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Leafy spurge control with low rate annual picloram and 2,4-D combination treatments¹

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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 leafy spurge control similar to expensive high rate picloram treatments. Picloram plus 2,4-D at 0.25 + 1 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 plus 2,4-D at 0.5 + 1 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 plus 2,4-D amine at relatively low application rates.

The experiment was established at four locations in North Dakota. Spring treatments were applied in June 1984 at Dickinson, Hunter, and Valley City, and the fall treatments were applied in September 1984 at Valley City and at the Sheyenne National Grasslands near McLeod. 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 treatments were applied annually in June in 1984 through 1987. The fall treatments were applied in September 1984 and 1985, but were discontinued thereafter. The herbicides were applied with a tractor-mounted sprayer delivering 8.5 gpa at 35 psi. All plots were 10 by 30 feet in a randomized complete block design with four replications except at Hunter which had 8 by 25 feet plots and three replications. Evaluations were based on a visual estimate of percent stand reduction as compared to the control.

The results from the Dickinson location were different than the other sites and will be discussed separately. Picloram at 0.12, 0.25, 0.38, and 0.5 lb/A provided 12, 24, 47 and 59% leafy spurge control, respectively, as a spring-applied treatment at Hunter and Valley City 48 months after treatment (MAT) (Table). Fall-applied treatments at Sheyenne and Valley City resulted in poor leafy spurge control and were discontinued following the 24 MAT evaluation. Table). The addition of 2,4-D to picloram tended to increase leafy spurge control slightly for spring- but not for fall-applied treatments. The slight increase in control was similar regardless of 2,4-D rate. Spring-applied treatments generally maintained control all season and regrowth was typically 0 to 3 inches tall when a killing frost occurred.

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Leafy spurge control 48 months after spring-applied treatment averaged 36% with picloram alone and increased slightly to 40% when picloram was applied with 2,4-D (Table). This increase is much less than previously reported when 2,4-D at 1 to 2 lb/A was applied with picloram. Picloram at 0.5 lb/A plus 2,4-D averaged 73% leafy spurge control compared to 59% with picloram at 0.5 lb/A alone and was the best treatment evaluated.

Leafy spurge control averaged 26% 48 months after the initial treatment at Dickinson compared to 41% at Hunter and Valley City (Table). The reason for poor control at Dickinson compared to the other locations is not known. A similar experiment, begun in 1981 at Dickinson, resulted in annual increases in leafy spurge control. Dickinson had received above average precipitation for the first 36 months of the experiment and leafy spurge may be growing more vigorously than previously.

In general, leafy spurge control increased when 2,4-D was applied with picloram at 0.25 to 0.5 lb/A as a spring applied but not as a fall-applied treatment. The 2,4-D application rate did not affect leafy spurge control with picloram. Picloram at 0.25 to 0.5 lb/A plus 2,4-D at 1 lb/A remains the most cost effective application rate for an annual leafy spurge control program.

Table. Leafy spurge control in 1968 from annual picloram or picloram plus 2,4-D amino treatments spring or fall applied since 1964 at four locations in North Dakota (Lym and Messersmith).

Treatment	Rate (lb/A)	Application time/location/evaluation date												Mean ^b
		Spring							Fall					
		Hunter		Dickinson		Valley City		Mean ^a	Sheyenne-1987		Valley City 1986/1987			
		Aug 87	May 88	Sept 87	June 88	Aug 87	June 88		1988	May 30	Aug 24	June 3	Aug 20	
		(% control)												
Picloram	0.12	3	0	2	13	55	23	12	42	0	3	0	1	0
Picloram	0.25	27	12	17	9	62	35	24	67	a	25	1	0	1
Picloram	0.38	61	39	64	29	81	54	47	74	9	56	3	2	6
Picloram	0.5	79	53	74	25	82	64	59	89	16	92	38	43	27
Picloram + 2,4-D	0.12 + 0.12	22	3	3	13	57	21	12	72	0	32	8	17	4
Picloram + 2,4-D	0.12 + 0.25	12	3	3	8	55	7	5	62	8	12	0	0	4
Picloram + 2,4-D	0.12 + 0.5	10	0	7	15	61	27	14	67	2	7	0	0	1
Picloram + 2,4-D	0.25 + 0.12	73	28	40	11	70	28	28	70	5	19	1	0	3
Picloram + 2,4-D	0.25 + 0.25	55	36	42	30	71	34	33	64	0	18	1	0	1
Picloram + 2,4-D	0.25 + 0.5	25	19	30	28	73	23	21	58	2	35	6	6	4
Picloram + 2,4-D	0.38 + 0.12	69	44	45	15	81	49	47	81	15	56	11	14	13
Picloram + 2,4-D	0.38 + 0.25	87	62	84	25	82	63	61	75	6	48	3	4	4
Picloram + 2,4-D	0.38 + 0.5	44	31	52	37	88	59	45	89	18	64	3	4	10
Picloram + 2,4-D	0.5 + 0.12	92	72	94	33	86	73	74	78	15	75	8	8	11
Picloram + 2,4-D	0.5 + 0.25	90	69	87	46	83	78	74	93	22	89	18	19	20
Picloram + 2,4-D	0.5 + 0.5	80	59	79	49	94	82	71	94	18	81	15	7	17
Picloram + 2,4-D	0.25 + 1.0	40	21	22	35	82	46	34	92	12	63	6	7	9
LSD (0.05)		31	26	26	24	19	25	12	28	NS	31	15	15	11

^aAverage control at Hunter and Valley City 48 months following the original 1984 treatment date.

^bAverage control 24 months following the original 1984 treatment data, fall treatments discontinued after 1985.