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Low rate annual picloram and 2,4-D combination treatments for leafy spurge control¹

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Previous research at North Dakota State University has shown that annual treatments of picloram + 2,4-D for 3 to 5 years will give similar leafy spurge control to expensive high rate picloram treatments. Picloram + 2,4-D at 0.25 + 1.0 lb/A generally gives 20 to 30% better leafy spurge control than picloram at 0.25 lb/A alone, but the benefit of a herbicide combination declines as the picloram or 2,4-D rate increases. Picloram + 2,4-D at 0.5 + 1.0 lb/A tends to give only 5 to 10% better control than picloram at 0.5 lb/A alone. The purpose of this experiment was to evaluate long-term leafy spurge control from annual treatments of picloram + 2,4-D at relatively low application rates.

The experiment was established at four locations in North Dakota. Spring treatments were applied on June 13, 18 and 19, 1984 at Dickinson, Hunter and Valley City, respectively, and the fall treatments were applied on September 5 and 18, 1984 at Valley City and the Sheyenne National Grasslands near McLeod, respectively. The soil was a loamy fine sand at Dickinson, a silty clay loam at Hunter, Sheldon and the Sheyenne National Grasslands and a loam at Valley City. Dickinson, located in western North Dakota, generally receives much less precipitation than the other two sites located in eastern North Dakota. The spring and fall treatments were applied annually in June or September 1984 and 1985. 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 at each site except Hunter, which had 8 by 25 ft plots, and 3 replications. Evaluations were based on a visible estimate of percent stand reduction as compared to the control.

Picloram at 0.125, 0.25, 0.375 and 0.5 lb/A provided 12, 13, 41 and 46% leafy spurge control, respectively, as a spring applied treatment but only 2, 7, 4 and 15% control, respectively, as a fall applied treatment 12 months following initial application (Table). The addition of 2,4-D to picloram tended to increase leafy spurge control slightly from spring but not fall applied treatments. The slight increase in control was similar regardless of 2,4-D rate. Control was similar to previous experiments after one application for spring applied treatments, but lower than expected for fall treatments. The weather was very dry

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in North Dakota during the fall of 1984 and leafy spurge was under moisture stress when the treatments were applied. These conditions probably account for the lower than expected control in 1985. This experiment must be continued for several years to determine if the presently used picloram at 0.25 to 0.5 lb/A + 2,4-D at 1.0 lb/A treatment is the most cost effective application rate for an annual leafy spurge control program.

Table. Leafy spurge control from annual picloram or picloram plus 2,4-D treatments spring or fall applied at four locations in North Dakota. (Lym and Messersmith).

		Application time/location/evaluation date											
		Spring							Fall				
		Hunter		Dickinson		Valley City		Mean ^a	Sheyenne		Valley City		Mean ^a
Treatment	Rate	June	Aug	June	Sept	June	Aug		June	Aug	June	Aug	
	(lb/A)	----- (%) -----											
Picloram	0.125	38	3	0	0	5	4	12	59	3	0	0	2
Picloram	0.25	11	35	3	24	24	21	13	66	12	20	1	7
Picloram	0.375	78	83	10	46	44	34	41	72	5	47	3	4
Picloram	0.5	81	93	15	61	51	48	46	98	18	85	13	15
Picloram+2,4-D	0.125+0.125	3	28	8	14	13	38	8	52	5	21	0	2
Picloram+2,4-D	0.125+0.25	0	13	8	53	8	20	6	38	1	10	0	0
Picloram+2,4-D	0.125+0.5	7	3	10	72	3	64	7	35	4	4	0	2
Picloram+2,4-D	0.25+0.125	31	73	4	64	21	87	18	55	8	11	0	2
Picloram+2,4-D	0.25+0.25	48	76	15	77	19	92	26	58	4	20	0	2
Picloram+2,4-D	0.25+0.5	41	50	11	85	24	92	24	50	1	18	0	1
Picloram+2,4-D	0.375+0.125	74	76	6	67	38	73	36	91	8	48	8	8
Picloram+2,4-D	0.375+0.25	88	82	5	96	45	80	42	65	4	44	2	3
Picloram+2,4-D	0.375+0.5	33	46	15	98	47	81	31	80	26	50	3	14
Picloram+2,4-D	0.5+0.125	88	88	9	98	73	69	54	81	15	54	3	9
Picloram+2,4-D	0.5+0.25	88	73	9	96	65	80	51	94	9	55	5	7
Picloram+2,4-D	0.5+0.5	85	70	10	98	75	75	54	97	36	42	8	22
Picloram+2,4-D	0.25+1.0	17	18	18	86	48	94	29	68	3	27	4	3
LSD (0.05)		31	36	11	26	33	27	18	31	11	30	8	8

^aAverage control 12 months following the original 1984 treatment date.