron provides better leafy spurge control when applied in midsummer or fall compared to spring treatments. However, sulfometuron applied annually has caused severe grass injury and should not be used as a retreatment. The purpose of these experiments was to evaluate initial treatments of sulfometuron alone and followed by annual retreatments with picloram in the fall, and in combination with auxin herbicides applied from mid-July to mid-September for leafy spurge control.

All herbicides were applied with a tractor-mounted sprayer delivering 8.5 gpa at 35 psi. All plots were 10 by 30 ft in a randomized complete block design. The sulfometuron experiment establishment dates in 1986 and leafy spurge growth stages were: July 22 and August 27 near Chaffee, ND, at the mature seed and fall regrowth stages, respectively; September 3 near Valley City, ND, well branched and in the fall regrowth stage; and September 15 near Dickinson, ND, in the fall regrowth stage with most leaves chlorotic or bright red. As leafy spurge control declined, a retreatment of picloram at 4 oz/A was applied 12 months after the original treatment as a split-block treatment to the back one-third of each plot at Chaffee and Dickinson and at 8 oz/A at Valley City. Evaluations were based on visible percent stand reduction as compared to the control.

Sulfometuron plus auxin herbicide treatments applied in July near Chaffee provided 82 to 100% top growth control 1 month after treatment (MAT) (Table 1). Sulfometuron alone did not provide satisfactory leafy spurge control. When evaluated in May 1987, grass injury tended to increase as the sulfometuron rate increased and was higher when sulfometuron was applied with picloram or dicamba compared to sulfometuron alone. When evaluated in August 1987, control was similar whether sulfometuron was applied alone or with an auxin herbicide prior to the picloram retreatment (62%). Control decreased rapidly and no treatment provided satisfactory leafy spurge control in 1988.

Leafy spurge control tended to be better when sulfometuron plus an auxin herbicide was applied in August or September (Table 2) compared to July (Table 1). However, grass injury also was higher. Long-term leafy spurge control tended to be higher as the

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sulfometuron rate increased up to 2 oz/A. The dicamba and 2,4-D rate had little affect on control over the ranges evaluated, but control tended to increase as the picloram application rate increased. Long-term control was much higher at Valley City compared to the other two locations. The best treatment for long-term control at Valley City was sulfometuron plus picloram at 2 plus 16 oz/A which averaged 80% 22 MAT compared to 32% control with picloram at 16 oz/A alone. Retreatment with picloram at 4 or 8 oz/A increased leafy spurge control at Chaffee and Valley City but not at Dickinson. Leafy spurge control averaged 81% when sulfometuron had been applied at 1 or 2 oz/A, averaged over all auxin herbicide combinations, followed by two annual picloram retreatments which was 20% higher than control with picloram alone. Control declined gradually and averaged 31% in August 1990, 24 months after the last retreatment. Thus, sulfometuron may be useful as the initial treatment in a long term management program provided some grass injury is acceptable.

Table 1. Leafy spurge control by sulfometuron plus auxin herbicides applied in July at Chaffee, ND (Lym and Messersmith).

Treatment	Rate oz/A	Evaluation date								
		Aug 86	May 87	Grass injury	Aug 87	Retreat ment ^a	May 88	Retreat ment ^a	Aug 88	Retreat ment ^a
		Control	Control		Control	%	Control	Control	Control	Control
Sulfometuron + picloram	0.5 + 8	100	40	11	15	52	6	16	0	10
Sulfometuron + dicamba	0.5 + 16	83	5	0	7	54	10	16	7	6
Sulfometuron + 2,4-D	1 + 8	97	18	3	8	53	10	43	1	19
Sulfometuron + picloram	1 + 8	99	60	20	16	54	10	27	6	13
Sulfometuron + dicamba	1 + 16	82	47	11	14	76	4	28	0	6
Sulfometuron + picloram	2 + 32	99	97	30	60	66	53	65	38	35
Sulfometuron + dicamba	2 + 130	100	96	49	59	69	26	37	11	15
Sulfometuron	1	31	18	10	7	66	6	41	1	9
Sulfometuron	2	13	16	15	8	72	0	33	3	19
Control	0	0	0	0	0	48	0	26	0	11
LSD (0.05)		15	32	21	22	NS	NS	NS	NS	24

^a Picloram at 4 oz/A applied as a split-block treatment to the back one-third of each plot on June 29, 1987.

Table 2. Sulfometuron plus auxin herbicides applied in August or September followed by a picloram retreatment for leafy spurge control (Lym and Messersmith).

Treatment	Rate oz/A	Evaluation date									
		May 87		Aug 87		June 88		Sept 88	June 89	Sept 89	Aug 90
		Control	Grass injury	Control	Grass injury	Control	Retreat- ment	Retreat- ment	Retreatment	Retreat- ment	
										%	
Chaffee											
Sulfometuron + picloram	0.5 + 8	89	35	15	...	5	78	11	...	...	...
Sulfometuron + dicamba	0.5 + 16	68	8	16	...	13	72	10	...	...	...
Sulfometuron + 2,4-D	1 + 8	35	83	1	...	0	44	11	...	...	...
Sulfometuron + picloram	1 + 8	95	46	32	...	8	67	16	...	...	...
Sulfometuron + dicamba	1 + 16	81	36	17	...	5	78	11	...	...	...
Sulfometuron + picloram	2 + 32	94	56	70	...	29	68	12	...	...	...
Sulfometuron + dicamba	2 + 128	95	53	56	...	8	78	16	...	...	...
Fosamine	64	43	15	9	...	3	78	16	...	...	...
Fosamine	96	56	13	20	...	6	70	12	...	...	...
Control		0	0	0	...	0	63	10	...	...	...
LSD (0.05)		29	19	28	...	NS	NS	NS	...	...	...
Dickinson											
Sulfometuron + 2,4-D	0.5 + 16	55	61	23	33	0	3	...	...	...	...
Sulfometuron + picloram	0.5 + 12	97	71	67	26	1	25	...	...	...	...
Sulfometuron + 2,4-D	2 + 16	75	73	26	33	1	16	...	...	...	...
Sulfometuron + 2,4-D	2 + 32	78	70	29	33	4	14	...	...	...	...
Sulfometuron + picloram	2 + 8	95	89	83	60	11	14	...	...	...	...
Sulfometuron + picloram	2 + 12	99	94	90	80	8	36	...	...	...	...
Sulfometuron + picloram	2 + 16	99	98	93	91	20	39	...	...	...	...
LSD (0.05)		20	29	22	24	NS	NS	...	...	...	...

Treatment	Rate oz/A	Evaluation date									
		May 87		Aug 87		June 88		Sept 88	June 89	Sept 89	Aug 90
		Control	Grass injury	Control	Grass injury	Control	Retreat- ment	Retreat- ment	Retreatment	Retreat- ment	
										%	
Valley City											
Sulfometuron + 2,4-D	0.5 + 16	41	0	11	0	6	96	20	92	33	5
Sulfometuron + 2,4-D	0.5 + 32	57	0	9	0	1	91	19	89	62	5
Sulfometuron + picloram	0.5 + 8	96	7	39	0	3	98	43	95	65	13
Sulfometuron + picloram	0.5 + 12	98	3	68	0	15	99	36	98	76	31
Sulfometuron + picloram	0.5+16	99	4	81	0	16	99	51	99	63	35
Sulfometuron + 2,4-D	1+16	90	5	26	0	5	94	29	93	64	24
Sulfometuron + 2,4-D	1+32	93	6	41	0	8	99	34	96	81	38
Sulfometuron + picloram	1+8	99	8	85	0	36	97	37	99	81	58
Sulfometuron + picloram	1+12	99	6	88	0	34	96	53	97	78	59
Sulfometuron + picloram	1+16	99	8	86	0	45	99	43	99	86	51
Sulfometuron + 2,4-D	2+16	97	34	68	4	10	99	57	98	80	43
Sulfawturon + 2,4-D	2+32	99	29	73	14	13	98	52	97	93	40
Sulfometuron + picloram	2+8	99	49	97	20	52	100	68	98	78	31
Sulfometron + picloram	2+12	99	41	95	0	45	100	75	98	87	65
Sulfometuron + picloram	2+16	99	37	98	20	80	99	65	93	82	48
Picloram	16	99	0	63	0	32	97	25	98	61	12
Control						0	98	29	94	58	3
LSD (0.05)		12	22	22	20	22	7	38	6	32	35

^aPicloram at 4 oz/A applied as a split-block treatment to the back one-third of each plot in Aug 1987 at Chaffee and Dickinson and at 8 oz/A in Aug 1987 and September 1988 at Valley City.