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Granular picloram and dicamba for leafy spurge control

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Granular and liquid formulations of picloram and dicamba were compared for leafy spurge control in five experiments established on June 25 near Valley City, July 2 near Tolna, July 10 near Minot, and July 15, 1980 near Dickinson, ND and on September 3, 1980 near Valley City. An experiment to compare liquid and granular picloram in a sandy soil was established on June 11, 1980 in the Sheyenne National Grasslands near McLeod, ND. All experiments were in a randomized complete block design with four replications and 10 by 30 ft plots. The granules were applied uniformly by hand, while the liquid formulations were applied with a tractor-mounted plot sprayer at 8 gpa. Evaluations were based on percent stand reduction compared to the control. The ANOVA test revealed that there was highly significant interaction between site and treatments. Therefore, experimental sites will be discussed individually.

At Valley City leafy spurge control from equal picloram rates gave similar leafy spurge control regardless of application date (Table 1). Picloram 2%G at 1 lb/A was less effective than higher rates for both application dates. Dicamba 4S and 5%G, spring and fall treatments provided similar control when evaluated one year after application. Dicamba 4S and 5%G at 8 lb/A gave between 91 and 100% control when evaluated one year after treatment. Leafy spurge control from spring-applied dicamba declined rapidly during the summer of 1981. Fall-applied dicamba 4S at 8 lb/A and dicamba 5%G at 6 and 8 lb/A gave very similar control to picloram at 2 lb/A one year later, but dicamba was less effective than picloram when spring applied.

Leafy spurge control at Valley City generally was better than at the other sites. At Tolna, picloram 2S at 2 lb/A and 2%G at 1.5 and 2 lb/A provided 95, 98 and 100% leafy spurge control, respectively, when evaluated 14 months after treatment (Table 1). Dicamba 4S at 8 lb/A gave 89% control, but the 5%G treatments did not provide comparable control. At Minot, picloram 2S and 2%G at 2 lb/A provided 85 and 81% control, respectively, when evaluated 14 months later, but the other treatments did not provide satisfactory control. At Dickinson, only picloram 2S at 2 lb/A provided satisfactory control at 91%.

Table 1. Leafy spurge control using granular picloram and dicamba applied in 1980 at various locations in North Dakota. (Lym and Messersmith).

Herbicide	Rate (lb/A)	Location/Evaluation date								
		Valley City						Dickinson		
		Spring		Fall		Tolna		Minot		
		6-17-81	9-2-81	6-17-81	9-2-81	6-8-81	9-9-81	6-11-81	9-15-81	8-25-81
		%								
Picloram 2%G	1	97	80	95	86	79	60	72	28	56
Picloram 2%G	1.5	98	89	99	100	88	98	85	30	74
Picloram 2%G	2	99	98	100	100	98	100	96	81	74
Dicamba 5%G	4	74	55	94	74	31	5	19	0	4
Dicamba 5%G	6	82	54	96	99	44	10	56	20	30
Dicamba 5%G	8	91	75	99	100	70	57	66	27	39
Picloram 2S	2	100	99	100	100	100	95	98	85	91
Dicamba 4S	8	94	74	99	99	88	89	61	5	42
LSD (0.05)		9	14	3	10	18	15	20	30	26

Picloram 2S and 2%G at equal rates provided similar leafy spurge control when evaluated on the sandy soil of the Sheyenne National Grasslands (Table 2). Picloram 2S and 2%G at 2 lb/A provided 99 and 98% control, respectively, but the other treatment did not give satisfactory control when evaluated 14 months after treatment.

Dicamba and picloram granular and liquid formulations generally provided similar leafy spurge control when compared at equal application rates. The comparably poor leafy spurge control at Minot and Dickinson may be due to unfavorable environmental conditions. The entire state of North Dakota received below normal precipitation and above normal temperatures in both 1979 and 1980 (Table 3). Dickinson and Minot, where the lowest average control occurred had the highest above normal temperature during the growing season and the first and third greatest precipitation deficit for 1979 through July 30, 1980 of -9.59 and -5.33 inches, respectively (Table 3). Valley City had a deficit of 9.06 inches of annual precipitation, but rain showers just before and after the treatment dates may have accounted for the improved control at this site. All sites received above normal precipitation beginning in August 1980, and the trend continued into June 1981 which provided favorable growing conditions for leafy spurge. The poor growing conditions during application followed by favorable conditions in 1981 probably account for the general trend of inadequate leafy spurge control.

Table 2. Leafy spurge control using picloram, liquid and granules on a sandy soil in the Sheyenne National Grasslands. (Lym and Messersmith).

Herbicide formulation	Rate (lb/A)	May 27, 1981	Aug. 19, 1981
		%	
Picloram 2S	0.5	73	13
Picloram 2S	1.0	98	73
Picloram 2S	2.0	100	99
Picloram 2%G	0.5	53	5
Picloram 2%G	1.0	97	72
Picloram 2%G	2.0	100	98
LSD (0.05)	---	25	12

Table 3. Average annual 1979 and 1980 precipitation and temperature departure from normal for various locations in North Dakota. (Lym and Messersmith).

Location ^a	Departure from normal			
	Precipitation			Temperature
	1979	Jan-July 1980	Aug-Dec 1980	1980 (April-July)
	inch			F
Dickinson	-3.63	-5.96	+2.64	+6
Minot	-1.21	-4.12	+7.50	+6
Sheldon	-1.11	-1.04	+0.21	+4
Tolna	-2.85	-1.43	4.12	+5
Valley City	-4.05	-5.01	+2.54	+3

^a The climatological data is recorded from the nearest reporting station to the experimental site.