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Leafy spurge control with various picolinic acid herbicides¹

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Picloram is the main herbicide used for leafy spurge control. Picloram is often applied at 1 to 2 lb/A for long-term control or at 0.25 to 0.5 lb/A as an annual treatment. The use of picloram, especially near open water or in areas with high water tables, has been criticized because of its high water solubility, potential to leach into groundwater and high phytotoxicity. The purpose of these experiments was to compare several picolinic acid herbicides both alone and in combination with 2,4-D or picloram for leafy spurge control.

The experiments were established near Hunter, ND on June 3, 1985. Leafy spurge was 18 to 24 inches tall and beginning seed set. Plots were 10 by 30 feet in a randomized complete block design with four replications. Herbicides were applied using tractor-mounted sprayer delivering 8.5 gpa at 35 psi. The weather was partly cloudy and 64° F with 60% relative humidity and the soil temperature at 2 inches was 64° F. Evaluations were based on a visual estimate of percent stand reduction as compared to the control.

The first experiment compared clopyralid, fluroxypyr and triclopyr alone and in various combinations to picloram for leafy spurge control. Clopyralid alone did not control leafy spurge and tended to reduce control when combined with picloram compared to picloram alone (Table 1). Picloram at 1 lb/A averaged 93 and 81% control compared to 77 and 43% control when combined with clopyralid at 1 lb/A 12 and 14 months after application, respectively. Fluroxypyr and triclopyr provided moderate leafy spurge control the season of application. Control decreased when fluroxypyr or triclopyr were combined with clopyralid and when triclopyr was combined with 2,4-D. Picloram at 1 and 2 lb/A gave 81 and 95% leafy spurge control, respectively, 15 months following application. No other treatment provided satisfactory leafy spurge control at the 15-month evaluation.

Previous research at North Dakota State University has shown that picloram at 0.25 to 0.5 lb/A plus 2,4-D at 1 lb/A provides increased control of leafy spurge compared to picloram alone at similar rates. The second experiment was designed to determine whether a similar enhancement of leafy spurge could be obtained by adding 1 lb/A of 2,4-D to low application rates of clopyralid, fluroxypyr, triclopyr, and dicamba. No treatment provided satisfactory leafy spurge control by August 1985 (Table 2).

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Picloram alone or with 2,4-D provided better leafy spurge control than other picolinic acid herbicides or dicamba. Previous research has shown that picloram uptake and translocation are not increased when applied with 2,4-D. Metabolism studies are in progress to determine why this combination treatment provides synergistic leafy spurge control. Whatever the mechanism, it apparently does not function with other picolinic acid herbicides or dicamba.

Table 1. Leafy spurge control with various picolinic acid herbicides.

Treatment	Rate (lb/A)	Evaluation date		
		21 Aug 1985	29 May 1986	18Aug 1986
		(% control)		
Triclopyr	4	28	28	5
Triclopyr	8	55	42	20
Triclopyr + clopyralid	2 + 2	6	5	4
Triclopyr + clopyralid	3 + 3	1	12	18
Triclopyr + 2,4-D	0.5 + 1	3	0	0
Triclopyr + 2,4-D	1 + 2	9	15	5
Picloram	0.5	75	23	9
Picloram	1	93	93	81
Picloram	2	100	97	95
Picloram + clopyralid	0.25 + 0.25	41	23	21
Picloram + clopyralid	0.5 + 0.5	61	33	11
Picloram + clopyralid	1 + 1	95	77	43
Clopyralid	2	6	3	5
Clopyralid	4	0	0	0
Clopyralid + fluroxypyr	0.5 + 0.5	14	4	1
Clopyralid + fluroxypyr	1 + 1	29	13	4
Clopyralid + fluroxypyr	2 + 2	14	3	0
Fluroxypyr	1	40	15	21
Fluroxypyr	2	22	0	0
Fluroxypyr	4	64	33	2
LSD (0.05)		25	27	27

Table 2. Leafy spurge control with 2,4-D combined with various auxin herbicides.

Treatment	Rate (lb/A)	Evaluation date	
		21 August 1985	29 May 1986
		(% control)	
Triclopyr+2,4-D	0.5 + 1	13	2
Triclopyr+2,4-D	1 + 1	1	2
Clopyralid+2,4-D	0.5 + 1	0	1
Clopyralid+2,4-D	1 + 1	0	0
Fluroxypyr+2,4-D	0.5 + 1	0	1
Fluroxypyr+2,4-D	1 + 1	0	6
Triclopyr+clopyralid	0.5 + 0.5	0	0
Dicamba+2,4-D	0.5 + 1	0	4
Dicamba+2,4-D	1 + 1	11	2
LSD (0.05)		5	5