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## **Leafy spurge control with resulting forage production from several herbicide treatments<sup>1</sup>**

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An experiment to evaluate long-term leafy spurge control and forage production was established at two sites in North Dakota in 1983. The predominate grasses were bluegrass (*Poa* spp.) with occasional crested wheatgrass, smooth brome, big bluestem, or other native grasses. The treatments were selected based on previous research conducted at North Dakota State University and included 2,4-D at 2 lb/A, picloram + 2,4-D at 0.25 + 1 lb/A, picloram 2 lb/A, and dicamba at 8 lb/A and were applied in August 1983 or June 1984 as fall or spring treatments. The 2,4-D at 2 lb/A and picloram plus 2,4-D treatments were applied annually while the picloram alone and dicamba treatments were reapplied when leafy spurge control declined to 70% or less. Thus, picloram at 2 lb/A was reapplied at Valley City in August 1985 and at Dickinson in June and August 1986. Dicamba at 8 lb/A was reapplied in June 1985 and 1986 at both locations as spring treatments and at Dickinson in September 1985 and at both locations in 1986 as a fall treatment. The plots were 15 by 50 feet with four replications in a randomized complete block design at each site. Forage yields were obtained by harvesting a 4 by 25 feet section with a rotary mower in July 1984, 1985, and 1986. Sub-samples were taken by hand along each harvested strip and separated into leafy spurge and forage so the weight of each component in the mowed sample could be calculated. The samples were oven dried and are reported with 12% moisture content. Economic return was estimated by converting forage production to animal unit days (AUD) and then to pounds of beef at \$0.60/lb minus the cost of the herbicide and estimated application cost, i.e. 2,4-D = \$2.00/lb ae, dicamba = \$11.75/lb ai, picloram = \$40.00/lb ai, and application = \$2.05/A. The cost of treatments applied in fall 1986 is not subtracted from the net return.

Most treatments have resulted in an economic loss at Dickinson despite excellent leafy spurge control from several treatments. This site general receives 8 to 10 inches less precipitation annually than the Valley City location. Total forage production averaged after 3 years across all treatments was 2,315 lb/A at Dickinson and 4,018 lb/A at Valley City (Table). Leafy spurge control from 2,4-D at 2 lb/A was not satisfactory from spring or fall applications at either site. However, it did provide short term control resulting in an economic gain at Valley City of \$31/A and \$2/A and at Dickinson of \$8/A and \$15/A as spring and fall applied treatments, respectively. Leafy spurge control with picloram + 2,4-D at 0.25 + 1 lb/A averaged over both locations was 67% as a spring applied treat-

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ment which was an increase from 44% control in 1985. Above average precipitation was received at both locations in 1986 allowing vigorous leafy spurge regrowth. The stems were only 3 to 5 inches tall but numerous in August 1986. Leafy spurge control was poor with picloram + 2,4-D at 0.25 + 1 lb/A fall applied, but average forage production of 2,989 lb/A was only slightly less than the spring average of 3,484 lb/A.

Picloram at 2 lb/A spring applied provided 94% leafy spurge control at Valley City and 53% control at Dickinson 36 months after application (Table). Dicamba generally gave good leafy spurge control as a fall but not as spring applied treatment. All treatments have reduced leafy spurge production compared to the control except the fall application of 2,4-D at 2 lb/A at Valley City.

**Table. Leaf spurge control, forage production and estimated net return from several herbicide treatments at two sites in North Dakota.**

Original treatment date		Re-treatment time		Year	Cost (\$/A)	Control		Yield <sup>a</sup>		Utilization (AUD)	Total Net return <sup>b</sup> (\$/A)
Herbicide	Rate (lb/A)	Herbicide	Rate (lb/A)			June	Aug	Forage	Leafy spurge		
						(%)		(lb/A)			
<b>Valley City</b>											
<b>Spring 1984</b>		<b>Spring</b>									
2,4-D	2	2,4-D	2 <sup>c</sup>	84-86	18	0	24	3266	2475	82	31
Picloram + 2,4-D	0.25 + 1	Picloram + 2,4-D	0.25 <sup>c</sup> + 1	84-86	42	31	74	4188	1480	105	21
Picloram	2	---	---	---	82	94	86	4401	1266	110	-16
Dicamba	8	Dicamba	.8 <sup>d</sup>	85, 86	288	30	97	3868	1509	97	-230
<b>Fall 1983</b>		<b>Fall</b>									
2,4-D	2	2,4-D	2 <sup>c</sup>	84-86	18	0	0	2580	3220	65	21
Picloram + 2,4-D	0.25 + 1	Picloram + 2,4-D	0.25 + 1 <sup>c</sup>	84-86	42	37	8	3950	2120	99	17
Picloram	2	Picloram	2 <sup>d</sup>	85	164	98	94	5227	256	131	-85
Dicamba	8	Dicamba	8 <sup>d</sup>	86	192	84	58	4662	660	117	-122
		Control						3814	3738	0	
LSD (0.05)						17	18	770	587		
<b>Dickinson</b>											
<b>Spring 1984</b>		<b>Spring</b>									
2,4-D	2	2,4-D	2 <sup>c</sup>	84-86	18	0	18	1767	293	44	8
Picloram + 2,4-D	0.25 + 1	Picloram + 2,4-D	0.25 + 1 <sup>c</sup>	84-86	42	35	59	2779	105	69	-1
Picloram	2	Picloram	2 <sup>d</sup>	86	164	53	96	2759	84	69	-123
Dicamba	8	Dicamba	8 <sup>d</sup>	85, 86	288	38	72	1960	136	49	-259
<b>Fall 1983</b>		<b>Fall</b>									
2,4-D	2	2,4-D	2 <sup>b</sup>	84-86	18	0	4	2176	646	55	15
Picloram + 2,4-D	0.25 + 1	Picloram + 2,4-D	0.25 + 1 <sup>c</sup>	84-86	42	14	3	2027	856	51	-12
Picloram	2	Picloram	2 <sup>d</sup>	86	164	71	35	2714	35	68	-41
Dicamba	8	Dicamba	8 <sup>d</sup>	85, 86	288	96	42	2334	54	58	-157
		Control				0	0	1907	1348	0	
LSD (0.05)						13	23	613	283		

<sup>a</sup> Total production of 1984, 1985 and 1986 harvest.

<sup>b</sup> Total net return for 1984, 1985 and 1986. Fall 1986 treatment cost is not subtracted from net return.

<sup>c</sup> Annual retreatment.

<sup>d</sup> Applied when control declines to less than 70%.