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Evaluation of sulfometuron and other sulfonylurea herbicides for leafy spurge control¹

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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 throughout the growing season for leafy spurge control. Also, DPX-L5300, chlorsulfuron, and fosamine were evaluated for leafy spurge control.

All herbicides were applied with a tractor-mounted sprayer delivering 8.5 gpa at 35 psi. All plots were 10 x 30 ft in a randomized complete block design. The sulfometuron experiment establishment dates in 1986 and leafy spurge growth stages were: June 5 near Hunter, ND, at the true flower stage; 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 Hunter and Chaffee. Evaluations were based on percent stand reduction as compared to the control.

No treatment applied in June near Hunter provided satisfactory leafy spurge control 2 months after treatment (MAT) (Table 1). There was 10% or less grass injury with all treatments. These plots were cultivated by the landowner and were not evaluated further. Similar sulfometuron plus auxin herbicide treatments applied in July near Chaffee provided 82 to 100% top growth control I MAT. 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 when sulfometuron was applied either alone or with an auxin herbicide prior to the picloram retreatment (62%) compared to no prior treatment (48%), although there was a trend for improved control when a treatment preceded picloram application.

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Table 1. Leafy spurge control by sulfometuron with auxin herbicides applied in June at Hunter or July at Chaffee (Lym and Messersmith).

		Location and evaluation date						
		Hunter		Chaffee				
		Aug 86		Aug 86	May 87		Aug 87	
Treatment	Rate	Control	Grass injury	Control	Control	Grass injury	Control	Retreat- ment ^a
	(oz/A)	(%)						
Sulfometuron + picloram	0.25 + 4	19	10	—	—	—	—	—
Sulfometuron + dicamba	0.25 + 8	0	10	—	—	—	—	—
Sulfometuron + 2,4-D	0.5 + 8	5	0	—	—	—	—	—
Sulfometuron + picloram	0.5 + 8	41	0	100	40	11	15	52
Sulfometuron + dicamba	0.5 + 16	1	10	83	5	0	7	54
Sulfometuron + 2,4-D	1 + 8	0	10	97	18	3	8	53
Sulfometuron + picloram	1 + 8	40	10	99	60	20	16	54
Sulfometuron + picloram	1 + 16	9	0	—	—	—	—	—
Sulfometuron + dicamba	1 + 16	—	—	82	47	11	14	76
Sulfometuron + picloram	2 + 32	—	—	99	97	30	60	66
Sulfometuron + dicamba	2 + 128	—	—	100	96	49	59	69
Sulfometuron + picloram + 2,4-D	0.5+ 4 + 16	18	10					
Sulfometuron	1	—	—	31	18	10	7	66
Sulfometuron	2	—	—	13	16	15	8	72
Control	0	0	0	0	0	0	0	48
LSD(0.05)		27	NS	15	32	21	22	NS

^a Picloram at 4 oz/A applied as a split-block 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 June or 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 but the dicamba, 2,4-D, and picloram rate had little effect on control over the ranges evaluated. Sulfometuron + picloram at 2 + 8 to 16 oz/A provided the best long-term leafy spurge control 12 MAT (averaged 93% over the Valley City and Dickinson locations). However, grass injury averaged 42 and 77% 12 MAT at the two locations, respectively (Table 2).

DPX-L5300 alone or applied with 2,4-D or dicamba did not provide long -term leafy spurge control (Table 3). DPX-L5300 + picloram at 1 + 8 oz/A Provided 77 and 21% leafy spurge control 3 and 12 MAT, respectively, averaged over locations and was similar to sulfometuron + picloram at 1 + 8 oz/A. However, no DPX-L5300 treatment injured grass. Chlorsulfuron applied with an auxin herbicide did not provide satisfactory leafy spurge control. Sulfometuron applied with amitrole, fluroxypyr, and picloram all resulted in similar leafy spurge control. Fosamine provided inconsistent leafy spurge control even when applied at 96 oz/A.

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

Treatment		Location and evaluation date									
		Chaffee			Valley City			Dickinson			
		May 87		Aug 87	May 87		Aug 87	June 87		Sept 87	
		Con- trol	Grass Injury	Con- trol	Con- trol	Grass Injury	Con- trol	Con- trol	Grass Injury	Con- trol	Grass Injury
Rate	(oz/A)	(%)									
Sulfometuron + 2,4-D	0.5 + 16	—	—	—	41	0	11	—	—	—	—
Sulfometuron + 2,4-D	0.5 + 32	—	—	—	57	0	9	55	61	23	23
Sulfometuron + picloram	0.5 + 8	89	35	15	96	7	39	—	—	—	—
Sulfometuron + picloram	0.5 + 12	—	—	—	98	3	68	97	71	67	26
Sulfometuron + picloram	0.5 + 16	—	—	—	99	4	81	—	—	—	—
Sulfometuron + dicamba	0.5 + 16	68	8	16	—	—	—	—	—	—	—
Sulfometuron + 2,4-D	1 + 8	35	83	1	—	—	—	—	—	—	—
Sulfometuron + 2,4-D	1 + 16	—	—	—	90	5	26	—	—	—	—
Sulfometuron + 2,4-D	1 + 32	—	—	—	93	6	41	—	—	—	—
Sulfometuron + picloram	1 + 8	95	46	32	99	8	85	—	—	—	—
Sulfometuron + picloram	1 + 12	—	—	—	99	6	88	—	—	—	—
Sulfometuron + picloram	1 + 16	—	—	—	99	8	86	—	—	—	—
Sulfometuron + dicamba	1 + 16	81	36	17	—	—	—	—	—	—	—
Sulfometuron + 2,4-D	2 + 16	—	—	—	97	34	68	75	73	26	33
Sulfometuron + 2,4-D	2 + 32	—	—	—	99	29	73	78	70	29	33
Sulfometuron + picloram	2 + 8	—	—	—	99	49	97	95	89	83	60
Sulfometuron + picloram	2 + 12	—	—	—	99	41	98	99	94	90	80
Sulfometuron + picloram	2 + 16	—	—	—	99	37	98	99	98	93	91
Sulfometuron + picloram	2 + 32	94	56	70	—	—	—	—	—	—	—
Sulfometuron + dicamba	2 + 128	95	53	56	—	—	—	—	—	—	—
Picloram	16	—	—	—	99	0	63	—	—	—	—
Fosamine	64	43	15	9	—	—	—	—	—	—	—
Fosamine	96	56	13	20	—	—	—	—	—	—	—
LSD (0.05)		29	19	28	12	21	22	20	29	22	24

Table 3. DPX-L5300 and chlorsulfuron with auxin herbicides for leafy spurge control (Lym and Messersmith).

Treatment	Rate	Location and evaluation date						
		Chaffee				Dickinson		
		Aug 86		May 87	Aug 87	Sept 86	June 87	Aug 87
		Leafy spurge	Grass injury	Leafy spurge	Leafy Spurge	Leafy Spurge	Leafy spurge	Leafy spurge
	(oz/A)	(% control)						
DPX-L5300	1	0	0	0	0	21	0	0
DPX-L5300	2	0	0	0	0	8	0	0
DPX-L5300 + 2,4-D	1 + 16	3	0	0	0	42	3	0
DPX-L5300 + picloram	1 + 8	67	0	36	20	87	5	15
DPX-L5300 + dicamba	1 + 16	3	0	8	3	42	0	0
Chlorsulfuron + 2,4-D	0.5 + 16	0	0	0	0	57	0	0
Chlorsulfuron + picloram	0.5 + 8	42	10	9	0	63	3	10
Chlorsulfuron + dicamba	0.5 + 16	3	10	3	0	37	0	0
Sulfometuron + amitrole	1 + 32	11	20	6	0	27	6	6
Sulfometuron + fluroxypyr	1 + 16	49	40	30	12	97	15	0
Sulfometuron + picloram	1 + 8	59	30	40	13	—	—	—
Fosamine + X-77 surf.	32 + 0.5%	—	—	—	—	62	14	a
Fosamine + X-77 surf.	64 + 0.5%	—	—	—	—	10	11	0
Fosamine + X-77 surf.	96 + 0.5%	—	—	—	—	68	52	10
LSD (0.05)		18	18	21	11	40	12	NS