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## **Leafy spurge control with low rate annual picloram and 2,4-D combination treatments**

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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 + 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 + 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 + 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 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 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 2, 28, 63 and 67% leafy spurge control, respectively, as a spring applied treatment at Hunter and Valley City, but only 0, 1, 6, and 27% control, respectively, as a fall applied treatment at Sheyenne and Valley City, when evaluated 24 months following initial application (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. The increased leafy spurge control obtained when 2,4-D was applied with picloram as a spring treatment was not found when similar treatments were fall applied. Leafy spurge generally begins regrowth in mid to late-July following a fall application and had become reestablished by the following fall. However, spring-applied treatments generally maintained control all season and regrowth was typically 0 to 3 inches tall when a killing frost occurred. This limited growth may predispose the plants to

winter kill and allow gradually increased control. Thus, the fall treatments were discontinued.

Leafy spurge control generally was greater 36 months after the initial treatment than 24 months at Hunter and Valley City, but not Dickinson (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 has received above average precipitation for the last 36 months and the leafy spurge may be growing more vigorously than previously.

Leafy spurge control 36 months after treatment averaged 10, 40, 67 and 78% with picloram alone at 0.12, 0.25, 0.38 and 0.5 lb/A, respectively, and control increased slightly when picloram was applied with 2,4-D to an average of 22, 46, 66 and 89%, respectively. This increase is much less than previously reported when 2,4-D at 1 to 2 lb/A was applied with picloram. The 2,4-D application rate did not affect leafy spurge control; control averaged 56% over the picloram treatments regardless of the 2,4-D rate.

This experiment must be continued for several years to determine whether the presently used picloram at 0.25 to 0.5 lb/A + 2,4-D at 1 lb/A treatment is the most cost effective application rate for an annual leafy spurge control program or whether the picloram and/or 2,4-D rate can be reduced and still maintain acceptable control. (Published with approval of the Agric. Exp. Stn., North Dakota State Univ., Fargo.)

**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).**

		Application time/location/evaluation date													
		Spring								Fall					
		<u>Hunter-1987</u>		<u>Dickinson-1987</u>		<u>Valley City-1987</u>		<u>Mean<sup>a</sup></u>		<u>Sheyenne-1987</u>		<u>Valley City 1986/1987</u>			
Treatment	Rate	May 29	Aug 21	June 2	Sept 9	May 28	Aug 20	1986	1987	May 30	Aug 24	June 3	Aug 20	May 20	Mean <sup>b</sup>
	(lb/A)	----- (% control) -----								-----					
Picloram	0.12	2	3	3	4	18	55	2	10	42	0	3	0	1	0
Picloram	0.25	17	27	6	13	62	62	28	40	67	0	25	1	0	1
Picloram	0.38	64	67	31	29	70	81	63	67	74	9	56	3	2	6
Picloram	0.5	74	79	9	33	81	82	67	78	89	16	92	38	43	27
Picloram + 2,4-D	0.12 + 0.12	3	22	6	21	40	57	30	22	72	0	32	8	17	4
Picloram + 2,4-D	0.12 + 0.25	3	12	3	6	24	55	4	14	62	8	12	0	0	4
Picloram + 2,4-D	0.12 + 0.5	7	10	13	23	54	61	10	31	67	2	7	0	0	1
Picloram + 2,4-D	0.25 + 0.12	40	73	10	20	67	70	26	54	70	5	19	1	0	3
Picloram + 2,4-D	0.25 + 0.25	42	55	28	45	44	71	21	43	64	0	18	1	0	1
Picloram + 2,4-D	0.25 + 0.5	30	25	22	29	51	73	29	41	58	2	35	6	6	4
Picloram + 2,4-D	0.38 + 0.12	45	69	13	27	64	81	50	55	81	15	56	11	14	13
Picloram + 2,4-D	0.38 + 0.25	84	87	22	40	73	82	70	79	75	6	48	3	4	4
Picloram + 2,4-D	0.38 + 0.5	52	44	36	64	80	88	63	66	89	18	64	3	4	10
Picloram + 2,4-D	0.5 + 0.12	94	92	40	54	92	86	87	93	78	15	75	8	8	11
Picloram + 2,4-D	0.5 + 0.25	87	90	27	66	85	83	74	86	93	22	89	18	19	20
Picloram + 2,4-D	0.5 + 0.5	79	80	40	73	95	94	80	87	94	18	81	15	7	17
Picloram + 2,4-D	0.25 + 1.0	22	40	23	43	73	82	46	48	92	12	63	6	7	9
LSD (0.05)		26	31	18	23	30	19	23	20	28	NS	31	15	18	11

<sup>a</sup>Average control at Hunter and Valley City 24 and 36 months following the original 1984 treatment date.

<sup>b</sup>Average control 24 months following the original 1984 treatment data, fall treatments discontinued after 1985.