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Leafy spurge control with sulfometuron and/or picloram plus 2,4-D in a 3 year rotation¹

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Previous research at North Dakota State University has shown that sulfometuron applied with picloram or 2,4-D provides good leafy spurge control especially when fall applied. However, sulfometuron can cause severe grass injury when fall applied. Picloram plus 2,4-D at 0.25 plus 1 lb/A will provide approximately 90% leafy spurge control when applied annually for 3 to 5 years. The purpose of this research was to evaluate leafy spurge control and grass injury with sulfometuron plus picloram or 2,4-D applied annually for 3 years or rotated with picloram plus 2,4-D as spring- or fall-applied treatments in pastures.

The experiment was established at three locations, Chaffee and Valley City in eastern and Dickinson in western North Dakota. The soil at Dickinson was a loamy fine sand with pH 6.5 and 6% organic matter, at Valley City a loam with pH 7.1 and 9.2% organic matter, and at Chaffee a sandy loam with pH 7.4 and 6.7% organic matter. Treatments were spring-applied the first week of June and fall-applied the first or second week of September in 1988. Retreatments were applied at a similar time in 1989 and 1990. Leafy spurge received the same treatments in 1990 as in 1988 to complete the 3-year treatment program. Herbicides were applied using a tractor-mounted sprayer delivering 8.5 gpa at 35 psi. Plots were 9 by 30 feet at Chaffee and Dickinson and 10 by 30 feet at Valley City. Each treatment was replicated four times in a randomized complete block design at all sites. Evaluations taken visually were based on percent stand reduction as compared to the control. The initial grass stand at Dickinson was too sparse to allow reliable evaluation of grass injury, so the experiment was abandoned following the June 1990 evaluation.

Leafy spurge control, averaged across all spring-applied treatments increased from 18 to 49 to 78% 12, 24, and 36 months after the first treatment (MAT), respectively (Table). Sulfometuron spring-applied with picloram or 2,4-D annually for 3 years provided an average of 79% leafy spurge control which was similar to picloram plus 2,4-D at 80%. However, grass injury from sulfometuron spring-applied for 3 years averaged 34%. There was no advantage to applying sulfometuron following picloram plus 2,4-D or vice versa.

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Leafy spurge control with sulfometuron plus picloram at 1.25 plus 4 oz/A fall applied for 3 consecutive years averaged 96%, but grass injury averaged 94% (Table). Sulfometuron plus 2,4-D at 1.25 plus 16 oz/A averaged 62% leafy spurge control and 95% grass injury following three consecutive fall-applied treatments. Picloram plus 2,4-D fall-applied for 3 consecutive years averaged only 27% leafy spurge control, but control increased to 34 and 44% when sulfometuron plus 2,4-D or sulfometuron plus picloram, respectively, were applied the second year rather than picloram plus 2,4-D. However, grass injury also increased to an average of 30%.

Sulfometuron plus picloram at 1.25 plus 4 oz/A fall-applied provided the best long-term control and averaged 77% 48 MAT compared to 11% for the standard treatment of picloram plus 2,4-D at 4 plus 16 oz/A, but grass injury was still 65% (Table). In general, leafy spurge control with sulfometuron plus 2,4-D or picloram was similar to picloram plus 2,4-D when applied in the spring but the sulfometuron combinations were best when fall-applied. However, grass injury was severe when sulfometuron was fall-applied.

Table. Leafy spurge control and grass injury from sulfometuron, picloram, and 2,4-D in pastures applied in various combinations spring or fall for 3 consecutive years. (Lym and Messersmith).

1988 and 1990				Mean ^a							
				12 MAT		24 MAT		36 MAT		48 MAT	
Date applied and treatment	Rate	1989 Treatment	Rate	Grass Control	Grass inj.	Grass Control	Grass inj.	Grass Control	Grass Inj.	Grass Control	Grass inj.
	-oz/A-		-oz/A-	%							
Spring											
Sume+picl	1.25+4	Sume+picl	1.25+4	18	12	37	23	79	41	37	4
Sume+picl	1.25+4	Picl+2,4-D	4+16	18	11	46	10	86	24	50	13
Sume+2,4-D	1.25+16	Sume+2,4-D	1.25+16	21	16	28	14	78	26	50	14
Sume+2,4-D	1.25+16	Picl+2,4-D	4+16	28	9	57	7	79	11	53	1
Picl+2,4-D	4+16	Picl+2,4-D	4+16	13	0	56	2	80	1	56	0
Picl+2,4-D	4+16	Sume+picl	1.25+4	17	0	67	55	71	2	49	0
Picl+2,4-D	4+16	Sume+2,4-D	1.25+16	11	0	49	21	76	8	54	0
LSD (0.05)				NS	7	12	16	11	19	18	18
Fall											
Sume+picl	1.25+4	Sume+picl	1.25+4	46	70	80	86	96	94	77	65
Sume+picl	1.25+4	Picl+2,4-D	4+16	52	76	42	56	89	61	58	16
Sume+2,4-D	1.25+16	Sume+2,4-D	1.25+16	31	80	49	89	62	95	32	33
Sume+2,4-D	1.25+16	Picl+2,4-D	4+16	25	89	10	51	35	70	14	57
Picl+2,4-D	4+16	Picl+2,4-D	4+16	10	3	7	3	27	0	11	0
Picl+2,4-D	4+16	Sume+picl	1.25+4	6	0	62	48	44	26	21	13
Picl+2,4-D	4+16	Sume+2,4-D	1.25+16	2	0	38	64	34	33	19	23
LSD (0.05)				12	7	16	19	20	18	20	51

^aMean 12, 24, 36, or 48 months after the first treatment averaged over 3 locations.