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## **Evaluation of sulfometuron applied in mid-summer and fall for leafy spurge control<sup>1</sup>**

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Previous research at North Dakota State University has shown that sulfometuron delays, and sometimes stops, bud growth on leafy spurge roots. A herbicide that prevents or delays bud regrowth should improve long-term control, since leafy spurge reestablishes by growth from the root buds following top growth control. The purpose of these experiments was to evaluate sulfometuron alone 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 feet 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.

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**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	Aug 87		May 88		Aug 88		
		Control	Control	Grass Injury	Control	Re- treat- ment	Control	Re- treat- ment	Control	Retreat- ment <sup>a</sup>
						(%)				
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 + 128	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

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

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 sulfometuron rate increased up to 2 oz/A. The dicamba and 2,4-D rate had little effect 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 + 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. In general, control was similar regardless of the original sulfometuron treatment rate.

**Table 2. Sulfometuron plus auxin herbicides applied in August or September for leafy spurge control (Lym and Messersmith).**

Treatment	Rate (OZ/A)	Evaluation date						
		May 87		Aug 87		June 88	Sept 88	
		Control	Grass Injury	Control	Grass Injury	Control	Retreat- ment	Retreat- ment
			(%)		(%)			
<u>Chaffee</u>								
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
<u>Dickinson</u>								
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	
<u>Valley City</u>								
Sulfometuron + 2,4-D	0.5 + 16	41	0	11	0	6	96	20
Sulfometuron + 2,4-D	0.5 + 32	57	0	9	0	1	91	19
Sulfometuron + picloram	0.5 + 8	96	7	39	0	3	98	43
Sulfometuron + picloram	0.5 + 12	98	3	68	0	15	99	36
Sulfometuron + picloram	0.5 + 16	99	4	81	0	16	99	51
Sulfometuron + 2,4-D	1 + 16	90	5	26	0	5	94	29
Sulfometuron + 2,4-D	1 + 32	93	6	41	0	8	99	34
Sulfometuron + picloram	1 + 8	99	8	85	0	36	97	37
Sulfometuron + picloram	1 + 12	99	6	88	0	34	96	53
Sulfometuron + picloram	1 + 16	99	8	86	0	45	99	43
Sulfometuron + 2,4-D	2 + 16	97	34	68	4	10	99	57
Sulfometuron + 2,4-D	2 + 32	99	29	73	14	13	98	52
Sulfometuron + picloram	2 + 8	99	49	97	20	52	100	68
Sulfometuron + picloram	2 + 12	99	41	95	0	45	100	75
Sulfometuron + picloram	2 + 16	99	37	98	20	80	99	65
Picloram	16	99	0	63	0	32	97	25
Control	...	...	...	...	...	0	98	29
LSD (0.05)		12	22	22	20	22	7	38

<sup>a</sup> Picloram 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 at Valley City.