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Leafy spurge control with low rate annual picloram and 2,4-D combination treatments[1]

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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 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 feet in a randomized complete block design with four replications except at Hunter which had 8 by 25 feet plots and 3 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 from spring but not 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 ap-

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plication 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.

The reason for poor control at Dickinson compared to the other locations is not known. A similar experiment begun in 1981 at the same location has resulted in annually increased leafy spurge control. This location has received above average precipitation for the last 24 months and the leafy spurge may be growing more vigorously than previously.

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.

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

		Application time/location/1986 evaluation date											
		Spring							Fall				
		Hunter		Dickinson		Valley City			Sheyenne		Valley City		
Treatment	Rate	May 29	Aug 18	June 10	Sept 16	June 3	Aug 20	Mean[a]	May 30	Aug 24	June 3	Aug 20	Mean[b]
	(lb/A)	(% control)											
Picloram	0.12	4	7	0	18	0	39	2	42	0	3	0	0
Picloram	0.25	14	37	0	28	39	88	28	67	0	25	1	1
Picloram	0.38	68	80	10	29	60	90	63	74	9	56	3	6
Picloram	0.5	67	88	19	16	67	90	67	89	16	92	38	27
Picloram + 2,4-D	0.12+0.12	3	12	3	31	51	41	30	72	0	32	8	4
Picloram + 2,4-D	0.12+0.25	2	13	1	18	6	56	4	62	8	12	0	4
Picloram + 2,4-D	0.12+0.5	0	7	5	35	17	65	10	67	2	7	0	1
Picloram + 2,4-D	0.25+0.12	23	87	3	21	28	89	26	70	6	19	1	3
Picloram + 2,4-D	0.25+0.25	11	68	11	45	26	54	21	64	0	18	1	1
Picloraw + 2,4-D	0.25+0.5	22	75	8	35	35	68	29	58	2	35	6	4
Picloram + 2,4-D	0.38+0.12	46	85	6	23	54	50	50	81	15	56	11	13
Picloram + 2,4-D	0.38+0.25	82	96	10	34	61	84	70	75	6	48	3	4
Picloram + 2.4-D	0.38+0.5	42	87	18	34	78	88	63	89	18	64	3	10
Picloram + 2,4-D	0.5+0.12	85	95	6	61	89	90	87	78	15	75	8	11
Picloram + 2.4-D	0.5+0.25	84	96	15	36	67	96	74	93	22	89	18	20
Picloram + 2,4-D	0.5+0.5	70	92	11	30	89	95	80	94	18	81	15	17
Picloram + 2,4-D	0.25+1.0	15	53	16	23	69	90	46	92	12	63	6	9
LSD (0.05)		20	19	11	NS	37	29	23	28	NS	31	15	11

[a]Average control at Hunter and Valley City 24 months following the original 1984 treatment date.
[b]Average control 24 months following the original 1984 treatment date.