Pink Section **Perennial and Noxious Weed control** **Page**

Long-term control of leafy spurge with aminocyclopyrachlor. Rodney G. Lym. (Department of Plant Sciences, North Dakota State University, Fargo, ND 58108-6050). Aminocyclopyrachlor (KJM44-062 or MAT28) is a new herbicide from E. I. DuPont company currently labeled for non-crop and right-of-way weed control. Initial evaluations of this compound for general pasture and invasive weed control was promising on a variety of species. The purpose of this research was to evaluate aminocyclopyrachlor applied twice for both leafy spurge control and possible grass injury.

Aminocyclopyrachlor methyl ester (DPX KJM44-062) was initially applied alone from 1 to 3 oz ai/A in the spring or fall of 2007. The first experiment was established near Walcott, ND in an ungrazed area of pasture with a dense stand of leafy spurge (92 stems/m^2). Treatments were applied June 5, 2007 when leafy spurge was in the true-flower growth stage. All herbicides were reapplied on June 30, 2009 to evaluate long-term control and potential grass injury. The second experiment was established on abandoned cropland near Fargo, ND on September 19, 2007 when leafy spurge was in the fall regrowth stage with a stand density of 30 stems/m^2.

Treatments were applied using a hand-held boom sprayer delivering 17 gpa at 35 psi. Experimental plots were 10 by 30 feet and replicated three or four times for the fall and spring study, respectively, in a randomized complete block design. Leafy spurge control was evaluated visually using percent stand reduction compared to the untreated control.

Aminocyclopyrachlor applied at 2 oz/A or higher provided better long-term leafy spurge control than the standard treatments of picloram at 8 oz/A or picloram plus imazapic plus 2,4-D at 4 + 1 + 16 oz/A (Table 1). For instance, aminocyclopyrachlor applied at 2 oz/A provided 90 and 88% leafy spurge control in June and August 2008, respectively, compared to 58 and 45% control, respectively, with picloram at 8 oz/A. Control averaged >80% with aminocyclopyrachlor at 2 to 3 oz/A in June 2009, 24 MAT (months after treatment), but had declined to 48 to 65% with aminocyclopyrachlor applied at 1 to 1.5 oz/A.

Long-term leafy spurge control tended to be higher 15 MAT following a second application compared to a single treatment. For instance, leafy spurge control averaged 89% compared to 55% in August 2010 or August 2008 (15 MAT), respectively, when aminocyclopyrachlor at 1 oz/A was applied twice. Also, the commonly used treatment of picloram plus imazapic plus 2,4-D provided 83% leafy spurge control in August 2010 (15 months after second application) compared to only 56% in August 2008 (15 months after single application). The major grass species present were Kentucky bluegrass and smooth brome and less than 5% grass injury was observed following either the 2007 or 2009 treatment applications (data not shown). Control declined regardless of treatment by 2011 and herbicides would have to be reapplied to maintain leafy spurge control.

Leafy spurge control 11 MAT with aminocyclopyrachlor applied in the fall increased from 89 to 99% as the application rate increased from 1 to 3 oz/A (Table 2). Grass injury was not observed regardless of aminocyclopyrachlor application rate (data not shown). Leafy spurge control averaged over treatments was 93% in June 2010 and 86% in June 2011 (45 MAT). This was much better control than normally observed with the standard treatment of picloram at 16 oz/A. Leafy spurge was still

present in the untreated areas, so the reason for such long-term control is unknown. In summary, aminocyclopyrachlor provided better long-term leafy spurge control than commonly used treatments with little grass injury.

Table 1. Evaluation of aminocyclopyrachlor for leafy spurge control applied in June 2007 and again in June 2009 near Walcott, ND.

		Leafy spurge control/evaluation date							
		2007	2008		2009		2010		2011
Treatment	Rate	6 Aug	9 June	19 Aug	10 June	18 Aug	15 June	20 Aug	3 June
	oz/A	%							
Aminocyclopyrachlor[1]	1	92	79	55	48	92	93	89	53
Aminocyclopyrachlor	1.5	98	87	71	65	95	92	86	46
Aminocyclopyrachlor	2	99	90	88	81	95	98	96	79
Aminocyclopyrachlor	2.5	99	97	92	86	98	99	97	62
Aminocyclopyrachlor	3	99	96	92	87	100	99	95	72
Picloram	8	86	58	45	41	98	76	79	58
Picloram + imazapic + 2,4-D	4 + 1 + 16	97	45	56	38	95	89	83	37
LSD (0.05)		7	31	23	36	NS	15	17	NS

[1]MSO was added to all treatments at 1% v/v except at 1 qt/A with picloram + imazapic + 2,4-D. Scoil by AGSCO, 1168 12th St NE, Grand Forks, ND 58201.

Table 2. Evaluation of aminocyclopyrachlor for leafy spurge control applied in September 2007 at Fargo, ND.

		Leafy spurge control/evaluation date						
		2008		2009		2010		2011
Treatment	Rate	20 June	20 Aug	12 June	3 Sept	10 July	8 Sept	13 June
	oz/A	%						
Aminocyclopyrachlor[1]	1	93	89	92	74	90	78	77
Aminocyclopyrachlor	2	99	97	98	85	93	82	84
Aminocyclopyrachlor	3	100	99	98	89	97	95	95
Picloram	16	99	97	98	82	90	88	88
LSD (0.05)		NS	7	4	NS	NS	NS	NS

[1]MSO was added to all treatments at 1% v/v except at 1 qt/A with picloram. Scoil by AGSCO, 1168 12th St NE, Grand Forks, ND 58201.

Imazapic applied with saflufenacil for leafy spurge control. Rodney G. Lym. (Department of Plant Sciences, North Dakota State University, Fargo, ND 58108-6050). Imazapic is primarily used for leafy spurge control as a fall only treatment because spring applications do not provide satisfactory control. Saflufenacil is a pyrimidinedione chemical primarily used for burndown and selective pre-emergence dicot weed control in cropland. Previous research has shown that imazapic applied with saflufenacil in the spring and early summer provided leafy spurge control similar to or better than commonly used treatments. The purpose of this research was to evaluate imazapic applied with a liquid or dry formulation of saflufenacil for leafy spurge control.

The study was established on the Albert Ekre Research Station near Walcott, ND on June 2, 2010. Leafy spurge was in the vegetative to true-flower growth stage and 18 to 24 inches tall. Herbicides were applied using a hand-held boom sprayer delivering 17 gpa at 35 psi. Experimental plots were 10 by 30 feet and replicated four times in a randomized complete block design. Leafy spurge control was evaluated visually using percent stand reduction compared to the untreated control. The two formulations of saflufenacil evaluated were BAS80001H, a 70% ai dry flowable, and BAS80004H, a liquid formulated at 342 g ai/L.

All treatments except imazapic alone provided an average 95% leafy spurge top-growth burndown (injury) when evaluated approximately 3 weeks after treatment (28 June 2010) (Table). Leafy spurge control averaged greater than 90% 2 and 3 MAT (months after treatment) with all treatments of imazapic plus saflufenacil and was similar to the standard treatment of imazapic plus picloram plus 2,4-D (North Dakota three-way). Control gradually declined to 33% or less when saflufenacil was applied alone. The best long-term leafy spurge control was achieved when imazapic plus saflufenacil was applied at 1 plus 0.7 oz/A or imazapic at 1.5 oz/A with saflufenacil at 0.35 to 0.7 oz/A and averaged 85% 12 MAT. There was no difference in leafy spurge control when imazapic was applied with the dry or liquid formulation of saflufenacil. No treatment provided satisfactory leafy spurge control 15 MAT. In general, imazapic applied with saflufenacil provided better long-term leafy spurge control than the standard North Dakota three-way treatment.

Table. Evaluation of saflufenacil applied with imazapic for leafy spurge control near Walcott, ND applied 2 June 2010.

		2010						2011	
		28 June		29 July		20 Aug		3 June	8 Sept
Treatment	Rate	LS[1]	Grass	LS	Grass	LS	Grass	Leafy spurge	
	oz/A	% injury		% control					
Imazapic + picloram + 2,4-D amine + MSO[2]	1 + 4 + 13 + 1 qt	91	15	90	18	91	11	55	33
AS80001H[3] + NIS[4] + AMS[5]	0.35 + 0.25 %	87	0	72	0	33	0	15	1
BAS80004H[6] + NIS + AMS	0.35 + 0.25 %	90	0	59	0	29	0	14	0
BAS80001H + NIS + AMS	0.7 + 0.25 %	96	0	70	0	18	1	13	0
Imazapic + NIS + AMS	1 + 0.25 %	5	7	4	6	1	6	4	0
Imazapic + NIS + AMS	1.5 + 0.25 %	6	2	8	3	4	3	5	0
Imazapic + BAS80001H + NIS + AMS	1 + 0.35 + 0.25 %	96	9	94	8	94	1	65	36
Imazapic + BAS80004H + NIS + AMS	1 + 0.35 + 0.25 %	99	9	97	11	95	8	64	45
Imazapic + BAS80001H + NIS + AMS	1 + 0.7 + 0.25 %	99	4	99	6	94	4	82	48
Imazapic + BAS80001H + NIS + AMS	1.5 + 0.35 + 0.25 %	89	14	91	11	94	3	83	25
Imazapic + BAS80001H + NIS + AMS	1.5 + 0.7 + 0.25 %	100	13	100	15	99	5	91	37
Imazapic + BAS80004H + MSO + AMS	1 + 0.35 + 1 qt + 1 %	99	20	96	13	94	0	53	16
LSD(0.05)		11	11	11	10	13	8	34	28

[1]LS = leafy spurge.
[2]MSO = methlated seed oil, [4]NIS is Induce both, Helena Chemical Co., 225 Schilling Blvd., Suite 300, Collierville, TN 38017.
[3]Saflufenacil 70% dry flowable formulation and [6]342 g/L liquid formulation.
[5]AMS is granular ammonium sulfate at 17 lbs/100 gallons of water.

Comparison of dry and liquid quinclorac formulations for leafy spurge control. Rodney G. Lym. (Department of Plant Sciences, North Dakota State University, Fargo, ND 58108-6050). Quinclorac was originally registered for use in rice to control annual grass and broadleaf weeds, but has also been used to control leafy spurge in pasture and rangeland. Quinclorac is generally applied at 8 to 12 oz /A with a methylated seed oil during the spring or fall for optimal leafy spurge control. Quinclorac is available as a 75% DF, but would be more convenient if a liquid formulation were available as many applicators now use a direct injection method for application in pasture and roadsides. The purpose of this study was to compare leafy spurge control with liquid or dry formulations of quinclorac.

The study was established on the Albert Ekre Research Station near Walcott, ND on June 16, 2010. Leafy spurge was in the vegetative to true-flower growth stage and 20 to 28 inches tall. Herbicides were applied using a hand-held boom sprayer delivering 17 gpa at 35 psi. Experimental plots were 10 by 25 feet and replicated three times in a randomized complete block design. Leafy spurge control was evaluated visually using percent stand reduction compared to the untreated control.

		Evaluation date			
		2010		2011	
Treatment	Rate	29 July	20 Aug	3 June	8 Sept
	— oz/A —		% control		
Quinclorac (dry) + MSO[1]	6 + 1 %	72	96	86	65
BAS 514 51H (liquid) + MSO	6 + 1 %	80	97	90	81
Untreated		0	0	0	0
LSD (0.05)		7.8	3	10	6

[1]MSO is methylated spray oil from Helena Chemical Co., 225 Schilling Blvd., Suite 300, Collierville, TN 38017.

Quinclorac applied as a liquid formulation provided slightly better initial leafy spurge control 6 weeks after treatment (29 July) than the dry formulation, but control was similar 12 MAT (months after treatment) and averaged 88% (Table). However, control with the liquid formulation of quinclorac was superior to the dry formulation by September 2011 (15 MAT) and averaged 81% compared to only 65% with the dry formulation. Quinclorac liquid would be useful if available for leafy spurge control both for applicator convenience and increased long-term efficacy.

Evaluation of aminocyclopyrachlor for Russian olive control. Rodney G. Lym. (Department of Plant Sciences, North Dakota State University, Fargo, ND 58108-6050). Aminocyclopyrachlor (KJM44-062 or MAT28) has been evaluated for control of wide spread invasive weeds such as leafy spurge and Canada thistle. However, the effect of aminocyclopyrachlor on other invasive or troublesome weeds is largely unknown. The purpose of this research was to evaluate aminocyclopyrachlor efficacy on Russian olive (*Elaeagnus angustifolia* L.) applied as a basal bark treatment.

The study was established near the Sheyenne National Grassland in southeast North Dakota. Russian olive originally had been planted as part of a shelter belt but had spread into an adjacent pasture. The trees were 15 to 25 feet tall and ranged from approximately 10 to over 50 years old. Herbicides were applied in bark oil ranging in concentration from 5 to 25% v/v on July 8, 2009. The herbicide was applied in an 8-inch band to the bark of uncut Russian olive trees about 12 inches above the soil. If the tree had more than one stem, the largest was chosen for treatment. Each treatment was applied to four trees (reps). Each replicate had similar size trees which ranged in circumference from an average 5 inches in rep one to 13 inches in rep four.

Aminocyclopyrachlor slowly controlled Russian olive when applied as a basal bark treatment (Table). Injury increased from 54 to 75% 6 weeks after treatment (18 Aug 2009) as the aminocyclopyrachlor rate increased from a 5 to 15% solution. Aminocyclopyrachlor at 5% solution killed all but the largest trees and averaged 93% control by July 2011 (24 months after treatment). All Russian olive trees died when aminocyclopyrachlor was applied as a 10 or 15% solution. Control was similar with triclopyr applied alone at 25% or with imazapyr at 20 + 1%, respectively.

All vegetation surrounding the treated tree was also killed and the size of the area increased to over 6 ft in diameter, as the aminocyclopyrachlor rate increased. The largest area of injury was observed when the treatment included imazapyr. No injury was observed when triclopyr was applied alone. Plants gradually reestablished during the course of the study, and no non-target injury was observed by the second season after application.

In summary, aminocyclopyrachlor provided excellent Russian olive control when applied as a basal bark treatment. Previous research had found aminocyclopyrachlor provided 100% control of regrowth when applied as a 2.5% solution in bark oil blue to cut-stumps, but had to be applied at a 10% or more solution to kill well established trees. This study confirmed that to ensure complete kill of all treated Russian olive trees, the aminocyclopyrachlor rate should be 10%, regardless if applied as a basal bark or cut-stump treatment.

Table. Evaluation of aminocyclopyrachlor as a basal bark treatment applied on July 8, 2009 for Russian olive control near McLeod, ND.

		Evaluation				
		2009		2010		2011
Treatment[1]	Rate	22 July	18 Aug	16 June	26 Aug	19 July
	— % by vol. —	— % injury —		— % control —		
Aminocyclopyrachlor	5	30	54	83	90	93
Aminocyclopyrachlor	10	41	79	100	100	100
Aminocyclopyrachlor	15	35	75	100	100	100
Triclopyr ester[2]	25	63	96	99	100	100
Triclopyr ester + imazapyr[3]	20 + 1	46	88	93	99	100
Aminocylopyrachlor + imazapyr	10 + 1	45	68	99	100	100
Untreated	...	0	0	0	0	0
LSD (0.05)		21	25	12	8.5	8

[1]Herbicide treatments applied in Bark Oil Blue LT from UAP Distribution Inc., 7251 West 4th St., Greeley, CO 80634.
[2]Commercial formulation - Garlon 4 from Dow AgroSciences LLC, 9330 Zionsville Road, Indianapolis, IN 46268-1189.
[3]Commercial formulation - Stalker from BASF Corporation, 100 Campus Drive, Florham Park, NC 07932.

Evaluation of aminocyclopyrachlor for common annual weed control. Rodney G. Lym. (Department of Plant Sciences, North Dakota State University, Fargo, ND 58108-6050). Aminocyclopyrachlor is currently being evaluated for invasive weed control in pasture, rangeland, and roadside right-of-ways. This herbicide has provided good long-term control of common perennial weeds such as leafy spurge, Canada thistle, absinth wormwood, and spotted knapweed. However, the efficacy of aminocyclopyrachlor on common annual weeds has largely been unreported. The purpose of this research was to evaluate Lady's thumb (*Polygonum persicaria* L.), lambsquarters (*Chenopodium album* L.), wild buckwheat (*Polygonum convolvulus* L.), and wild mustard (*Sinapis arvensis* L. ssp. *arvensis*) aka (*Brassica kaber* (DC.) L.C. Wheeler) control with aminocyclopyrachlor.

The study was established on North Dakota Agricultural Experiment Station land north of Fargo on May 26, 2010. The land had been cropped with soybean the previous year, but was not seeded in 2010. Herbicides were applied using a hand-held boom sprayer delivering 17 gpa at 35 psi. Experimental plots were 10 by 25 feet and replicated three times in a randomized complete block design. The annual weeds were in the seedling to early flowering growth stage and 1 to 14 inches tall. Weed control was evaluated visually using percent stand reduction compared to the untreated control.

		2010 evaluation date/species						
		10 June				20 June		
Treatment[1]	Rate	Wild mustard	Lady's thumb	Lambs-quarter	Wild buck-wheat	Wild mustard	Lady's thumb	Wild buck-wheat
	— oz/A —	——— % injury ———				—— % control ——		
Aminocyclopyrachlor	0.5	20	32	17	32	61	36	20
Aminocyclopyrachlor	1.0	42	25	22	25	86	45	0
Aminocyclopyrachlor	1.5	45	49	0	35	82	68	65
Aminocyclopyrachlor	2.0	42	65	55	37	90	84	87
Aminocyclopyrachlor + metsulfuron	0.7 + 0.1	91	87	52	55	100	90	39
Aminocyclopyrachlor + chlorsulfuron	0.8 + 0.3	89	89	90	84	100	99	43
Aminocyclopyrachlor (liquid) + 2,4-D	0.7 + 5.3	73	43	70	37	97	45	48
Metsulfuron	0.2	91	97	63	64	100	96	31
2,4-D amine	8	75	38	40	34	99	0	0
Control		0	0	0	0	0	0	0
LSD (0.05)		11	37	48	37	15	59	57

[1]Induce (NIS) was added to all treatments at 0.25% (v/v) and manufactured by Helena Chemical Company, 225 Schilling Blvd, Suite 300, Collierville, TN 38017.

Aminocyclopyrachlor (AMCP) generally did not provide satisfactory weed control of the annual weeds in this study unless applied at 2 oz /A which would likely cause crop injury (Table). Wild mustard control 1 MAT (months after treatment) ranged from 61 to 90% when AMCP was applied at 0.5 to 2 oz/A alone. Control increased to an average of 99% when AMCP was applied with metsulfuron, chlorsulfuron, or 2,4-D. AMCP applied alone at 1 to 2 oz/A provided an average of 86% control of lady's thumb and control increased to an average of 95% control when applied with metsulfuron or chlorsulfuron, but not 2,4-D. Only AMCP applied with metsulfuron provided satisfactory control of lambsquarters and no treatment but AMCP at 2 oz/A controlled wild buckwheat.

Yellow toadflax control in rangeland with DPX-MAT28 (Jenks, Willoughby, and Hoefing) The study objective was to evaluate DPX-MAT28 (aminocyclopyrachlor) for long-term yellow toadflax control in rangeland compared to Tordon. DPX-MAT28 was applied at 1.5 or 3 oz ai/A or at 2 oz tank mixed with Telar. Tordon was applied at 2 pt/A. Treatments were applied at vegetative stage, flowering, and late fall. Treatments were applied in 2008 and evaluated in 2009, 2010, and 2011. Toadflax density was measured before application in 2008 and again each year after. Tordon provided poor toadflax control at any stage. DPX-MAT28 provided excellent control after 1 year with any rate. However, after 2 years, control with the 1.5 oz rate dropped off significantly, while the 3 oz rate still maintained excellent control. Toadflax control with DPX-MAT28 + Telar was 8-13% lower than with 3 oz. No treatment caused more than 6% grass injury. After 3 years, the 3 oz rate is still providing ≥95% control at any stage, while the 2 oz rate + Telar provided 76-89% control.

Table. Yellow toadflax control with DPX-MAT28. (0949)

			Injury			Weed Control			Density			
			Grass			Yellow Toadflax						
Treatment[a]	Rate	Stage	7-Aug-09	10-Sep-10	22-Aug-11	7-Aug-09	10-Sep-10	22-Aug-11	4-Aug-08	14-Jul-09	15-Sep-10	25-Aug-11
			----------%----------						----------sq ft----------			
Untreated			0	0	0	0	0	0	9.6	11.9	8.7	9.9
DPX-MAT28	1.5 oz	Veg.	5	0	0	93	55	27	8.3	0.2	3.1	4.9
DPX-MAT28	1.5 oz	Flow.	1	0	0	95	62	43	6.1	1	3.4	3.1
DPX-MAT28	1.5 oz	Fall	1	0	0	90	64	40	7.8	1	1.7	4.1
DPX-MAT28	3 oz	Veg.	5	0	0	100	98	95	8.3	0	0	0.3
DPX-MAT28	3 oz	Flow.	3	0	0	100	99	95	7.6	0	0	0.2
DPX-MAT28	3 oz	Fall	3	0	0	100	99	98	5.9	0	0	0
Tordon	2 pt	Veg.	1	0	0	23	0	0	6.2	5.8	7.2	9.1
Tordon	2 pt	Flow.	1	0	0	32	0	0	10	6.8	7	11.9
Tordon	2 pt	Fall	1	0	0	60	13	10	6.4	2.9	3.8	6.9
DPX-MAT28 + Telar	0.75 oz	Veg.	4	0	0	99	85	76	7.9	0.1	0.6	1
DPX-MAT28 + Telar	0.75 oz	Flow.	6	0	0	100	91	89	7.1	0	0.3	1.3
DPX-MAT28 + Telar	0.75 oz	Fall	3	0	0	100	92	86	8.6	0	0.7	0.9
Untreated			0	0	0	0	0	0	6.1	6.4	5	8.4
LSD (0.05)			7	15	17	NS	NS	NS	NS	2	3	3
CV			6	17	22	111	0	0	40	56	57	45

[a] *All treatments applied with MSO (1%)*

Perennial weed control with aminopyralid and aminocyclopyrachlor, Sheridan County. (Greg Endres and Emily Kline)

A field trial was conducted by the NDSU Carrington Research Extension Center on the Ducks Unlimited Coteau Ranch near Denhoff, ND to examine perennial weed control with aminopyralid (Milestone, ForeFront R&P, and Chaparral) and aminocyclopyrachlor (MAT28). Experimental design was a randomized complete block with three replications. Weeds were mowed during the summer of 2008. Herbicide treatments were applied with a backpack-type plot sprayer delivering 11 gal/A at 35 psi through 8001 flat fan nozzles to the center 6.7 ft of 10- by 25-ft plots. Fall herbicide treatments were applied on October 3, 2008 to 3- to 12-inch tall absinth wormwood, 2- to 10-inch tall Canada thistle, and ≤ 24-inch tall (rosette to mature) sowthistle. Summer herbicide treatments were applied on July 1, 2009 to 13- to 40-inch tall absinth wormwood, 5- to 29-inch tall (bud stage) Canada thistle, and 6- to 28-inch tall sowthistle.

Absinth wormwood control was excellent (99%) and sowthistle control was good (83 to 87%) 12 months after treatment (MAT) with fall application of Milestone, ForeFront R&P and Chaparral (Table 1). All herbicides except 2,4-D provided 72 to 80% control of absinth wormwood 22 MAT. Canada thistle control 12 MAT was 85% with fall-applied Milestone at 7 fl oz/A. However, Canada thistle control did not continue when evaluated 22 MAT.

All summer herbicides provided excellent control 12 MAT of absinth wormwood and sowthistle except wormwood control with MAT28 plus Telar (Table 2). Wormwood control was good (80 to 90%) with all herbicides 25 MAT except 2,4-D. Summer-applied MAT28 or MAT28 plus Telar provided excellent control (98%) of Canada thistle 12 MAT and good control (87 to 89%) 25 MAT.

Table.1 Perennial weed control with fall herbicide treatments[1]

Herbicide		Weed control							
		1-Jul-09			30-Sep-09			8-Aug-11	
Treatment[2]	Rate	Absinth wormwood	Canada thistle	Sowthistle	Absinth wormwood	Canada thistle	Sowthistle	Absinth wormwood	Canada thistle
	product/A	%							
2,4-D	32 fl oz	65	33	0	62	13	0	27	0
Milestone	7 fl oz	99	98	89	99	85	87	72	7
Milestone	5 fl oz	99	84	80	99	75	83	80	13
ForeFront R&P	32 fl oz	99	89	86	99	71	83	79	0
Chaparral	3 oz wt	99	90	94	99	75	88	71	13
C.V. (%)		11.6	23.2	15.8	10.8	18.1	16.9	12.9	59.2
LSD (0.05)		16	28	17	15	17	17	15	NS

[1]Application on October 3, 2008.

[2]2,4-D=LV4 (Loveland); All treatments except 2,4-D include NIS=Preference (Winfield Solutions) at 0.25% v/v.

Table.2 Perennial weed control with summer herbicide treatments[1]

Herbicide		Weed control							
		30-Sep-09			2-Jul-10			8-Aug-11	
Treatment[2]	Rate	Absinth wormwood	Canada thistle	Sowthistle	Absinth wormwood	Canada thistle	Sowthistle	Absinth wormwood	Canada thistle
	product/A	%							
2,4-D	32 fl oz	96	72	93	91	65	93	75	7
Milestone	7 fl oz	99	94	93	98	86	95	90	49
Milestone	5 fl oz	99	83	93	95	72	90	83	38
Chaparral	3 oz wt	99	87	98	93	71	99	83	68
MAT28	2 oz wt	94	96	98	93	98	98	85	89
MAT28 + Telar	2 + 0.167 oz wt	89	93	99	78	98	98	80	87
C.V. (%)		7.9	6.8	4.4	5.1	9.4	3.2	12.9	59.2
LSD (0.05)		12	9	6	7	12	5	15	31

[1]Application on July 1, 2009.

[2]2,4-D=LV4 (Loveland); All treatments except 2,4-D include NIS=Preference (Winfield Solutions) at 0.25% v/v.