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Evaluation of AC 263,222 for leafy spurge control

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AC 263,222 (Plateau) has been registered for leafy spurge control in non-cropland. The label states AC 263,222 should be applied with a methylated seed oil (MSO) type adjuvant plus 28% urea nitrogen. Also, the manufacturer recommends AC 263,222 be applied in the fall prior to a killing frost or as a split application in the fall and the following spring. The purpose of these experiments was to evaluate AC 263,222 for leafy spurge control applied alone or with a MSO adjuvant and/or 28% N, applied in the spring or fall, in a variety of soil types.

The first experiment compared AC 263,222 applied alone, with a MSO, 28% N, or MSO plus 28% N and was established at the Ekre Research Station, near Walcott, ND on September 4, 1996. The leafy spurge was in the fall regrowth stage and was 12 to 18 inches tall. The soil was a sandy loam (Table 1). The herbicide treatments were applied using a tractor-mounted sprayer delivering 8.5 gpa at 35 psi. The plots were 10 by 30 feet and replicated four times with the herbicide treatments in a randomized complete block design. The air temperature was 83° F, and the soil temperature at the 4-inch depth was 77° F. A light frost occurred on September 15 when the temperature was 30° F and a killing frost on October 2 when the low temperature was 23° F. Leafy spurge control and grass injury was visually evaluated with control or injury based on percent stand reduction compared to the control.

Table 1. Soil type at the various experiment locations in North Dakota.

Location	N-P-K — lb/A —	pH	Organic	Sand:Silt:Clay
			Matter %	
Camp Grafton South	2-2-275	7.4	3.9	85:9:6
Jamestown	6-4-340	6.8	6.8	46:44:10
Valley City	5-5-1415	7.1	6.8	32:51:17
Walcott	3-3-70	6.8	2.9	85:10:5

AC 263,222 applied at 2 oz/A provided 98% or better leafy control in June 1997 [9 months after treatment (MAT)] whether applied alone or with an adjuvant and was similar to the standard treatment of picloram plus 2,4-D (Table 2). However, control was increased when AC 263,222 at 1 oz/A was applied with MSO or MSO plus 28% N compared to the herbicide applied alone and averaged 95 and 68% control, respectively.

Grass injury averaged 7 and 16 % when AC 263,222 was applied at 1 and 2 oz/A, respectively, and was similar whether the herbicide was applied alone or with an adjuvant.

Leafy spurge control declined dramatically by August 1997 for all treatments except AC 263,222 plus MSO and 28% N which averaged 76% (Table 2). Leafy spurge control was better when AC 263,222 was applied with MSO plus 28% N compared to the herbicide applied alone and tended to provide better leafy spurge control when applied with MSO alone than with 28% N alone. Grass injury was minimal regardless of treatment.

Table 2. AC 263,222 applied alone and with a MSO or MSO plus nitrogen for leafy spurge control near Walcott, ND.

Treatment	Rate — oz/A —	Evaluation			
		June 1997		August 1997	
		Control	Grass Injury	Control	Grass Injury
		%			
AC 263,222	1	68	1	1	0
AC 263,222	2	99	12	17	2
AC 263,222 + MSO ^b	1 + 1 qt	96	6	11	0
AC 263,222 + MSO ^b	2 + 1 qt	99	18	55	5
AC 263,222 + 28% N	1 + 1 qt	74	11	7	1
AC 263,222 + 28% N	2 + 1 qt	98	21	25	3
AC 263,222 + MSO ^b + 28% N	1 + 1 qt + 1 qt	94	8	28	0
AC 263,222 + MSO ^b + 28% N	2 + 1 qt + 1 qt	99	14	76	6
Picloram + 2,4-D	8 + 16	98	5	36	0
LSD (0.05)		17	12	26	4

^aTreatments applied September 4, 1996.

^bMethylated seed oil was SunIt by AGSCO.

The second experiment evaluated leafy spurge control with AC 263,222 applied in mid-summer or fall at two locations in North Dakota. Herbicides were applied near Valley City or Jamestown on July 3 or July 4, 1996, respectively, when the leafy spurge was in the flowering to seed-set growth stage. The air temperature was approximately 80° F and the soil temperature at the 4-inch depth was 57° F at Valley City and 69° F at Jamestown. The fall treatments were applied at both locations on September 9 when the leafy spurge was in the fall regrowth stage and the air temperature was in the mid 80s. The summer treatments were reapplied in July 1997 to two treatments at Valley City (Table 3) and all treatments at Jamestown (Table 4). The soil at both locations was a fine-loam (Table 1). A killing frost occurred on October 3 when the minimum temperature was 28 and 22° F at Valley City and Jamestown, respectively.

AC 263,222 applied in mid-summer did not control leafy spurge when visually evaluated in September (Table 3). However, control averaged 94 and 99% in May of the following year when AC 263,222 was applied at 2 and 4 oz/A, respectively. AC 263,222 at 4 oz/A provided 93% leafy spurge control in September 1997 with minimal grass injury, but 4 oz/A is twice the labeled use rate. AC 263,222 fall-applied at 2 or 4 oz/A provided excellent leafy spurge control the following spring but grass injury was very noticeable

and averaged 43%. AC 263,222 provided 92% leafy spurge control when applied at 1 or 2 oz/A with MSO 12 MAT which was higher than the standard picloram plus 2,4-D treatment which averaged 47%.

Table 3. AC 263,222 for leafy spurge control applied in mid-summer or fall at Valley City, ND.

Treatment ^a	Rate — oz/A —	Evaluation					
		Sept. 1996		May 1997		Sept. 1997	
		Control	Grass injury	Control	Grass injury	Control	Grass injury
		%					
AC 263,222 (summer)	2	0	0	94	10	74	5
AC 263,222 (summer)	4	0	0	99	28	93	5
AC 263,222 + MSO ^b (summer)	1 + 1 qt	0	0	0	8	97	3
AC 263,222 + MSO ^b (summer) ^c	2 + 1 qt	0	0	99	29	73	16
Picloram + 2,4-D (summer)	4 + 16	74	4	75	0	39	0
AC 263,222 (fall)	2			100	36	71	0
AC 263,222 (fall)	4			100	53	99	0
AC 263,222 + MSO ^b (fall)	1 + 1 qt			100	20	92	0
AC 263,222 + MSO ^b (fall)	2 + 1 qt			100	40	92	0
Picloram + 2,4-D	8 + 16			99	13	47	0
LSD (0.05)		34	NS	20	25	25	NS

^aTreatments applied July 2, (summer) and September 9, 1996 (fall).

^bMethylated seed oil was SunIt by AGSCO.

^cTreatments reapplied in July 1997.

Leafy spurge control with AC 263,222 applied in mid-summer tended to be less at Jamestown than Valley City (Tables 3 and 4). Only AC 263,222 at 4 oz/A provided greater than 90% control in May 1997 and all treatments were reapplied in July 1997. Control averaged 99% in September following a second application of picloram plus 2,4-D, but was 71% or less with a second application of AC 263,222. Grass injury could not be evaluated in September because a severe hail storm occurred at the research location.

AC 263,222 applied in the fall at Jamestown provided excellent leafy spurge control and averaged 99% regardless of application rate (Table 4). In contrast to the high grass injury at Valley City (Table 3), AC 263,222 at 4 oz/A fall-applied averaged 18% grass injury and was the only treatment to injure grass at Jamestown. Leafy spurge control averaged 97% 12 MAT with both AC 263,222 applied alone at 4 oz/A or at 2 oz/A with MSO compared to 26% with picloram plus 2,4-D.

The third experiment evaluated leafy spurge control with AC 263,222 on a sandy soil at Camp Grafton South, near McHenry, North Dakota (Table 1). The experiment was established on August 29, 1996 when leafy spurge was in the fall regrowth stage, the air temperature was 79° F and the soil temperature was 72° F at the 4-inch soil depth.

Table 4. AC 263,222 for leafy spurge control applied in mid-summer or fall at Jamestown, ND.

Treatment ^a	Rate — oz/A —	Evaluation				
		Sept. 1996		May 1997		Sept. 1997
		Control	Grass injury	Control	Grass injury	Control
%						
AC 263,222 (summer) ^c	2	0	0	0	0	0
AC 263,222 (summer) ^c	4	13	14	92	1	71
AC 263,222 + MSO ^b (summer) ^c	1 + 1 qt	28	0	33	0	13
AC 263,222 + MSO ^b (summer) ^c	2 + 1 qt	17	0	72	0	45
Picloram + 2,4-D (summer) ^c	4 + 16	46	0	15	0	99
AC 263,222 (fall)	2			99	5	28
AC 263,222 (fall)	4			100	18	97
AC 263,222 + MSO ^b (fall)	1 + 1 qt			99	6	70
AC 263,222 + MSO ^b (fall)	2 + 1 qt			100	6	96
Picloram + 2,4-D (fall)	8 + 16			95	0	26
LSD (0.05)		14	10	19	6	18

^aTreatments applied July 2, (summer) and September 9, 1996 (fall).

^bMethylated seed oil was SunIt by AGSCO.

^cTreatments reapplied in July 1997.

Leafy spurge control averaged 100% with AC 263,222 compared to 89% with picloram plus 2,4-D in June 1997 (Table 5). There was 23% grass injury with AC 263,222 applied at 3 oz/A. Control remained high 12 MAT with both AC 263,222 treatments and averaged 95% control compared to 48% with picloram plus 2,4-D and the grass had recovered.

In general, AC 263,222 applied in the fall provided better leafy spurge control than mid-summer treatment and control was improved when the herbicide was applied with a MSO or MSO plus 28% N compared to AC 263,222 applied alone. Control varied by location and tended to be higher in sandier soils. Leafy spurge control was better 12 MAT with AC 263,222 at 2 oz/A plus MSO compared to picloram plus 2,4-D at 8 plus 16 oz/A and averaged 85 and 39% over all locations, respectively. Grass injury to cool season species tended to be higher when AC 263,222 was spring- compared to fall-applied, but the grasses recovered by 12 MAT.

Table 5. AC 263,222 for leafy spurge control near trees established on Camp Grafton South near McHenry, ND.

Treatment ^a	Rate — oz/A —	Evaluation			
		June 1997		Sept. 1997	
		Control	Grass inj.	Control	Grass inj.
%					
AC 263,222 + MSO ^b + 28% N	2 + 1 qt + 1 qt	100	11	93	0
AC 263,222 + MSO ^b + 28% N	3 + 1 qt + 1 qt	100	23	96	3
Picloram + 2,4-D	9 + 16	89	0	48	0
LSD (0.05)		8	9	14	NS

^aTreatments applied August, 1996.

^bMethylated seed oil was SunIt by AGSCO.