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Screening trials of various herbicides, herbicide combinations and surfactants for leafy spurge control¹

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Four experiments to evaluate several herbicides and additives for leafy spurge control were established near Sheldon, ND, and on the Sheyenne National Grasslands near McLeod, ND, in 1984 and 1985. The herbicides were applied using 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 percent stand reduction as compared to the control.

Previous research at North Dakota State University has shown that amitrole alone provides inadequate leafy spurge control, but does translocate in the plant as evidenced by inhibition of chlorophyll formation in new stem growth from the root. Picloram was applied with amitrole on June 10, 1983 in an effort to increase picloram translocation into the leafy spurge root system. Leafy spurge was flowering and 18 to 24 inches tall. Leafy spurge regrowth in plots treated with picloram + amitrole lacked chlorophyll 1 year after application, but plant density was similar to plots treated with picloram alone (Table 1). There was a tendency for leafy spurge control to be increased when amitrole was added to picloram compared to picloram alone 24 months following application, but grass injury from amitrole would prohibit use in pasture and rangeland.

Research using a roller applicator to apply picloram in pasture showed increased leafy spurge control with a boom-end marking foam additive in one experiment, but not when other surfactants or oils were added. An experiment was established on June 14 and 15, 1984 at the Sheyenne National Grasslands and Sheldon, respectively, to evaluate the foam as an additive to picloram spray applied. The leafy spurge was 10 to 18 inches tall and beginning seed set at both sites. Initial control was better at Sheyenne than Sheldon regardless of treatment, but the foam additive did not increase control compared to picloram alone at either site (Table 1). No treatment provided satisfactory leafy spurge control 15 months after application.

Previous research has shown picloram + 2,4-D at 0.25 + 1.0 lb/A provides better leafy spurge control compared to picloram alone. The third experiment was established to compare the alkanolamine and mixed amine salts (EH-736) of 2,4-D for leafy spurge control alone and when tank mixed with picloram. The experiment was begun on the same dates and locations as the additive experiment. Leafy spurge control was similar at

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Sheldon when the 2,4-D formulations were applied alone or with picloram (Table 1). However, at the Sheyenne National Grasslands there was a tendency for better leafy spurge control when picloram was combined with EH-736 than the alkanolamine formulation. The 2,4-D formulations provided similar control when applied alone. Research was begun in 1985 to further evaluate EH-736 as an additive to picloram for leafy spurge control.

AC 252,925 was applied for leafy spurge control at three different growth stages in 1984. Various rates of the compound were applied on May 29 when leafy spurge was in the vegetative growth stage, on June 15 during flowering and seed set, and on September 18 during vigorous fall regrowth following a summer dormancy period. AC 252,925 provided good initial top growth control especially at 2.0 lb/A but grass damage was severe at all application dates (Table 2). Control in May 1985 averaged across all dates and rates was 91% but grass injury was severe. Leafy spurge control decreased rapidly 12 to 15 months after application, but grass damage remained high.

Table 1. Leafy spurge control with picloram in combination with amitrole, a foam additive and 2, 4-D. (Lym and Messersmith).

		Location/evaluation date										
	•				Sheldon							
	•	June	1984	Aug	1984	May	1985			Sheyenne		
			Grass		Grass		Grass	Aug 1985	Aug 1984	May 1985	Aug 1985	
Treatment	Rate	Control	injury	Control	injury	Control	injury	Control	Control	Control	Control	
	(lb/A)						(%)					
Experiment 1												
Amitrole + picloram	1.25+0.5	34	10	13	5	28						
Amitrole + picloram	2.5+0.5	38	25	25	18	21						
Amitrole + picloram	5.0+0.5	50	75	23	45	20						
Amitrole + picloram	1.25+1.0	73	12	34	3	40						
Amitrole + picloram	2.5+1.0	79	30	31	20	61						
Amitrole + picloram	5.0+1.0	74	72	35	53	49						
Picloram	0.5	40	0	18	0	3						
Picloram	1.0	64	0	28	0	29						
Amitrole	5.0	25	63	16	57	11						
LSD (0.05)		27	16	25	22	31						
Experiment 2												
Picloram	0.5			57		25		4	94	91	20	
Picloram	1.0			87		81		21	98	99	13	
Picloram + foam ^a	0.5+0.5%			51		26		4	95	96	2	
Picloram + foam ^a	1.0+0.5%			81		70		8	98	99	44	
LSD (0.05)				21		26		12	5	7	24	

	-	Location/evaluation date									
		Sheldon									
		June 1984		Aug 1984		May 1985			Sheyenne		
			Grass		Grass		Grass	Aug 1985	Aug 1984	May 1985	Aug 1985
Treatment	Rate	Control	injury	Control	injury	Control	injury	Control	Control	Control	Control
	(lb/A)						(%)				
Experiment 3											
Picloram	0.25			35		11			76	23	4
Picloram	0.5			37		9			95	75	43
Picloram + 2,4-D alkanolamine	0.25+1.0			21		4			78	14	6
EH-736 ^b	4.0			19		4			47	7	13
Picloram +EH-736 ^b	0.25+1.0			22		8			94	72	23
2,4-D alkanolamine	4.0			24		1			42	20	7
LSD (0.05)				21		9			15	25	15

^aBoom-end marking foam (Stamfoam, Stam Manufacturing Co., Wateska, IL)

^bMixed amine salts of 2, 4-D (2:1 dimethylamine:diethalolamine

Table 2. Leafy spurge control with AC 252,925 applied at various times during the growing season. (Lym and Messersmith).

		Evaluation/date								
		Aug	1984	Ma	ıy 1985	Aug 1985				
			Grass	-	Grass	-	Grass			
Treatment	Rate ^a	Control	injury	Control	injury	Control	injury			
	(lb/A)			(0	⁄ ₀)					
Applied 29 May 84										
AC 252,925	0.5	23	7	95	60	18	20			
AC 252,925	1.0	68	58	75	80	8	60			
AC 252,925	2.0	92	45	99	90	3	80			
Applied 15 June 84										
AC 252,925	0.5	76	22	65	50	0	20			
AC 252,925	1.0	79	23	94	90	0	80			
Ac 252,925	2.0	93	38	99	90	66	70			
Applied 18 Sept 84										
Picloram	2.0	_	_	100	10	97	0			
AC 252,925	0.5	_	_	97	100	6	20			
AC 252,925	1.0	_	_	99	100	17	50			
AC 252,925	2.0	_	_	100	100	35	80			
LSD (0.05)		18	23	24	3	35	5			

^aAll AC 252,925 treatments included 0.5% surfactant WK (v/v)