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Leafy spurge control with picloram plus dicamba or various 2,4-D formulations

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Picloram remains the most effective herbicide for leafy spurge control. Previous research at North Dakota State University has shown picloram + 2,4-D at 0.25 + 1.0 lb/A applied annually to be more cost effective than picloram at 1 to 2 lb/A applied once. The purpose of these experiments was to compare the effect of dicamba and/or various 2,4-D formulations applied with picloram for leafy spurge control.

The initial 2,4-D formulation experiments were established on the Sheyenne National Grasslands near McLeod, ND, on June 15, 1984, and near Hunter, ND, on May 30, 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.

Picloram plus 2,4-D mixed amine provided better leafy spurge control than picloram + 2,4-D alkanolamine (Table 1). Leafy spurge control from picloram + 2,4-D mixed amine at 0.25 + 1 lb/A was similar to control from picloram at 0.5 lb/A alone but picloram + 2,4-D is approximately 30% less expensive. Similarly, leafy spurge control from picloram plus dicamba was greater when applied with 2,4-D mixed amine than with the alkanolamine. Neither 2,4-D formulation alone controlled leafy spurge.

Picloram + dicamba + 2,4-D mixed amine provided 72% leafy spurge control 2 years after application at Hunter (Table 1). This level of control was similar to that attained with picloram at 2 lb/A in North Dakota but is 70% less expensive. Therefore, similar experiments were begun in 1986 to evaluate this combination treatment further. Experiments were established on June 11 and 18, near Dickinson and Valley City, respectively, and on August 28 on the Sheyenne National Grasslands and September 3 and 15 near Valley City and Dickinson, respectively.

Leafy spurge control was much lower at Dickinson than at Valley City or Sheyenne regardless of treatment (Table 2). The plots near Dickinson were on an abandoned mine site with a very dense leafy spurge stand. The soil drains quickly and generally was much drier than nearby areas. The combination of a dense stand and poor growing conditions may account for the poor leafy spurge control from both spring- and fall-applied treatments.

Table 1. Leafy spurge control with picloram applied with various formulations of 2,4-D (Lym and Messersmith).

Location/ application date		Months after treatment				
Treatment	Rate	3	12	15	24	27
	(lb/A)	----- (% control) -----				
Sheyenne, June 1984						
Picloram	0.25	76	23	4	1	—
Picloram	0.5	95	75	43	10	—
Picloram+2,4-D alkanolamine	0.25+1	78	14	6	3	—
Picloram+2,4-D mixed amine ^a	0.25+1	94	72	23	21	—
2,4-D mixed amine ^a	4	47	7	13	0	—
2,4-D alkanolamine	4	42	20	7	5	—
LSD (0.05)		15	25	15	12	—
Hunter, June 1985						
Picloram+dicamba +2,4-D mixed amine ^a	0.25+1+2	99	98	89	72	60
Picloram+dicamba +2,4-D alkanolamine	0.25+1+2	51	51	25	25	18
2,4-D mixed amine ^a	4	6	3	0	0	0
2,4-D alkanolamine	4	5	0	0	0	0
Picloram+dicamba	0.25+1	53	38	15	0	7
LSD (0.05)		15	15	15	15	20

^a Mixed amine salts of 2,4-D (2:1 dimethylamine:diethanolamine)-EH736.

In general, leafy spurge control was similar with all 2,4-D formulation combinations in experiments begun in 1986 (Table 2). No treatment provided the long-term control obtained with the picloram + dicamba + 2,4-D mixed amine treatment applied at Hunter in 1985 (Table 1). Previous research at North Dakota State University has shown that the benefit of applying 2,4-D with picloram may not be apparent after one application. Likewise, subtle but consistent differences in control due to 2,4-D formulation may take several years to become obvious. Therefore, these treatments were reapplied in 1987 to evaluate the long-term effect of picloram combined with various 2,4-D formulations and dicamba on leafy spurge control. (Published with approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo.)

Table 2. Leafy spurge control with Picloram applied with dicamba and various formulations of 2,4-D (Lym and Messersmith).

Original application date		Location/evaluation date (MAT)							
		Valley City			Dickinson			Sheyenne	
Treatment	Rate	3/9	12	15 ^a	3/9	12	15	9	12
	(lb/A)	----- (% control) -----							
Spring 1986									
2,4-D mixed amine ^b +piclorant+dicamba	2+0.25+1	43	7	52	3	3	46	—	—
2,4-D mixed amine ^b +piclorant+dicamba	2+0.25+0.5	78	24	63	10	3	28	—	—
2,4-D mixed amine ^b +piclorant+dicamba	1+0.12+0.5	37	5	49	11	7	23	—	—
2,4-D alkanolamine ^c +picloram+dicamba	2+0.25+1	59	8	75	10	6	45	—	—
Picloram+dicamba	0.25+1	83	9	73	16	6	38	—	—
LSD (0.05)		40	19	43	NS	NS	NS	—	—
Fall 1986									
2,4-D mixed amine ^b +piclorant+dicamba	2+0.25+1	95	40	—	33	1	—	89	31
2,4-D alkanolamine ^c +picloram+dicamba	2+0.25+1	93	24	—			—	92	49
2,4-D mixed amine ^b +picloram+dicamba	4+0.5+2	99	80	—	61	12	—	95	56
2,4-D ester+2,4-DP +dicamba+picloram	2+2+0.5+0.25	89	10	—	36	3	—	94	40
2,4-D ester+2,4-DP +dicamba+picloram	2+2+0.5+0.5	99	54	—	50	6	—	98	71
2,4-D alkanolamine ^c +picloram+dicamba	4+0.5+2	97	36	—	60	8	—	96	55
Picloram+dicamba	0.5+2	98	45	—	76	18	—	94	58
Picloram	0.5	95	35	—	32	0	—	96	47
LSD (0.05)		5	31		NS	NS		8	NS

^a Treatments reapplied June 1987.

^b Mixed amine salts of 2,4-D (2:1 dimethylamine:diethanolamine)-EH736.

^c 2,4-D alkanolamine.

^d 2,4-D isooctyl ester:2,4-DP butoxyethanol ester:dicamba (4:4:1)-EH680.