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Late season leafy spurge control with sulfometuron and picloram¹

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Previous research has shown the best time to apply herbicides for leafy spurge control is the true flower growth stage in mid-June or during fall regrowth. Late-fall treatments generally provide good control of many perennial weeds, but leafy spurge shows more visible changes due to cold temperatures and changes in daylength than most other perennial weeds. Many landowners often are unable to treat all of the infestations present before a light frost occurs and/or the leaves lose chlorophyll and turn red. The purpose of this research was to determine if frost or changes in leafy physiology prior to herbicide application would prevent satisfactory leafy spurge control the following growing season.

The experiment was established in dense leafy spurge stands at West Fargo and Hunter, ND in 1987. Treatments were applied on four dates from September 1 to October 14, and leafy spurge ranged from vigorous fall regrowth to senescence (Table 1). Fall 1987 was warmer than average as there were no temperatures colder than 38 F in September, and the coldest overnight temperatures during the experiment were 31 and 24 F on October 2 and 7, respectively. The 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 with four replications. Evaluations were based on a visual estimate of percent stand reduction as compared to the control.

Leafy spurge control was better at Hunter than West Fargo regardless of treatment on application date (Table 2). The environmental conditions were similar at the two locations, except leafy spurge at Hunter was growing more vigorously, probably due to higher soil moisture available than at West Fargo. Leafy spurge control at West Fargo was similar when herbicides were applied on September 1 and 15, and averaged 73% in May 1988. Leafy spurge leaves had turned red by September 15 but were firmly attached to the stem (Table 1). However, the plants were beginning to defoliate when the treatments were applied on October 1 and the stems were bare by October 14. Control declined accordingly and averaged only 49 and 30%, respectively. Leafy spurge control with picloram at 16 oz/A tended to be better than with sulfometuron plus picloram at 1 + 8 oz/A, but both treatments were better than picloram plus 2,4-D at 8 + 16 oz/A. The plots were burned during a grass fire in July 1988 and could not be reevaluated.

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Table 1. Growth and environmental conditions during late-season leafy spurge control treatments (Lym and Messersmith).

1987 treatment date	West Fargo					Hunter				
	Leafy spurge		Temperature			Leafy spurge		Temperature		
	Stems	Leaves	Air	Soil 1 inch	Relative humidity	Stems	Leaves	Air	Soil 1 inch	Relative humidity
			— (F)—		(%)			— (F)—		(%)
September 1	branched	green	68	70	51	branched	slightly red	67	71	53
September 15	red	red	81	74	45	yellow	red	79	72	58
October 1	red	senescence	59	60	65	red	red	61	60	60
October 15	bare	—	50	48	60	red	red	48	48	60

Leafy spurge leaves at Hunter had turned red by September 15, but did not defoliate during the experiment despite the temperature dropping to 24° F on October 7 (Table 1). Leafy spurge control was similar in May 1988 regardless of treatment date at Hunter except for picloram plus 2,4-D at 8 + 16 oz/A which averaged only 36% control when applied on October 1 (Table 2). The reason for the decline is not known, since this treatment was applied prior to frost and the October 15 treatment averaged 81% control. Sulfometuron plus picloram at 1 + 8 oz/A and picloram at 16 oz/A provided better long-term control than picloram plus 2,4-D at 8 + 16 oz/A when applied on September 15 or later.

Table 2. Leafy spurge control from late-season herbicide treatments (Lym and Messersmith).

Location/Treatment	Rate (z/A)	Sept 1		Sept 15		Oct 1		Oct 15	
		May	Aug	May	Aug	May	Aug	May	Aug
West Fargo									
Picloram + 2,4-D	8 + 16	54	...	60	...	24	...	10	...
Sulfometuron + picloram	1 + 8	54	...	80	...	56	...	43	...
Picloram	16	77	...	94	...	67	...	38	...
LSD (0.05) May = 38									
Hunter									
Picloram + 2,4-D	8 + 16	92	47	91	18	36	0	81	23
Sulfometuron + picloram	1 + 8	100	59	99	79	98	39	93	61
Picloram	16	94	57	92	42	91	38	86	56
LSD (0.05) May = 26; Aug = 25									

Soil and air temperature (including below 32° F) and relative humidity did not affect leafy spurge control with these herbicides. Good control can be expected the following spring if fall treatments are applied when leafy spurge leaves are green or red but still firmly attached to the stem.