Wheat response to soil residues of grass herbicides. Kirk Howatt, Ronald Roach, and Janet Harrington. Treatments 1 through 4 were applied to bare soil on May 3, 14 days before seeding (DBS), with 61° F, 0% humidity, 5% cloud cover, 3 to 5 mph wind at 315°, and dry soil at 41° F. Treatments 5 through 8 were applied on May 10 (7 DBS) with 51° F, 66% RH, 100% cloud cover, 15 mph wind at 0°, and damp soil at 53° F. Treatments 9 through 12 were soil applied on May 17, 0 DBS, with 64° F, 61% RH, 0% cloud cover, 14 mph wind at 180°, and dry soil at 48° F. 'Alsen' hard red spring wheat was seeded May 17. The entire experiment was over sprayed with fenoxaprop at 1.32 oz ai/A plus bromoxynil&MCPA at 8 oz ai/A and fluroxypyr at 2 oz ae/A for weed control on June 17 with 79° F, 36% RH, 5% cloud cover, 12.3 mph wind at 135°, and dry soil at 77° F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/22 Wht	7/22 Wht	7/25 Population	8/15 Yield
	oz ai/A	%		Plants/m row	bu/A
Quizalofop	1.54	0	0	76	39
Fluazifop-P	3	0	0	81	39
Sethoxydim	9	0	0	85	39
Clethodim	8	10	4	78	42
Quizalofop	1.54	0	1	74	41
Fluazifop-P	3	0	1	83	43
Sethoxydim	9	0	1	86	42
Clethodim	8	43	29	73	36
Quizalofop	1.54	0	1	89	41
Fluazifop-P	3	13	4	92	41
Sethoxydim	9	75	26	73	35
Clethodim	8	95	80	36	15
Untreated	0	0	0	81	43
CV		64	76	17	12
LSD (P=0.05)		16	12	19	7

Herbicide rates were two- to three-times typical use rates to encourage injury and identify herbicides with the largest margin of safety. Clethodim caused visible injury to wheat of 95% on June 22 when applied the day of seeding. A significant contributor to the injury rating was reduced population, but surviving plants exhibited irregular growth and stunting as well. Clethodim also caused injury in earlier treatment timings. Clethodim did not reduce wheat yield when applied 14 DBS but reduced yield 16% when applied 7 DBS and 65% when applied the day of seeding. Setyhoxydim applied the day of seeding resulted in injury and yield reduction similar to clethodim applied the day of seeding, but sethoxydim did not cause problems when applied earlier. Injury was observed with fluazifop, but yield was not affected with any application timing. Quizalofop elicited the fewest symptoms and did not affect yield.

Wild Oat Control with Triallate. Kirk Howatt, Ronald Roach, and Janet Harrington. Treatments were applied to soil and 'Alsen' hard red spring wheat was seeded on April 25 with 39° F. 51% RH, 100% cloud cover, and damp soil with 42° F. The treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. Treatments were incorporated with two passes of a field cultivator at 180° with tines set to a depth of 3 inches. The experiment was a randomized complete block design with four replicates.

		5/31		6/23	8/05
Treatment	Rate	Wioa	Wht	Wioa	Yield
	oz ai/A		%		bu/A
Triallate	16	94	14	98	30
GWN 3045	0.19	23	8	20	17
GWN 3045	0.26	25	10	40	13
GWN 3045	0.37	23	11	33	23
GWN 3047	0.26	28	10	28	15
GWN 3047	0.35	28	11	28	15
GWN 3047	0.42	33	10	48	16
GWN 3060	0.5	20	9	0	7
GWN 3060	0.56	28	5	40	13
GWN 3060	0.75	43	11	55	13
Triallate + GWN 3045	16+0.19	96	20	97	27
Triallate + GWN 3045	16+0.26	98	21	98	33
Triallate + GWN 3045	16+0.37	96	23	97	32
Triallate + GWN 3047	16+0.26	95	14	97	33
Triallate + GWN 3047	16+0.35	96	14	98	33
Triallate + GWN 3047	16+0.42	93	18	97	34
Triallate + GWN 3060	16+0.5	95	20	98	28
Triallate + GWN 3060	16+0.56	96	24	97	29
Triallate + GWN 3060	16+0.75	98	19	97	29
Untreated	0	0	0	0	12
CV		8	27	10	22
LSD(P=0.05)		7	5	9	7

Cool, wet conditions after application promoted exceptional control of wild oat with triallate but also enhanced wheat injury with all treatments. Injury was not visible June 23. Triallate provided 94 and 98% control of wild oat at the two evaluations. Addition of GWN 3045, GWN 3047, or GWN 3060 did not improve control of wild oat, but GWN 3045 and GWN 3060 with triallate caused more wheat injury than triallate alone. By greatly reducing wild oat competition early in the season, yield potential was preserved and wheat yield with treatments containing triallate was 28 to 34 bu/A.

Preplant flucarbazone in wheat. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 29. Treatments, 7 days before seeding (DBS), were applied to soil on April 22 with 48° F, 13% RH, 100% cloud cover, 20 mph wind at 315°, and dry soil at 38° F. Pre-emergence (Pre) treatments were applied to soil on May 6 with 75° F, 5% RH, 0% cloud cover, and 1 to 3 mph wind at 180°. Post treatments were applied to three-leaf wheat, one- to two-leaf yellow foxtail and wild oat, 3- to 8-inch Canada thistle, and two- to five-leaf wild mustard on June 3 with 71° F, 76% RH, 100% cloudcover, 5 to 7 mph wind at 80°, and moist soil at 61° F. All treatments were applied with a backpack sprayer delivering 35 (Pre and Post) or 40 (7DBS) psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

			6/22/05				7/8/05		8/4/05
Treatment	Rate	Appl	Wht	Yeft	Cath	Wimu	Yeft	Wioa	Yield
	oz/A					%			bu/A
Flucarbazone	0.28	7 DBS	4	43	0	99	86	79	8
Flucarbazone	0.42	7 DBS	4	45	0	99	84	80	7
Flucarbazone	0.28	Pre	4	40	0	99	76	87	9
Flucarbazone	0.42	Pre	0	50	0	99	74	87	9
Flcz/flcz+Salvo+NIS	0.21/0.21+4+0.25%	Pre/3L	6	59	84	99	73	93	12
Flcz/flcz+Salvo+NIS	0.28/0.14+4+0.25%	Pre/3L	8	65	83	99	74	94	10
Flcz+Salvo+NIS	0.21+4+0.25%	3L	5	60	85	99	69	91	11
Flcz+Salvo+NIS	0.28+4+0.25%	3L	5	64	86	99	73	95	13
Flcz+Salvo+NIS	0.42+4+0.25%	3L	1	83	83	99	91	94	14
Untreated	0		0	0	0	0	0	0	10
CV			111	21	5	0	7	4	35
LSD (P=0.05)			6	16	3	1	7	5	5

Control of yellow foxtail and wild oat with flucarbazone applied to soil has been inconsistent in previous research. Sometimes the system works well, and other times it is difficult to notice any symptoms. In this study, flucarbazone in the soil provided good control of yellow foxtail and wild oat. Rate of flucarbazone, either 0.28 or 0.42 oz ai/A did not affect control of grasses, but the timing of application resulted in different control on July 8. Flucarbazone applied 7 DBS provided and average of 85% control of yellow foxtail, which was greater than the 75% control achieved when flucarbazone was applied Pre. Conversely, flucarbazone applied 7 DBS gave 79% control of wild oat, which was less than the 87% control with flucarbazone Pre. Flucarbazone only had activity on Canada thistle when applied Post. Flucarbazone at 0.21 to 0.42 oz/A provided 83 to 86% control of Canada thistle on June 22. Thistle control remained essentially the same at the later evaluation. Flucarbazone at all rates provided complete control of wild mustard regardless of soil or foliar application.

Prickly lettuce control with various rates of glyphosate compared to paraquat. Jenks, Markle, and Willoughby. Spring wheat was seeded May 2 near Beach, ND. Preplant (PP) treatments were applied April 21 with air temp 61F, soil temp 46F, RH 58%, and moist soil. Preemergence (PRE) treatments were applied May 4 with air temperature 71F, soil temp 51F, RH 27%, and dry soil. Prickly lettuce, which is a winter annual, was in the rosette stage at the PP or PRE application (about 1-4" diameter, 10-20 per sq ft). Both applications were made with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. Individual plots were 10 x 30 ft and replicated three times.

Glyphosate provided greater than 93% prickly lettuce control at any rate applied PP or PRE. Paraquat applied PP on April 21 provided about 83% prickly lettuce control, but provided only 49% control when applied PRE on May 4. We had speculated that colder temperatures in April might result in less Paraquat control than with the May application, but that did not occur. We believe the May 4 paraquat application may have been less effective due to larger prickly lettuce plants, which resulted in partial kill only. We observed that the growing point on many plants survived and plants were able to continue growing.

Table. Prickly lettuce control with various rates of glyphosate compared to paraquat.

Treatment[a]	Rate	Timing	Prickly lettuce Jun 16
			% control
Glyphosate	0.375 lb ae	PP	93
Glyphosate	0.56 lb ae	PP	94
Glyphosate	0.75 lb ae	PP	95
Glyphosate	1.5 lb ae	PP	97
Glyphosate	3 lb ae	PP	98
Paraquat	1.3 pt	PP	83
Glyphosate	0.375 lb ae	PRE	96
Glyphosate	0.56 lb ae	PRE	97
Glyphosate	0.75 lb ae	PRE	98
Glyphosate	1.5 lb ae	PRE	99
Glyphosate	3 lb ae	PRE	99
Paraquat	1.3 pt	PRE	49
Glyphosate + Express + NIS	0.75 lb ae + 0.1 oz + 0.125% v/v	PRE	98
Glyphosate + Express + NIS	0.75 lb ae + 0.167 oz + 0.125% v/v	PRE	98
Untreated			0
LSD (0.05)			12
CV			8

[a]*Glyphosate treatments were applied with AMS at 2.5 gal/100 gal. Paraquat treatments were applied with NIS at 0.25% v/v..*

False chamomile control in wheat. Jenks, Markle, and Willoughby. No-till durum was seeded June 6 near Lansford, ND. Herbicide treatments were applied preplant (PP) on May 20 with air and soil temperatures at 68 and 62 F, respectively, and 36% relative humidity. Postemergence (POST) on July 5 with air and soil temperatures at 83 and 70 F, respectively, and 54% relative humidity. Both applications were made with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. Individual plots were 10 x 30 ft and replicated three times. *All plots received a preplant glyphosate application with the exception of the untreated.* On May 20, false chamomile was emerging to 5 inches tall with 15-40 plants/ft^2. On July 5, surviving false chamomile was 2-6 inches tall with 0-10 plants/ft^2 in the treated plots, while false chamomile in the untreated plot was 2-3 feet tall.

The objectives of this study were to 1) determine if Express tankmixed with preplant glyphosate would provide more false chamomile control than glyphosate applied alone, and 2) compare several postemergence herbicides for false chamomile control in wheat. The first two treatments did not receive a postemergence herbicide application. In treatment 1, glyphosate was applied alone preplant. In treatment 2, glyphosate + Express was applied preplant. In treatment 3, glyphosate was applied preplant followed by Ally + 2,4-D ester applied postemergence, and so on.

Express tankmixed with glyphosate provided more false chamomile control than glyphosate alone at all evaluation dates. Ally, Express, Affinity, and WideMatch provided greater than 93% control at the August evaluation. Bronate provided fair to good control, while Clarity provided poor control.

Table. False chamomile control in wheat.

			False chamomile		
Treatment[a]	Rate	Timing	Jun 21	Jul 19	Aug 12
			% control		
Glyphosate	0.75 lb ae	PP	85	38	57
Express + NIS	0.167 oz + 0.25% v/v	PP	98	87	78
Ally + 2,4-D ester	0.1 oz + 0.75 pt	POST	85	84	99
Express + 2,4-D ester	0.167 oz + 0.75 pt	POST	84	86	100
Affinity (Harmony GT + Express) + 2,4-D ester	(0.48 oz + 0.12 oz) + 0.75 pt	POST	85	83	96
WideMatch + MCPe	1 pt + 0.5 pt	POST	88	84	93
Clarity + MCPe	2 fl oz + 0.5 pt	POST	84	68	50
Bronate Advanced	0.8 pt	POST	85	68	81
Untreated			0	0	0
LSD (0.05)			4	12	11
CV			3	10	9

[a]*Glyphosate plus AMS at 0.75 lb ae plus 2.5 gal/100 gal were applied preplant to every plot except the untreated.*

Grass Control in Wheat, Fargo. Kirk Howatt, Ronald Roach, Janet Harrington. Pre-emergence treatments were applied and 'Alsen' hard red spring wheat was seeded on April 22 with 32° F, 23% RH, 100% cloud cover with some snow occurring, wind direction was 45°, and soil was moist at 38° F. Post treatments were applied to three- to four-leaf wheat, one- to four-leaf wild oat, two-leaf to bolting wild mustard, and three- to six-leaf wild buckwheat on June 9 with 69° F, 51% RH, 30% cloud cover, 2 mph wind at 225°, and wet soil at 61° F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 or 40 psi, respectively, through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment[a]	Rate	6/23 Wioa	7/07 Wioa	8/05 Yield
	oz ai/A	%	%	bu/A
Imazamethabenz+bromoxynil&MCPA5+MSO	5+8+0.19G	20	15	7
Flucarbazone+bromoxynil&MCPA5+Basic Blend	0.32+8+1%	52	60	10
Mesosulfuron+bromoxynil&MCPA5+MSO	0.036+8+1%	75	84	12
Clodinafop-ng+bromoxynil&MCPA5	0.8+8	82	90	8
Fenoxaprop+bromoxynil&MCPA5	1.32+8	86	94	16
Tral+brox&MCPA5+Supercharge+AMS	2.9+8+0.5%+9.5	87	98	17
Pinoxaden+A12127+bromoxynil&MCPA5	0.86+0.075G+8	86	96	16
Flucarbazone / Fenoxaprop+bromoxynil&MCPA5	0.21 / 0.66+8	93	91	20
Flucarbazone / Fenoxaprop+bromoxynil&MCPA5	0.32 / 0.66+8	94	93	22
Untreated	0	0	0	8
CV		16	18	25
LSD (P=.05)		15	18	5

[a] Herbicides before the slash were applied pre-emergence. All other herbicides were applied post-emergence.

Several treatments provided greater than 90% control of wild oat on July 7, but only the treatments with flucarbazone applied PRE provided greater than 90% control of wild oat on June 23. Flucarbazone applied PRE would not have given satisfactory control of wild oat and a POST treatment was necessary. Reducing the amount of wild oat competition early in the season with PRE flucarbazone resulted in the most grain yield although weather conditions were not conducive to high yield. Flucarbazone applied POST gave only 60% control of wild oat. Mesosulfuron gave 84% control, but ACCase inhibitors provided at least 90% control of wild oat.

Weedy Grass Control in Wheat at Hettinger

Eric Eriksmoen

Reeder hard red spring wheat was seeded on April 18. Pre-emergence treatments (trts 8 and 9) were applied on April 20. Post emergence treatments were applied to 3 ½ leaf wheat and to 2 leaf wild oat on May 24 with 68°F, 36% RH, cloudy sky and 8 mph N wind. Treatments were applied with a tractor mounted CO^2 propelled plot sprayer delivering 10 gpa at 30 psi through PK-01E80 nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The experiment was a randomized complete block design with four replications. Wild oat population was 0.2 plants per ft^2. Plots were evaluated for crop injury on June 9 and for wild oat control on July 12. The trial was not harvested.

	Treatment	Product Rate	--6/9-- HRSW	7/12 Wiot
		oz/Ac	- % Control -	
1	Assert + Bronate Adv. + MSO	16 + 12.8 + 24	2	98
2	Everest + Bronate Adv. + Basic Blend	0.45 + 12.8 + 1%	0	96
3	Silverado + Bronate Adv. + MSO	1.75 + 12.8 + 1%	0	98
4	Discover NG + Bronate Adv.	12.8 + 12.8	0	98
5	Puma + Bronate Adv.	10.6 + 12.8	0	98
6	Achieve + Bronate Adv. + Supercharge + AMS	7.25 + 12.8 + 0.5% + 1%	1	98
7	Axial + A12127 + Bronate Adv.	8.2 + 9.6 + 12.8	0	98
8	Everest / Puma + Bronate Adv.	0.3 / 5.3 + 12.8	0	98
9	Everest / Puma + Bronate Adv.	0.45 / 5.3 + 12.8	2	93
10	Untreated		0	0
C.V. %			230	2.6
LSD .05			NS	3

Summary

None of the herbicide treatments caused any significant crop injury and all treatments had excellent wild oat control.

Grass Control in Wheat – Langdon 2005 (Lukach)

Alsen wheat was planted May 11 and Everest PE treatments applied May 17. The PE treatments were applied to a dry bare soil surface and 0.28 inch rain was received that night. Post treatments were applied on June 10 between 1 and 2pm. Conditions were 76F, 45RH, 12mph SE wind and a partly cloudy sky with dry foliage. Application was made with a tractor mounted CO2 sprayer with wind shield on using 8001 tips to apply 8.5 gal/a solution at 40 psi.

Grass control in wheat, Langdon, 2005

			20-Jul	30-May					
			Wioa	inju	chlor	Wioa	Wimu	Wioa	Yield
				%				plant/ft2	bu/a
Immb+Brox&MCPA5+MSO	5+8+0.19G	4 leaf	20	---	---	---	---	---	2.6
Flcz+Brox&MCPA5+Basic Blend	0.32+8+1%	4 leaf	71	---	---	---	---	---	14.7
Meso+Brox&MCPA5+MSO	0.036+8+1%	4 leaf	90	---	---	---	---	---	24.6
Clfp+Brox&MCPA5	0.8+8	4 leaf	78	---	---	---	---	---	17.4
Fenx+Brox&MCPA5	1.32+8	4 leaf	60	---	---	---	---	---	11.9
Tral+Brox&MCPA5+Supercharge+ AMS	2.9+8+0.5%+9.5	4 leaf	74	---	---	---	---	---	20.4
Pinoxaden+A12127+Brox&MCPA5	0.86+0.075G+8	4 leaf	97	---	---	---	---	---	26.6
Flcz/Fenx+Brox&MCPA5	0.21/0.66+8	PE/4lf	71	0.8	2.3	16	63	27.1	14.9
Flcz/Fenx+Brox&MCPA5	0.32/0.66+8	PE/4lf	66	3.5	6.3	35	75	25.0	13.8
Flcz/Brox&MCPA5	0.43/ 8	PE/4lf	15	13.8	20	63	83	22.6	4.6
Untreated	0		0	0	0	0	0	---	2.1
	C.V. %		22	101	34.8	37	17	24.6	30.4
	LSD 5%		17	7.3	4	17	15	7.4	5.7

WILD OAT CONTROL IN DURUM WHEAT

Wild oat control in durum wheat, Williston 2005. (Riveland and Bradbury). 'Pierce' durum wheat was planted on recrop (land cropped to durum wheat in 2004) in 7 inch rows at 90 lbs/a on April 28. The PRE treatments did not get applied. All treatments were applied on June 11 with 56 F., 78% RH, 50% clear sky and West wind at 0-2mph to 4-4.5 leaf wheat, 5-5.5 leaf wild oats, 3-4 leaf green foxtail and 1-2 inch Russian thistle. We used a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor to apply the treatments, delivering 8.6 gals/a at 30 psi through 8001vs flat fan nozzles to a 6.67 ft wide area the length of 10 by 25 ft plots. First rain received after application was 0.81 inches on June 21 The experimental design was a randomized complete block design with four replications. Wild oat density averaged 3-6 plants/ft2 and green foxtail density was about 25 plants/ft2. Plots were evaluated for crop injury on July 13 and Auguust 15. Durum was machine harvested for yield on August 23.

Treatment a	Rate	Test Weight lbs/b	Yield bus/a	Wioa Control --7/13	8/15-	Grft 7/13	Cntrl 8/15	Ruth Cntrl
				%				
Immb+Brox&MCPA5+MSO	5+8+0.19G	59.9	19.2	84	84	0	0	94
Flcz+Brox&MCPA5+BasicBlend	0.32+8+1%	60.6	19.0	96	96	95	95	97
Meso+Brox&MCPA5+MSO	0.036+8+1%	60.6	20.5	87	84	0	0	89
Clfp+Brox&MCPA5	0.8+8	60.8	24.1	99	98	88	90	94
Fenx+Brox&MCPA5	1.32+8	61.4	20.8	93	93	99	98	97
Tral+Brox&MCPA5+SuperC+AMS	2.9+8+0.5%+9.5	60.6	25.3	97	93	55	33	89
Pinoxaden+A12127+Brox&MCPA5	0.86+0.075G+8	60.4	27.1	99	99	90	76	85
Fenx+Brox&MCPA5	0.66+8	60.1	18.9	97	95	99	96	98
Untreated	0	58.8	13.6	0	0	0	0	0
EXP MEAN		60.3	21.4	85	84	62	59	84
C.V. %		.8	18.1	5	6	4	12	6
LSD 5%		1.1	5.6	6	7	4	10	7

Summary: No crop injury from any treatment was noted. Generally all treatments gave good control of wild oats which resulted in yield increases. Yields were the highest from plots where pinoxaden and tralkoxydim were applied.
fast control and a high degree of wild oat control quickly gave the best yield increase compared to the untreated check.

Wild Oat Control with Pinoxaden tank-mixes. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 69° F, 61% RH, 40% cloud cover, 2 to 5 mph wind at 225°, and wet soil at 65° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Soil type was silty clay with 7.5 pH and OM of 5%. Study coordinates were N 46.92819, W 096.85891.

Treatment	Rate	6/26 Wioa	7/01 Wioa	7/15 Wioa	8/03 Wioa	8/05 Yield
	oz ai/A			%		bu/A
Pinoxaden+A12127	0.86+0.07G	90	93	99	99	19
Pinoxaden+brox&MCPA5+A12127	0.86+8+0.07G	92	95	99	99	18
Pinoxaden+thif&trib+A12127	0.86+0.3+0.07G	92	93	98	99	19
Fenoxaprop	1.32	92	95	99	99	15
Fenoxaprop+bromoxynil&MCPA5	1.32+8	86	90	94	94	16
Fenoxaprop+thif&trib	1.32+0.3	88	92	98	98	17
Flucarbazone+Quad 7	0.31+1%	73	78	90	89	14
Flcz+brox&MCPA5+Quad 7	0.31+8+1%	74	75	85	84	12
Flcz+thif&trib+Quad 7	0.31+0.3+1%	80	84	94	94	18
Untreated	0	0	0	0	0	14
CV		3	2	3	3	22
LSD(P=0.05)		3	3	4	4	5

Pinoxaden alone provided 90% control of wild oat on June 26, which was similar to fenoxaprop alone at 92% but greater than flucarbazone alone at 73%. Pinoxaden control of wild oat was not antagonized by bromoxynil&MCPA5 or thifensulfuron&tribenuron, resulting in complete control of wild oat by July 15. Bromoxynil&MCPA5 reduced control of wild oat with fenoxaprop by 5 to 6 percentage points at each evaluation and reduced control with flucarbazone at later evaluations by 3 to 5 points. As was observed in some of the yellow foxtail studies this year, thifensulfuron&tribenuron often enhanced the control of wild oat with fenoxaprop or flucarbazone. Moist soil conditions may have influenced this response, which was opposite of the effect of thifensulfuron&tribenuron in previous studies.

Grass Herbicide for Wild Oat Control in Wheat. (Terry D. Gregoire, 2005) Spring wheat planted in early May was sprayed June 16th between 1:30 pm and 2:30 pm near Langdon, North Dakota. The temperature during application was 75°F, relative humidity near 50%, and partly cloudy sky. The leaf stages of the wheat and wild oat were: wheat 4 ½ leaf, and wild oat 4-5 leaf. Treatments were applied with a CO_2 pressurized back pack sprayer using 8.5 gpa at 40 psi and 8001 nozzles. Treatments were arranged in RCBD and replicated 4 times. Treatment evaluation date was 20th, 2005. No wheat injury was observed at a July 5th observation.

Trt No.	Treatment Name	Rate Unit	July 20 Wild Oat % control
1	Untreated		
2	Axial A121127s	8.2 OZ/A 9.6 oz/a	98
3	Axial A121127s Bronate Advanced	8.2 OZ/A 9.6 oz/a 0.8 pt/A	92
4	Axial MCPA ester Harmony Extra A121127s	8.2 OZ/A 0.5 pt/A 0.3 oz wt/A 9.6 oz/a	98
5	Puma	0.5 pt/A 1.8	74
6	Puma Bronate Advanced	0.5 pt/A 2.8 0.8 pt/A	21
7	Everest NIS	0.4 oz wt/A 0.25 % v/v	28
8	Everest Bronate Advanced	0.4 oz wt/A 0.8 pt/A	40
9	Silverado Destiny	1.78 oz wt/A 1.5 pt/A	73
10	Silverado Bronate Advanced Destiny	1.78 oz wt/A 0.8 pt/A 15 pt/A	63
	LSD		16.7
	CV		19.7

The wild oat density was greater > 30 plants ft^2. The site is located in an area where multiple wild oat resistance types have been recorded in the past. The area was sampled for resistance again this year. Axial gave good control alone and with combinations and was significantly better than other herbicides tested. Puma was antagonized with Bronate Advanced due to below label rate used for wild oat and possible interaction with resistant wild oat. Everest control was not acceptable perhaps due to resistance and wild oat were larger than desired for Everest application. Wild oat resistance to Acc-ase and ALS types of chemistry were verified in 2003 in the area.

Wild oat control in barley with pinoxaden. Jenks, Markle, and Willoughby. 'Robust' barley was seeded April 21 at 80 lb/A into 7.5-inch rows. Herbicide treatments were applied postemergence (POST) on May 24 and one week later on May 31 with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. On May 24, barley and wild oat were both at the 3-3.5 leaf stage; wild oat density was approximately 50-100 plants/ft^2. Air and soil temperatures were 70 and 60 F, respectively, and relative humidity was 36%. On May 31, air and soil temperatures were 70 and 63 F, respectively, and relative humidity was 50%. Individual plots were 10 x 30 ft and replicated three times.

Pinoxaden is a new grass herbicide that may be available in 2006 for wild oat control in barley and wheat. The trade name for pinoxaden will be "Axial". The objective of this study was to compare pinoxaden to Puma and Everest. We included Everest in the trial for comparison even though it is not labeled for use in barley. At the August evaluation, pinoxaden alone provided 93% wild oat control, but slightly less control when tankmixed with Bronate or Harmony Extra. Puma applied alone provided 85% wild oat control, but was reduced to 66% when tankmixed with Bronate. Everest applied alone or with Bronate or Harmony Extra provided 76-78% wild oat control. Pinoxaden and Puma treatments caused some initial crop injury, but by June 15 injury was no longer visible. As would be expected with barley, Everest caused severe crop injury.

Table. Wild oat control in barley with pinoxaden.

			Barley				Wild oat		
Treatment[a]	Rate	Timing	May 31	Jun 15	Jun 28	Aug 5	Jun 15	Jun 28	Aug 5
			% injury				% control		
Untreated			0	0	0	0	0	0	0
Pinoxaden + Adjuvant / Bronate	0.86 oz ai + 0.6 pt/ 0.8 pt	POST/ +7 day	8	0	0	0	96	94	93
Pinoxaden + Adjuvant + Bronate	0.86 oz ai + 0.6 pt + 0.8 pt	POST	15	0	0	0	94	90	87
Pinoxaden + Adjuvant + Harm Ex	0.86 oz ai +0.6 pt + 0.4 oz	POST	8	0	0	0	92	90	90
Puma / Bronate	0.67 pt/ 0.8 pt	POST/ +7 day	19	0	0	0	91	85	85
Puma + Bronate	0.67 pt + 0.8 pt	POST	20	0	0	0	69	69	66
Puma + Harm Ex + NIS	0.67 pt + 0.4 oz + 0.25% v/v	POST	11	0	0	0	81	79	79
Everest + NIS / Bronate	0.45 oz + 0.25% v/v + 0.8 pt	POST/ +7 day	48	63	48	15	79	81	78
Everest + Bronate	0.45 oz + 0.8 pt	POST	48	63	45	15	78	83	76
Everest + Harm Ex + NIS	0.45 oz + 0.4 oz + 0.125% v/v	POST	50	63	47	15	79	80	76
LSD (0.05)			4	3	5	—	6	8	8
CV			10	8	22	0	5	6	7

[a]*Bronate = Bronate Advanced, Harm Ex = Harmony Extra XP.*

Pinoxaden Control of Wild Oat, Ada MN. Kirk Howatt, Ronald Roach, and Janet Harrington. Hard red spring wheat was seeded. Treatments were applied to four- to five leaf wheat and two- to five- leaf wild oat on June 10 with 75°F, 29% RH, 75% cloud cover, 3 to 4 mph wind at 45°, moist soil at 75°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Soil type was silty clay with 8 pH and OM of 6%. Study coordinates were N 47.33369, W 096.51202. Previous herbicides used were glyphosate, Clodinafop, and clethodim.

Treatment	Rate	7/02 Wioa	7/15 Wioa	7/29 heads
	oz ai/A		%	no./m^2
Pinoxaden+A12127	0.86+0.07G	97	98	0.5
Clodinafop+DSV	0.8+0.08G	96	92	1.9
Tralkoxydim+Supercharge+AMS	2.9+0.5%+9.5	98	94	2.0
Clethodim+PO	2+1%	99	99	0.1
Mesosulfuron+MSO	0.045+2%	96	89	2.6
Imazamox+MSO	0.75+2%	95	98	0.2
Flucarbazone+NIS	0.28+0.25%	30	18	27.5
Fenoxaprop	1.32	92	93	1.1
Untreated	0	0	0	41.2
CV		10	6	77
LSD (P=.05)		11	7	9.6

This experiment was established in an area with suspected resistance in the wild oat population. Activity of all herbicides was exceptional except for flucarbazone, which gave less than 20% control on July 15. Pinoxaden, clethodim and imazamox provided 98 to 99% control of wild oat on July 15. The farmer accidentally sprayed the study with clodinafop at 0.8 oz ai/A. This may explain why so many of the treatments provided greater than 90% control when there was suspected resistance. Wild oat from this site survived fenoxaprop, clodinafop, tralkoxydim, quizalofop, mesosulfuron, and imazamethabenz in the greenhouse.

Pinoxaden Control of Wild Oat, Ayre ND. Kirk Howatt, Ronald Roach, Janet Harrington. Hard red spring wheat was seeded. Treatments were applied to four-leaf wheat and three-leaf wild oat on June 10 with 62°F, 77%RH, 100% cloud cover, 5 mph wind at 90°. and moist soil at 62°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with 3 replicates. Soil type was loam with 7.3 pH and OM of 3%. Study coordinates were N47.05938, W 097.53537. Previous herbicides used starting with most recent were flucarbazone, imazethapyr, Clodinafop, glyphosate, and Clodinafop.

Treatment	Rate	7/02 Wioa	7/15 Wioa	7/29 heads
	oz ai/A		%	no./m^2
Pinoxaden+A12127	0.86+0.07G	99	99	0
Clodinafop+DSV	0.8+0.08G	99	99	0
Tralkoxydim+Supercharge+AMS	2.9+0.5%+9.5	99	99	0
Clethodim+PO	2+1%	99	99	0
Mesosulfuron+MSO	0.045+2%	99	99	0
Imazamox+MSO	0.75+2%	99	99	0
Flucarbazone+NIS	0.28+0.25%	99	99	0
Fenoxaprop	1.32	99	99	0
Untreated	0	0	0	12
CV		0	0	74
LSD (P=.05)		0	0	2

This experiment was established in an area with previously confirmed resistant wild oat. All treatments provided complete control of wild oat.

Wild Oat Control in Wheat – Langdon 2005 (Lukach)

Alsen wheat was planted May 11. Post treatments were applied on June 10 between 4 and 5pm to 4 leaf wheat. Conditions were 70F, 44RH, 14mph SE wind and a partly cloudy sky with dry foliage. Application was made with a tractor mounted CO2 sprayer, with wind shield on, using 8001 tips to apply 8.5 gal/a solution at 40 psi. The site became too wet to tractor apply a general broadleaf herbicide timely so no application was made.

Wild Oat Control In HRSW, Langdon, 2005

		Jun 18			Jul 20		Test
		Wioa	Wht	Foba	Wioa	Yield	Weight
		——— % ———				bu/a	lb/bu
Pinoxaden+A12127	0.86+0.07G	93	0	0	99	36.5	58.6
Clodinafop+DSV	0.8+0.08G	94	0	1	94	37.5	60.0
Tralkozydim+Supercharge+AMS	2.9+0.5%+9.5	63	1	0	75	26.7	58.9
Clethodim+PO	2+1%	99	99	69	98	---	---
Mesosulfron+MSO	0.045+2%	71	6	5	95	32.8	58.6
Imazamox+MSO	0.28+0.25%	73	73	60	95	---	---
Fenoxaprop	1.32	63	18	0	84	32.4	59.5
Untreated	0	0	0	0	0	4.7	---
Flucarbazone+NIS	0.5+0.25%	63	11	13	95	35.7	59.7
	C.V. %	17	54	60	8	20.4	1.6
	LSD 5%	17	18	14	10	NS	NS

Broadleaf tank mixes with reduced Clodinafop rate. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to four-leaf wheat and one- to five-leaf wild oat on June 9 with 69° F, 61% RH, 40% cloud cover, 2 to 5 mph wind at 225°, and wet soil at 65° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/23 Wioa	7/07 Wioa
	oz ai/A	%	
Clodinafop-ng	0.8	90	99
Clfp-ng+PO	0.54+0.5%	89	99
Clfp-ng+brox&MCPA5	0.8+8	82	99
Clfp-ng+brox&MCPA5+PO	0.54+8+0.5%	84	98
Clfp-ng+brox&MCPA	0.8+8	84	98
Clfp-ng+brox&MCPA+PO	0.54+8+0.5%	81	98
Clfp-ng+brox&2,4-D	0.8+9	84	99
Clfp-ng+brox&2,4-D+PO	0.54+9+0.5%	82	96
Clfp-ng+thif&trib+flox&MCPA	0.8+0.22+8	85	99
Clfp-ng+thif&trib+flox&MCPA+PO	0.54+0.22+8+0.5%	83	97
Clfp-ng+dicamba+carf	0.8+1.5+0.128	84	98
Clfp-ng+dica+carf+PO	0.54+1.5+0.128+0.5%	79	96
Untreated	0	0	0
LSD (P=0.05)		3	2
CV		3	1

All broadleaf herbicides antagonized activity of clodinafop at 0.8 and 0.54 oz ai/A, resulting in 80 to 85% control of wild oat rather than 90% control on June 23. By July 7, all herbicide treatments provided 96 to 99% control. Antagonism could be numerically detected but would not be practical in the crop environment.

Antagonism with Bromoxynil&MCPA formulations. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 58° F, 62% RH, 50% cloud cover, 5 mph wind at 225°, wet soil at 61° F. Treatments were applied with a backpack sprayer delivering 8.5 gap at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		Wioa	
Treatment	Rate	6/23	7/07
	oz ai/A	%	
Clodinafop-ng	0.54	89	99
Clfp-ng+brox&MCPA	0.54+8	86	99
Clfp-ng+brox&MCPA	0.54+12	80	99
Clfp-ng+brox&MCPA5	0.54+8	81	98
Clfp-ng+brox&MCPA5	0.54+12	82	97
Fenoxaprop	1	86	99
Fenx+brox&MCPA	1+8	82	91
Fenx+brox&MCPA	1+12	79	90
Fenx+brox&MCPA5	1+8	81	93
Fenx+brox&MCPA5	1+12	81	87
CV		3	3
LSD (P=0.05)		3	4

Intended to exaggerate antagonism, this study was established with reduced rates of clodinafop and fenoxaprop and a standard and high rate of 4 and 5 pound bromoxynil&MCPA products. Antagonism of both grass herbicides was observed on June 23. The 5 pound formulation of Bromoxynil&MCPA5 was more antagonistic to clodinafop than the 4 pound formulation when products were applied at 8 oz ai/A equivalents. But this was a difference in speed of symptom development as all treatments containing clodinafop provided at least 97% control of wild oat on July 7. Fenoxaprop control of wild oat was reduced to 79 to 82% by bromoxynil products on June 23. Antagonism of fenoxaprop was still observed with bromoxynil products on July 7. Antagonism was slightly more with 12 oz/A of the 5 pound formulation than with 8 oz/A, but the 4 and 5 pound formulations resulted in similar antagonism at similar rate.

Antagonism of Grass Control by Thifensulfuron&Tribenruon Tankmixes. Kirk Howatt, Ronald Roach, Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 69° F, 51% RH, 30% cloud cover, 2 mph wind at 225°, wet soil at 61° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Wioa	
		7/01	7/22
	oz ai/A	%	
Fenoxaprop+thif&trib	1+0.3	91	97
Clodinafop-ng+thif&trib	0.8+0.3	95	97
Flucarbazone+thif&trib+2,4-D LV4	0.28+0.3+2	78	74
Fenx+brox&MCPA5	1+8	87	81
Clfp-ng+brox&MCPA5	0.8+8	95	97
Flcz+brox&MCPA5	0.28+8	78	70
Fenx+thif&trib+brox&MCPA5	1+0.3+8	83	74
Clfp-ng+thif&trib+brox&MCPA5	0.8+0.3+8	92	96
Flcz+thif&trib+brox&MCPA5+2,4-D LV4	0.28+0.3+8+2	79	75
Fenx+thif&trib+clpy&fluroxypyr	1+0.3+2	94	98
Clfp-ng+thif&trib+clpy&flox	0.8+0.3+2	91	95
Flcz+thif&trib+clpy&flox+2,4-D LV4	0.28+0.3+2+2	87	80
Fenx+thif&trib+flox	1+0.3+1	94	96
Clfp-ng+thif&trib+fluroxypyr	0.8+0.3+1	94	98
Flcz+thif&trib+flox+2,4-D LV4	0.28+0.3+1+2	0	0
CV		5	7
LSD (P=0.05)		6	8

Fenoxaprop provided 96 to 98% control of wild oat on July 22 when tank-mixed with thifensulfuron&tribenuron, thifensulfuron&tribenuron plus clopyralid&fluroxypyr, or thifensulfuron&tribenuron plus fluroxypyr. Bromoxynil&MCPA5 antagonized fenoxaprop activity, resulting in 81% control, but fenoxaprop gave only 74% control of wild oat when combined with thifensulfuron&tribenuron and bromoxynil&MCPA5. Antagonism was accentuated in this study because the rate of fenoxaprop was reduced from the label recommendation. The rate used was equivalent to 0.5 pt/A Puma and demonstrates the risk of reducing herbicide rates, especially when broadleaf herbicides are included. Clodinafop provided 95 to 98% control of wild oat across all broadleaf tank-mix treatments, showing that clodinafop is very active on wild oat and not very susceptible to antagonism when applied at the labeled rate. Flucarbazone control of wild oat did not exceed 80% on July 22. Tank-mixes with flucarbazone generally gave similar control, except flucarbazone plus thifensulfuron&tribenuron with fluroxypyr and 2,4-D could not be discerned from the check strips in between the plots.

Broadleaf tank mixes with reduced Fenoxaprop rate. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to four-leaf wheat and one- to five-leaf wild oat on June 9 with 75° F, 46% RH, 10% cloud cover, 2 mph wind at 225°, wet soil at 61° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/23 Wioa	7/07 Wioa
	oz ai/A	%	
Fenoxaprop	1.32	87	98
Fenx	1	85	98
Fenx+PO	1+0.5%	83	98
Fenx+brox&MCPA5	1.32+8	80	94
Fenx+brox&MCPA5	1+8	80	90
Fenx+brox&MCPA5+PO	1+8+0.5%	76	88
Fenx+brox&2,4-D	1.32+9	78	89
Fenx+brox&2,4-D	1+9	74	84
Fenx+thif&trib-H+flox&MCPA	1.32+0.22+8	84	98
Fenx+thif&trib-H+flox&MCPA	1+0.22+8	80	93
Fenx+thif&trib-H+flox&MCPA+PO	1+0.22+8+0.5%	81	94
Fenx+dicamba+carf+NIS	1.32+1.5+0.128+0.25%	79	94
Fenx+dica+carf+NIS	1+1.5+0.128+0.25%	74	89
Untreated	0	0	0
CV		4	3
LSD (P=0.05)		4	4

On July 7, fenoxaprop alone at 1.32 or 1 oz ai/A provided 98% control of wild oat. When broadleaf herbicides were included, the 1 oz/A rate of flucarbazone provided 4 to 6 percentage points less control of wild oat. Broadleaf herbicides antagonized the control of wild oat with fenoxaprop. Bromoxynil&2,4-D was slightly more antagonistic to fenoxaprop activity than bromoxynil&MCPA, resulting in 84% control with 1 oz/A fenoxaprop. Additional adjuvant with the reduced rate of fenoxaprop did not improve overall control of wild oat.

Wild Oat Control with Fenoxaprop. Kirk Howatt, Ronald Roach, Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 75° F, 46% RH, 10% cloud cover, 2 mph wind at 225°, and wet soil with 61° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/23 Wioa	7/01 Wioa	7/07 Wioa	8/03 Wioa	8/05 Yield
	oz ai/A			%		bu/A
Fenoxaprop	1.32	85	92	96	96	39
Fenoxaprop+bromoxynil&MCPA5	1.32+8	79	88	94	95	18
Fenx+brox&MCPA5+clpy&flox	1.32+6+1.5	80	88	94	94	17
Fenx+brox&MCPA5+thif&trib	1.32+6+0.1	80	87	92	95	16
Fenx+thif-sg+flox	1.32+0.15+1	84	90	94	95	19
Fenx+clpy&flox+Sword	1.32+2.25+5.7	81	89	89	92	15
Fenx+clpy&flox+thif&trib	1.32+2.25+0.1	86	92	96	97	17
Untreated	0	0	0	0	0	13
CV		3	3	5	3	79
LSD (P=0.05)		3	3	6	4	22

Waterlogged soils greatly influenced the yield of plots and led to a large LSD compared to treatment means. However, fenoxaprop alone resulted in yield that was greater than yield with tank-mixes possibly indicating that broadleaf herbicides contributed to injury to wheat that was not visibly detected. Fenoxaprop alone or with clopyralid&fluroxypyr and thifensulfuron&tribenuron or thifensulfuron and fluroxypyr provided similar weed control across evaluations, but wheat treated with fenoxaprop alone produced more grain than the other two treatments. Clopyralid&fluroxypyr and Sword was the only combination that antagonized fenoxaprop activity on July 7, although control of wild oat was 89%. Bromoxynil&MCPA5 was the most antagonistic of fenoxaprop activity on June 23, resulting in 79% control.

Wild Oat Control with Mesosulfuron. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 75° F, 46% RH, 10% cloud cover, 2 mph wind at 225°, and wet soil at 6° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/23 Wioa	7/01 Wioa	7/07 Wioa	8/03 Wioa	8/05 Yield
	oz ai/A			%		bu/A
Mesosulfuron+MSO	0.036+0.19G	74	79	88	86	17
Mesosulfuron+Quad 7	0.036+1%	73	76	88	85	18
Mess+brox&MCPA5+MSO	0.036+8+0.19G	71	74	88	88	12
Mess+brox&MCPA5+Quad 7	0.036+8+1%	71	75	88	88	14
Mess+Sword+clpy&flox+MSO	0.036+3.8+2.25+0.19G	73	74	89	86	13
Mess+Sword+clpy&floxr+Quad 7	0.036+3.8+2.25+1%	74	78	89	89	16
Mess+thif-sg+clpy&flox+MSO	0.036+0.22+2.25+0.19G	73	76	88	86	12
Mess+thif-sg+clpy&flox+Quad 7	0.036+0.22+2.25+1%	71	76	89	88	14
clfp-ng+brox&MCPA5	0.8+8	88	94	99	99	14
AE F130081+brox&MCPA5+MSO	0.25+8+0.19G	80	85	93	91	13
AE F130081+brox&MCPA5+Quad 7	0.25+8+1%	76	79	89	89	14
Untreated	0	0	0	0	0	11
CV		6	5	3	3	29
LSD (P=0.05)		6	5	3	3	6

Mesosulfuron treatments were slow to control wild oat. All mesosulfuron treatments gave similar control of wild oat within each evaluation regardless of broadleaf tank-mix partner or adjuvant type. Clodinafop consistently provided better control but did not result in increased yield. AE F130081 tended to give better control of wild oat than mesosulfuron but did not provide as good of control as clodinafop.

SILVERADO ON DURUM WHEAT

Wild oat control in durum with Silverado, Williston 2005. (Neil Riveland). 'Pierce' durum wheat was planted on recrop (land cropped to durum wheat in 2004) in 7 inch rows at 90 lbs/a on April 28. The treatments were applied on June 13 to 5-leaf wheat, 5- 5.5 leaf wild oats beginning at 1:55pm with 68 F, 47% RH, 10% clear sky and 3-5 mph ESE wind and moist topsoil at 68 F. The crop and wild oats were 7-8 inches tall at application.We used a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor to apply the treatments, delivering 10 gals/a at 40 psi through 8001vs flat fan nozzles to a 6.67 ft wide area the length of 10 by 25 ft plots. First rain received after application was 0.94 inches on June 21. The experiment was a randomized complete block design with four replications. Wild oat density was more than 10 plants/ft2. Green foxtail density was very low and was not rated. Plots were evaluated wild oat control on JuLY 13 and August 15. No crop injury was detected at any time. Durum was machine harvested for yield on August 17.

Treatment a	Product Rate b oz/a and pts/a	Crop inj. %	Wioa Control 7/13	Wioa Control 8/15	Test Wght lb/bu	Yield bus/a
			------%-----			
Untreated	0		0	0	61.0	4.6
Siverado+MSO	1.75+1.5		73	69	61.9	6.0
Siverado+Quad 7	1.75+1		69	53	61.9	4.7
Silver+Bronate Adv+MSO	1.75+0.8+1.5		71	66	62.1	6.0
Silver+Bronate Adv+Quad 7	1.75+0.8+1%vv		76	75	62.0	6.1
Sil+MCPA+Widematch+MSO	1.75+0.5+0.75+1.5		81	74	62.2	7.1
Sil+MCPA+Widematch+Quad 7	1.75+0.5+0.75+1%vv		75	66	63.0	6.4
Sil+HarmonyGT+Wide+MSO	1.75+0.3+0.75+1.5		69	56	63.0	4.2
Sil+HarmGT+Wide+Quad 7	1.75+0.3+0.75+1%vv		73	61	61.9	5.1
AE F13...+BronAdv+MSO	1.75+0.8+1.5		83	81	63.2	7.7
AE F13...+BronAdv+Quad 7	1.75+0.8+1%vv		83	86	62.8	7.0
Discover NG+Bronate Adv	0.8+0.8		99	95	62.8	9.7
Puma 1 EC	0.654		99	97	62.6	8.8
Puma 1 EC+Bronate Adv	0.654+0.8		93	91	63.3	7.9
Puma 1 EC+Affinity+Wide	0.654+0.2+0.75		99	97	63.0	10.0
EXP MEAN			76	71	62.4	6.8
C.V. %			6	10	.8	25.6
LSD 5%			7	10	1.1	2.5

a - Silvrdo and Sil = Silverado. AE F13...= AE F130081 01 OD23 A2
BronAdv = Bronate Advanced. Wide=Widematch
MSO - a methylated seed oil adjuvant from Loveland.
Quad 7 - a basic pH blend adjuvant from AGSCO.
b - Silverado, Harmony GT and Affinity in weight oz/a.
AE F13...in fluid oz/a. All others in pints/a

Heavy wild oat infestation caused yield reductions. Because of weather conditions the treatments were not applied at the ideal time of application. Wild oats were in the 5 leaf stage and considerable crop competition had already taken place.

Silverado for Wild Oat Control in Spring Wheat (Terry D. Gregoire, 2005) Durum wheat was planted April 25. Wheat was sprayed May 23rd between 7:20 am and 8:20 am near Minnewaukan, North Dakota. The temperature during application was 63 °F, relative humidity near 65%, with partly cloudy sky. The leaf stages of the wheat and weeds were: wheat 3 ½ leaf, wild oat 2-4 leaf. Treatments were applied with a CO_2 pressurized back pack sprayer using 8.5 gpa at 40 psi and 8001 nozzles. Treatments were arranged in RCBD and replicated 4 times. Treatment evaluation dates were June 21, and July 12, 2005. No wheat injury was observed.

Trt	Treatment	Rate		June 21 Wild Oat	July 12 Wild Oat
No.	Name	Rate	Unit	% control	% control
1	untreated			14	0
2	Silverado	1.78	OZ/A	75	96
	Destiny	1.5	PT/A		
3	Silverado	1.78	OZ WT/A	83	95
	Quad 7	1%	V/V		
4	Silverado	1.78	OZ WT/A	61	96
	Bronate Advanced	0.8	PT/A		
	Destiny	1.5	PT/A		
5	Silverado	1.78	OZ WT/A	74	96
	Bronate Advanced	0.8	PT/A		
	Quad 7	1%	V/V		
6	Silverado	1.78	OZ WT/A	75	92
	Mcpa Ester	0.75	PT/A		
	Widematch	0.665	PT/A		
	Destiny	1.5	Pt/A		
7	Silverado	1.78	OZ WT/A	88	95
	Mcpa Ester	0.75	PT/A		
	Widematch	0.665	PT/A		
	Quad 7	1%	V/V		
8	Silverado	1.78	OZ WT/A	70	94
	Harmony GT	0.4	OZ WT/A		
	Widematch	0.665	PT/A		
	Destiny				
9	Silverado	1.78	OZ WT/A	61	83
	Harmony GT	0.4	OZ WT/A		
	Widematch	0.75	PT/A		
	Quad 7	1%	V/V		
10	Ae F130081	1.75	OZ/A	84	95
	Bronate Advanced	0.8	PT/A		
	Destiny				
11	Ae F130081	1.75	OZ/A	90	100
	Bronate Advanced	0.8	PT/A		
	Quad 7	1%	V/V		
12	Discover NG	0.8	PT/A	84	93
	Bronate Advanced	0.8	PT/A		
13	Puma	0.654	PT/A	76	89
14	Puma	0.654	PT/A	80	89
	Bronate Advanced	0.8	PT/A		
15	Puma	0.654	PT/A	81	84
	Affinity Tankmix	0.2	OZ WT/A		
	Widematch	0.76	PT/A		
	LSD			27.6	6
	CV			19.3	4.9

Silverado performed well at the July 20th evaluation. The Silverado, Harmony GT, Widematch and Quad 7 treatment was significantly lower for wild oat control than other Silverado treatments. The AE130081 formulation was not different for wild oat control when compared to similar Silverado treatments.

Wild oat control with Mesosulfuron. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wioa on June 9 with 67° F, 54% RH, 10% cloud cover, 3 to 6 mph wind at 225°, and wet soil with 60° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 flat fan nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	AVEFA 6/23/05	AVEFA 7/7/05
	oz ai/A	%	
Mesosulfuron+Destiny	0.036+1%	71	83
Mesosulfuron+Destiny	0.027+1%	78	84
Mesosulfuron+Destiny	0.018+1%	74	72
Mesosulfuron+Destiny	0.009+1%	53	73
Mesosulfuron+Prime Oil+AMS	0.027+1%+0.5G	68	82
Mesosulfuron+Prime Oil+Alliance	0.027+1%+2%	61	81
Mesosulfuron+Prime Oil+Class Act NG	0.027+1%+2.5%	75	84
Mesosulfuron+SuperbHC+AMS	0.027+0.5%+0.5G	65	81
Mesosulfuron+SuperbHC+Alliance	0.027+0.5%+2%	74	84
Mesosulfuron+SuperbHC+Class Act NG	0.027+0.5%+2.5%	71	84
Mesosulfuron+Destiny+AMS	0.027+1%+0.5G	73	86
Mesosulfuron+Destiny+Alliance	0.027+1%+2%	73	83
Mesosulfuron+Destiny+Class Act NG	0.027+1%+2.5%	74	85
CV		7	5
LSD (P=0.05)		7	6

Wild oat control did not progress steadily with increasing mesosulfuron rate. Mesosulfuron at 0.008 and 0.018 oz ai/A both provided about 72% control, and 0.027 and 0.036 oz/A mesosulfuron provided about 83% control. Mesosulfuron at 0.027 oz/A with the various adjuvant systems provided similar control of wild oat on July 7. However, Control with mesosulfuron was inhibited by Prime Oil plus AMS, Prime Oil plus Alliance, SuperbHC plus AMS, and SuperbHC plus Class Act NG compared with Destiny. Addition of AMS, Alliance, or Class Act NG did not reduce wild oat control with mesosulfuron plus Destiny.

MESOSULFURON PLUS PROPOXYCARBAZONE ON DURUM

Wild oat control in durum with Mesosulfuron plus Propoxycarbazone, Williston 2005. (Neil Riveland).

'Pierce' durum wheat was planted on recrop (land cropped to durum wheat in 2004) in 7 inch rows at 90 lbs/a on April 28. The treatments were applied on June 11 to 4.5-leaf wheat, 5-leaf wild oats beginning at 7:12am with 54 F, 81% RH, 40% clear sky and 0-3 mph W wind and moist topsoil at 55 F. Plants were moist. The crop and wild oats were about 7 inches tall at application. We used a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor to apply the treatments, delivering 10 gals/a at 40 psi through 8001vs flat fan nozzles to a 6.67 ft wide area the length of 10 by 25 ft plots. First rain received after application was 0.94 inches on June 21. The experiment was a randomized complete block design with four replications. Wild oat density was more than 10 plants/ft2. Green foxtail density was very low and was not rated. Plots were evaluated wild oat control on July 13 and August 15. No crop injury was detected at any time. Durum was machine harvested for yield on August 17.

Treatment a	Product Rate b oz/a and pts/a	Crop inj. %	Wioa Control 7/13	8/15	Test Wght lb/bu	Yield bus/a
			------%	-----		
Untreated	0		0	0	60.3	4.0
AE 0298618 03 WG22 A1+MSO	1.76+1.5		75	71	61.8	7.3
AE 02....+Bronate Adv+MSO	1.76+0.8+1.5		73	70	62.2	7.7
AE 02....+Quad 7	1.76+0.8		80	71	62.7	7.5
AE 02....+Bronate+Quad 7	1.76+0.8+0.8		70	61	62.3	7.1
AE 02..+Bro+Widematch+MSO	1.76+0.6+0.5+1.5		75	78	62.2	8.4
AE 02..+Bro+Wide+Quad 7	1.76+0.6+0.5+0.8		71	74	62.1	8.2
Discover NG	0.8		99	98	62.7	11.8
Bronate Advanced	0.8		0	0	61.4	4.7
EXP MEAN			60	58	62.0	7.4
C.V. %			6	11	1.1	17.3
LSD 5%			5	11	NS	1.9

a - AE 02... = AE 0298618 03 WG22 A1 (Silverado+Olympus)
BronAdv and Bro = Bronate Advanced. Wide = Widematch
MSO - a methylated seed oil adjuvant from Loveland.
Quad 7 - a basic pH blend adjuvant from AGSCO.
b - AE 0298618 03 WG22 A1 in weight oz/a.
Others in pints/a

Heavy wild oat infestation caused yield reductuions. Because of weather conditions the treatments were not applied at the ideal time of application. Wild oats were in the 5 leaf stage and considerable crop competition had already taken place.

Broadleaf tank mixes with reduced flucarbazone rate. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 67° F, 54% RH, 10% cloud cover, 3 to 6 mph wind at 225°, and wet soil at 60° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/23 Wioa	7/07 Wioa
	oz ai/A	%	
Flcz+Quad 7	0.31+1%	71	91
Flcz+Quad 7	0.21+1%	71	88
Flcz+brox&MCPA5+Quad 7	0.31+8+1%	71	84
Flcz+brox&MCPA5+Quad 7	0.21+8+1%	68	86
Flcz+brox&2,4-D+Quad 7	0.31+9+1%	68	86
Flcz+brox&2,4-D+Quad 7	0.21+9+1%	61	79
Flcz+thif&trib+flox&MCPA+Quad 7	0.31+0.22+8+1%	73	88
Flcz+thif&trib+flox&MCPA+Quad 7	0.21+0.22+8+1%	68	87
Flcz+dica+carf+Quad 7	0.31+1.5+0.128+1%	71	81
Flcz+dica+carf+Quad 7	0.21+1.5+0.128+1%	69	75
Untreated	0	0	0
CV		9	6
LSD (P=0.05)		8	7

Flucarbazone alone provided an average of 90% control of wild oat. Flucarbazone at 0.31 oz ai/A was antagonized by bromoxynil&MCPA5 or dicamba plus carfentrazone, resulting in 84 and 81% control, respectively. Flucarbazone at 0.21 oz ai/A was antagonized by bromoxynil&2,4-D or dicamba plus carfentrazone, resulting in 79 and 74% control, respectively. Dicamba, the antagonistic component of dicamba plus carfentrazone, consistently reduced flucarbazone control of wild oat and presents more concern for antagonism of flucarbazone activity than bromoxynil premixes.

Flucarbazone Efficacy with Bronc Max. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded April 22. Treatments were applied to three- to four-leaf wheat and one- to five-leaf wild oat on June 9 with 58° F, 62% RH, 50% cloud cover, 5 mph wind at 225°, and wet soil at 61° F. Treatments were applied with a backpack sprayer delivering 8.3 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/23 Wioa	7/07 Wioa
	oz ai/A	%	
Flcz+brox&2,4-D	0.28+6.7	66	83
Flcz+brox&2,4-D	0.28+9	68	85
Flcz+brox&2,4-D+WE 5074	0.28+6.7+0.5%	64	85
Flcz+brox&2,4-D+WE 5074	0.28+9+0.5%	66	84
Flcz+brox&2,4-D+WE 5001	0.28+6.7+0.25%	68	81
Flcz+brox&2,4-D+WE 5001	0.28+9+0.25%	71	84
Flcz+brox&2,4-D+WE 5074+WE 5001	0.28+6.7+0.5%+0.25%	69	80
Flcz+brox&2,4-D+WE 5074+WE 5001	0.28+9+0.5%+0.25%	69	79
Flcz+brox&MCPA+Quad 7	0.28+8+0.25%	70	83
CV		8	6
LSD (P=0.05)		8	7

Flucarbazone provided similar control of wild oat regardless of broadleaf tank-mix partner or adjuvant. Control of wild oat with flucarbazone ranged from 79 to 85% control on July 7.

Pinoxaden Control of Green Foxtail. Kirk Howatt, Ronald Roach, Janet Harrington. This experiment was established in a field with suspected ACCase-resistant green foxtail near ADA, MN. Hard red spring wheat was seeded. Treatments were applied to four- to five-leaf wheat and one- to three-leaf green foxtail on June 10 with 73° F, 55% RH, 95% cloud cover, 3 mph wind at 90°, and damp soil with 73° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 8001 flat fan nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Soil type was silty clay with 7.8 pH and OM of 4%. Study coordinates were N 47.33994, W 096.61474. Previous two years of herbicide has been glyphosate on resistant soybean.

Treatment	Rate	7/2 Grft	7/15 Grft	7/29 Grft heads
	oz ai/A	%	%	no./m^2
Pinoxaden+A12127	0.86+0.07G	99	99	0.4
Clodinafop+DSV	0.8+0.08G	87	83	7.0
Tralkoxydim+Supercharge+AMS	2.9+0.5%+9.5	97	94	1.6
Clethodim+PO	2+1%	98	98	0.3
Flucarbazone+NIS	0.28+0.25%	99	99	0.0
Fenoxaprop	0.66	96	96	1.6
Untreated	0	0	0	22.5
CV		2	4	56
LSD (P=0.05)		3	5	4

Pinoxaden and flucarbazone provided 99% control of green foxtail, and flucarbazone eliminated the presence of foxtail seed heads on July 29. Fenoxaprop provided 96% control and clethodim gave 98% control which was not different from pinoxaden or flucarbazone. Tralkoxydim control of foxtail was 94%, but control with clodinafop was only 83% and a significant number of green foxtail seed heads were present.

The field population of green foxtail was largely susceptible to ACCase-inhibiting herbicides; however, some plants survived treatment, especially in the clodinafop plots, and were producing seed prior to harvest of the wheat. Greenhouse testing with seed from the field confirmed resistance at the whole-plant level in this collection although germination was very poor.

Yellow Foxtail Control with Pinoxaden Tank mixes. Kirk Howatt, Ronald Roach, Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail on June 22 with 81° F, 67% RH, 1% cloud cover, 15 mph wind at 180°, and damp sub-soil with dry top at 70° F. Treatments were applied with a backpack type sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Soil type was silty clay with 7.5 pH and OM of 5%. Study coordinates were N 46.93273, W 096.85815.

Treatment	Rate	Stg	7/11 Yeft
	oz ai/A		
Pinoxaden+A12127	0.86+0.07G	3-4 l ft	98
Pinoxaden+Brox&MCPA5+A12127	0.86+8+0.07G	3-4 l ft	95
Pinoxaden+Thif&Trib-H+A12127	0.86+0.3+0.07G	3-4 l ft	92
Fenoxaprop	0.73	3-4 l ft	98
Fenoxaprop+Brox&MCPA5	0.73+8	3-4 l ft	81
Fenoxaprop+Thif&Trib-H	0.73+0.3	3-4 l ft	93
Flucarbazone+Quad 7	0.42+1%	3-4 l ft	95
Flucarbazone+Brox&MCPA5+Quad 7	0.42+8+1%	3-4 l ft	86
Flucarbazone+Thif&Trib-H+Quad 7	0.42+0.3+1%	3-4 l ft	96
Untreated	0	3-4 l ft	0
CV			2
LSD (P=0.05)			3

Moist soil conditions and adequate rain may have increased the uptake of ALS-inhibiting herbicides and led to greater flucarbazone activity and less antagonism with thifensulfuron&tribenuron than has previously been experienced. Pinoxaden and fenoxaprop provided 98% control of yellow foxtail. This was slightly higher than the 95% control achieved with flucarbazone, but not different than 96% control with flucarbazone and thifensulfuron&tribenuron. Bromoxynil&MCPA slightly reduced yellow foxtail control with pinoxaden to 95% but substantially reduced control with fenoxaprop and flucarbazone, giving 81 and 86% control, respectively. Control with tank-mixes of thifensulfuron&tribenuron, which is typically antagonistic to ACCase inhibitors, was between 92 and 96%.

Foxtail control in HRS wheat, Carrington, 2005. (Greg Endres) The dryland study was conducted on a loam soil with 7.2 pH and 3.4% organic matter at the NDSU Carrington Research Extension Center. The experimental design was a randomized complete block with three replicates. An NDSU experimental HRS wheat line was planted on May 15. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 30 psi through 8001 flat-fan nozzles to the center 6.7 ft of 10 by 25 ft plots. Treatments were applied on June 7 with 62 F, 84% RH, 100% cloudy sky, and 10 mph wind to 4-leaf wheat and 1- to 4-leaf yellow foxtail. Average wheat density in untreated plots was 44plants/ft^2 and yellow foxtail density was 13 plants/ft^2. The trial was harvested with a plot combine on August 28.

		Yeft control		HRS wheat			
Herbicide		6/24	7/8	Injury		Seed	Test
Treatment	Product rate			6/24	7/8	yield	weight
	fl oz/A	---------% -------		--------% ------		bu/A	lb/bu
Pinoxaden+A12127S	8.2+9.6	94	94	0	0	32.8	54.5
Pinoxaden+A12127S+Wolfpack	8.2+9.6+12.8	94	94	0	0	31.7	53.9
Pinoxaden+A12127S+Harmony Extra+MCPAe	8.2+9.6+0.3 oz+8	89	91	0	0	32.5	54.9
Puma	8	85	84	0	0	31.9	55.0
Puma+Wolpack	8+12.8	70	72	0	0	33.3	55.2
Everest+NIS	0.6 oz+0.25% v/v	75	75	3	2	34.3	54.7
Everest+Wolfpack	0.6 oz+12.8	68	61	0	0	32.1	54.6
Untreated	0	0	0	0	0	30.5	54.7
LSD (0.05)		6	13	NS	NS	NS	NS

Yellow foxtail control was 89 to 94% with pinoxaden treatments. Foxtail control was not antagonized with broadleaf herbicide tank mixtures with pinoxaden. Short-term crop flash was noted in some plots treated with pinoxaden (data not shown). Slight wheat injury occurred with Everest. Wheat yield and test weight did not differ among treatments, likely due to a competitive wheat crop (excellent crop density with good vigor) and light to medium foxtail density.

Yellow Foxtail Control with Fenoxaprop. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail, 1st trifoliolate soybeans, and two- to four-leaf wild buckwheat, common purslane, lanceleaf sage, and curly dock on June 22 with 80° F, 70% RH, 2% cloud cover, 10 to 12 mph wind at 180°, and damp sub-soil with a dry top at 70° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		7/01						7/15
Treatment	Rate	Wibw	Sobe	Copl	Llsa	Cudo	Yeft	Yeft
	oz ai/A	%						
Fenx	0.66	0	0	0	0	0	85	91
Fenx+brox&MCPA5	0.66+8	80	65	73	58	70	79	81
Fenx+brox&MCPA5+clpy&flox	0.66+6+1.5	94	90	90	92	93	86	83
Fenx+brox&MCPA5+thif&trib	0.66+6+0.1	92	80	91	94	95	84	81
Fenx+thif-sg+flox	0.66+0.15+1	86	45	84	66	86	85	88
Fenx+clpy&flox+Sword	0.66+2.25+5.7	90	71	89	93	86	88	93
Fenx+clpy&flox+thif&trib	0.66+2.25+0.1	89	73	84	88	91	80	79
Untreated	0	0	0	0	0	0	0	0
CV		5	10	5	5	5	4	7
LSD (P=0.05)		5	8	5	5	5	4	8

Bromoxynil&MCPA5 with clopyralid&fluroxypyr provided the best control of this broadleaf weed spectrum, giving 90% control or better of each weed species. For the purpose of yellow foxtail control, however, this and several broadleaf herbicide treatments antagonized foxtail control by about 10 percentage points. Fenoxaprop alone provided 91% control of yellow foxtail on July 15. Clopyralid&fluroxypyr with Sword did not antagonize fenoxaprop activity at 93% control of foxtail, and thifensulfuron with fluroxypyr did not significantly reduce fenoxaprop activity on foxtail giving 88% control. All treatments containing bromoxynil&MCPA5 gave significantly less control of yellow foxtail than fenoxaprop alone.

Yellow Foxtail Control with Clodinafop Tankmixes. Kirk Howatt, Ronald Roach, Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail on June 22 with 80° F, 67% RH, 2% cloud cover, 10 to 12 mph wind at 180° F, and damp sub-soil with dry top at 70° F. Treatments were applied with a backpack type sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Soil type was silty clay with 7.5 pH and OM of 5%. Study coordinates were N 46.93307, W 096.85848.

Treatment	Rate	7/6 Yeft	7/22 Yeft
	oz ai/A	%	
Clodinafop-ng	0.8	86	89
Clfp-ng+thif-sg+MCPA	0.8+0.375+6	79	79
Clfp-ng+brox&MCPA5	0.8+8	86	89
Clfp-ng+clpy&MCPA	0.8+9.5	70	69
Clfp-ng+clpy&flox+MCPA	0.8+3+6	58	43
Clfp-ng+flox+thif-sg	0.8+1+0.22	76	76
Clfp-ng+flox+thif&trib	0.8+1+0.3	83	81
Clfp-ng+dicamba+MCPA	0.8+1+4	65	66
Untreated	0	0	0
CV		8	11
LSD (P=0.05)		8	11

Clodinafop provided 89% control of yellow foxtail on July 22, which was equal to contro with clodinafop plus bromoxynil&MCPA5. Antagonism was not detected with the tank-mix with bromoxynil&MCPA5 at was observed when this herbicide was included with fenoxaprop in another experiment. All other combinations with broadleaf herbicides resulted in varying degrees of antagonism. Clopyralid&fluroxypyr plus MCPA was the most antagonistic resulting in 43% control of foxtail with clodinafop. Dicamba plus MCPA or clopyralid&MCPA also resulted in very poor control of foxtail with clodinafop, giving 66 and 69% control, respectively.

Yellow Foxtail Control with Affinity tank-mixes. Kirk Howatt, Ronald Roach and Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail on June 22 with 83° F, 73% RH, 0% cloud cover, 15 mph wind at 180°, and dry top-soil with damp sub-soil at 70° F. Treatments were applied with a backpack type sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/1 Yeft	7/4 Yeft	7/22 Yeft
	oz ai/A		%	
Flucarbazone+Quad 7	0.42+1%	89	92	87
Flucarbazone+thif-sg+trib-sg+Salvo	0.42+0.24+0.06+8	84	87	88
Flucarbazone+thif-sg+trib-sg+Salvo	0.042+0.15+0.15+8	85	90	89
Mesosulfuron+Quad 7	0.045+1%	78	71	51
Mesosulfuron+thif-sg+trib-sg+Quad 7	0.045+0.24+0.06+1%	85	86	83
Mesosulfuron+thif-sg+trib-sg+Quad 7	0.045+0.15+0.15+1%	86	87	78
Clodinafop-ng+NIS	1+0.25%	56	28	20
Clodinafop-ng+thif-sg+trib-sg+NIS	1+0.24+0.06+0.25%	82	78	69
Clodinafop-ng+thif-sg+trib-sg+NIS	1+0.15+0.15+0.25%	84	87	86
Fenoxaprop+NIS	1.33+0.25%	20	0	10
Fenoxaprop+thif-sg+trib-sg+NIS	1.33+0.24+0.06+0.25%	82	78	74
Fenoxaprop+thif-sg+trib-sg+NIS	1.33+0.15+0.15+0.25%	81	83	80
Untreated	0	0	0	0
CV		15	9	12
LSD (P=0.05)		15	8	10

Flucarbazone provided 87% control of yellow foxtail on July 22, and flucarbazone activity was not affected by the addition of thifernsulfuron and tribenuron. Yellow foxtail control with mesosulfuron was greater than expected at 51%, and the addition of thifensulfuron and tribenuron increased control by at least 25 percentage points. This increase was not understood but also was demonstrated with clodinafop and fenoxaprop. Wet soil conditions may have enhanced the expression of symptoms for grass activity of thifensulfuron and tribenuron by increasing uptake or inhibiting metabolism, but cool, wet conditions typically have not been advantageous for efficacy of ALS-inhibiting herbicides. Clodinafop and fenoxaprop control of yellow foxtail was not more than 20% on July 22. These ratings are remarkable since either of these herbicides provided greater than 90% control in other studies located adjacent to this experiment.

Yellow Foxtail Control with Harmony Extra Tank-mixes. Kirk Howatt, Ronald Roach, Janet Harrington. This experiment was established in a fallow area with soybean. Treatments were applied to two-to five-leaf yellow foxtail on June 22 with 83° F, 73% RH, 0% cloud cover, 15 mph wind at 180°, dry top-soil with damp sub-soil at 70° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/1 Yeft	7/6 Yeft	7/22 Yeft
	oz ai/A		%	
Flcz+Quad 7	0.42+1%	40	43	43
Flcz+thif-sg+Salvo	0.42+0.45+8	5	0	5
Flcz+thif-sg+trib-sg+Salvo	0.42+0.3+0.15+8	85	91	89
Mess+Quad 7	0.045+1%	76	76	63
Mess+thif-sg+Quad 7	0.045+0.45+1%	83	86	80
Mess+thif-sg+trib-sg+Quad 7	0.045+0.3+0.15+1%	84	87	79
Clfp-ng+NIS	1+0.25%	0	0	0
Clfp-ng+thif-sg+NIS	1+0.45+1%	74	78	68
Clfp-ng+thif-sg+trib-sg+NIS	1+0.3+0.15+1%	77	81	73
Fenx+NIS	1.33+0.25%	0	0	0
Fenx+thif-sg+NIS	1.33+0.45+1%	73	74	60
Fenx+thif-sg+trib-sg+NIS	1.33+0.3+0.15+1%	84	85	83
Untreated	0	0	0	0
CV		25	26	30
LSD (P=0.05)		19	20	21

Mesosulfuron provided 63% control of yellow foxtail on July 22, which was greater than expected. Flucarbazone gave 43% control which was les than previously achieved inother studies, but clodinafop and fenoxaprop did not appear to cause any symptoms in this study. The addition of thifensulfuron and/or tribenuron often increased control of yellow foxtail with graminicides by as much as 83 percentage points. This increase was not understood but also was demonstrated in another study. Wet soil conditions may have enhanced the expression of symptoms for grass activity of thifensulfuron and tribenuron by increasing uptake or inhibiting metabolism, but cool, wet conditions typically have not been advantageous for efficacy of ALS-inhibiting herbicides. Clodinafop and fenoxaprop control of yellow foxtail was 0% on July 22. These ratings are remarkable since either of these herbicides provided greater than 90% control in other studies located adjacent to this experiment.

Yellow Foxtail control with Thifensulfuron plus Tribenuron tank-mixes. Kirk Howatt, Ronald Roach, Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail on June 22 with 82° F, 67% RH, 3% cloud cover, 8 to 9 mph wind at180°, and dry top soil with damp subsoil at 70° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/01 Yeft	7/06 Yeft	7/19 Yeft
	oz ai/A		%	
Clodinafop-ng+NIS	1+0.25%	91	89	88
Clodinafop-ng+thif-sg+trib-sg+NIS	1+0.24+0.06+0.25%	87	85	80
Clodinafop-ng+thif+trib+NIS	1+0.24+0.06+0.25%	88	83	78
Clodinafop-ng+thif-sg+trib-sg+NIS	1+0.15+0.15+0.25%	88	84	81
Clodinafop-ng+thif+trib+NIS	1+0.15+0.15+0.25%	85	82	76
Clodinafop-ng+thif-sg+trib-sg+NIS	1+0.30+0.15+0.25%	86	84	81
Clodinafop-ng+thif+trib+NIS	1+0.30+0.15+0.25%	86	83	78
Fenoxaprop+NIS	1.33+0.25%	89	86	88
Fenx+thif-sg+trib-sg+NIS	1.33+0.24+0.06+0.25%	89	90	88
Fenx+thif+trib+NIS	1.33+0.24+0.06+0.25%	91	89	86
Fenx+thif-sg+trib-sg+NIS	1.33+0.15+0.15+0.25%	89	90	86
Fenx+thif+trib+NIS	1.33+0.15+0.15+0.25%	84	89	84
Fenx+thif-sg+trib-sg+NIS	1.33+0.30+0.15+0.25%	87	89	89
Fenx+thif+trib+NIS	1.33+0.30+0.15+0.25%	86	88	84
Untreated	0	0	0	0
CV		4	5	5
LSD (P=0.05)		5	6	6

Clodinafop and fenoxaprop provided 88% control of yellow foxtail on July 19. Addition of thifensulfuron and tribenuron did not reduce fenoxaprop activity on foxtail regardless of formulation or ratio of chemicals, but the fenoxaprop rate was greater than the typical yellow foxtail rate of 0.8 oz ai/A. Thifensulfuron and tribenuron antagonized clodinafop control of yellow foxtail by 7 to 12 percentage points, resulting in a minimum rating of 76% with the 1:1 ratio of the XP formulation. Foxtail control with clodinafop and other ratios and formulations of thifensulfuron and tribenuron was not different than clodinafop with the 1:1 ratio of the XP formulation.

Adjuvants for yellow foxtail control with flucarbazone. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail on June 22 with 79° F, 78% RH, 3% cloud cover, 8 to 10 mph wind at 180°, and dry top soil with damp subsoil at 70° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/06 Yeft	7/19 Yeft
	oz ai/A	%	
Flucarbazone+NIS	0.28+0.25%	75	63
Flucarbazone+NIS	0.42+0.25%	80	61
Flucarbazone+MSO	0.28+0.19G	82	70
Flucarbazone+MSO	0.42+0.19G	81	78
Flucarbazone+NIS+AMS	0.28+0.25%+64	64	43
Flucarbazone+NIS+AMS	0.42+0.25%+64	75	51
Flucarbazone+MSO+AMS	0.28+0.19G+64	66	45
Flucarbazone+MSO+AMS	0.42+0.19G+64	70	50
Flucarbazone+NIS+UAN	0.28+0.25%+1G	68	45
Flucarbazone+NIS+UAN	0.42+0.25%+1G	79	71
Flucarbazone+MSO+UAN	0.28+0.19G+1G	88	81
Flucarbazone+MSO+UAN	0.42+0.19G+1G	89	87
Flucarbazone+Quad 7	0.28+1%	85	80
Flucarbazone+Quad 7	0.42+1%	88	79
Flucarbazone+Renegade	0.28+1%	85	78
Flucarbazone+Renegade	0.42+1%	80	68
Flucarbazone+NIS+MSO	0.28+0.25%+0.19G	82	71
Flucarbazone+NIS+MSO	0.42+0.25%+0.19G	84	83
Flucarbazone+NIS+MSO+AMS	0.28+0.25%+0.19G+64	83	76
Flucarbazone+NIS+MSO+AMS	0.42+0.25%+0.19G+64	88	86
Fenoxaprop	0.8	87	96
Untreated	0	0	0
CV		6	15
LSD (P=0.05)		6	14

Adding a source of nitrogen was not as consistent in improving yellow foxtail control with flucarbazone as in studies last year. MSO and UAN resulted in greater than 80% control of yellow foxtail at both flucarbazone rates. AMS with NIS or MSO resulted in 40 to 50% yellow foxtail control with flucarbazone, but flucarbazone with AMS plus NIS and MSO provided 76 to 86% control depending on flucarbazone rate. Fenoxaprop provided 96% control of yellow foxtail.

Alliance rate to increase foxtail control with flucarbazone. Kirk Howatt, Ronald Roach, Janet Harrington. The experiment was established in a fallow area with soybean. Treatments were applied to two- to five-leaf yellow foxtail on June 22 with 85° F, 63% RH, 0% cloud cover, 8 to 10 mph wind at 180°, and dry top soil with damp subsoil at 76° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 1001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/06 Yeft	7/22 Yeft
	oz ai/A	%	
Flucarbazone+Destiny+AMS	0.35+1%+0.5G	89	88
Flucarbazone+Destiny+AMS	0.35+1%+1G	85	84
Flucarbazone+Destiny+Alliance	0.35+1%+0.75%	86	86
Flucarbazone+Destiny+Alliance	0.35+1%+1%	87	85
Flucarbazone+Destiny+Alliance	0.35+1%+1.25%	84	83
Flucarbazone+Destiny+Alliance	0.35+1%+1.5%	86	84
Flucarbazone+Destiny+Alliance	0.35+1%+1.75%	88	86
Flucarbazone+Destiny+Alliance	0.35+1%+2%	91	92
CV		3	4
LSD (P=0.05)		4	5

Flucarbazone provided very consistent control of yellow foxtail across nitrogen supplements and Alliance rates. All but one treatment were similar in control rating, 83 to 88% on July 22. Flucarbazone with Destiny and the Alliance at 2% was the only treatment that exceeded 90% control. Enhancement of flucarbazone activity by Alliance at 2% provided 92% control of yellow foxtail, which was greater than control with any of the other Alliance rates at 83 to 86% control.

Application Timing of Everest Herbicide in Spring Wheat at Hettinger, North Dakota, (Eriksmoen). Fall treatments (trts 5 - 12) were applied to 1 ½ leaf downy brome on October 21, 2004. Pre-plant treatments (trts 9, 12 - 17) were applied to tillering downy brome and 1 leaf Japanese brome on April 7, 2005. Pre-emergence treatments (trts 18 - 22) were applied to 1 leaf wild oats, jointing downy brome and tillering Japanese brome on April 20. Post-emergence treatments (trts 2 - 4, 10 & 11) were applied to 3 ½ leaf wheat, to 2 ½ leaf wild oats, to downy brome in the boot and to jointing Japanese brome on May 24 with 63°F, 46 % RH, cloudy sky and 8 mph NW wind. Reeder hard red spring wheat was seeded on April 18. All treatments were applied with a tractor mounted CO^2 propelled plot sprayer delivering 10 gpa at 40 psi through PK-01E80 nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The experiment was a randomized complete block design with four replications. Wild oat and cheatgrass (downy brome and Japanese brome combined) populations were 9 and 10 plants per sq. ft, respectively. Evaluations for crop injury were on June 9, and for weed control on June 23 and July 22. The trial was harvested on August 5.

Summary

Crop injury was relatively minor on all herbicide treatments. Fall treatments (trts 5,6 & 7) did not provide adequate downy brome, Japanese brome or wild oat control. Split applications, pre-plant, pre-emergence and post-emergence applications all provided excellent season long grassy weed control regardless of application rate except for the pre-plant Roundup application (trt 15) which did not provide adequate control of wild oats, the low rate post-emergence treatment (trt 2) which was weaker on downy brome and the fall/low rate pre-plant split treatment (trt 12) which also did not provide adequate control of wild oats. All treatments had significantly higher yields than the untreated check except for the lower fall applied rates (trts 5 & 6). In general, crop yields and weed control tended to increase as rates increased and with later application dates.

Treatment		Rate	Timing	June 9	6/23		July 22			8/5
				HRSW	dobr	wiot	wiot	dobr	Jabr	Yield
		oz/A		% Control						bu/A
1	Untreated	0		0	0	0	0	0	0	10.5
2	Everest	0.2	POST	1	84	99	99	80	97	14.9
3	Everest	0.4	POST	0	90	99	99	91	99	15.0
4	Everest	0.6	POST	1	94	99	99	96	99	17.5
5	Everest	0.2	Fall	0	0	0	0	0	8	9.7
6	Everest	0.4	Fall	0	34	12	15	17	40	12.2
7	Everest	0.6	Fall	0	25	0	37	30	32	13.6
8	Roundup Ult. Max	16	Fall	2	32	25	25	20	28	13.3
9	R'up / Everest	16 / 0.4	Fall / PP	8	95	90	95	99	99	15.2
10	Everest / Everest	0.4 / 0.2	Fall / POST	1	90	99	99	97	99	16.4
11	Everest / Everest	0.2 / 0.4	Fall / POST	2	92	87	97	90	94	15.1
12	Everest / Everest	0.4 / 0.2	Fall / PP	3	86	78	89	70	98	14.8
13	Everest	0.4	PP	12	88	90	93	99	99	14.5
14	Everest	0.6	PP	8	90	96	95	98	96	13.9
15	Roundup Ult. Max	16	PP	0	90	45	57	97	91	13.8
16	Everest + R'up	0.4 + 16	PP	4	99	94	96	99	99	14.3
17	Everest + R'up	0.6 + 16	PP	6	99	98	98	99	99	15.1
18	Roundup Ult. Max	16	PRE	0	92	92	86	95	92	15.4
19	Everest	0.4	PRE	5	89	84	90	87	96	14.3
20	Everest	0.6	PRE	6	92	97	96	98	93	14.1
21	Everest + R'up	0.4 + 16	PRE	5	99	91	94	99	99	15.8
22	Everest + R'up	0.6 + 16	PRE	4	91	84	87	96	94	15.2
C.V. %				114	23	22	23	26	21	13.2
LSD 5%				5	25	22	25	28	23	2.7

Grassy Weed Control with Axial Herbicide in Spring Wheat at Hettinger, North Dakota.
(Eriksmoen) Reeder hard red spring wheat was seeded on April 18. Treatments were applied to 4 leaf wheat (HRSW), 3 ½ leaf wild oats (wiot), heading downy brome (dobr), tillering Japanese brome (jabr) and to seedling (exact size was not recorded) Persian darnel (pdar) on May 29 with 43° F, 94% RH, cloudy sky and 6 mph N wind. Treatments were applied with a tractor mounted CO^2 propelled plot sprayer delivering 10 gpa at 40 psi through PK-01E80 nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The experiment was a randomized complete block design with four replications. Wild oat, cheatgrass (Japanese and downy brome combined) and Persian darnel populations were 9, 10 and 5 plants per sq. foot, respectively. Evaluations for crop injury were on June 15 and June 27, and for weed control on June 15, June 27 and July 22. The trial was harvested on August 5.

	Treatment	Rate	June 15		June 27				July 22			Grain yield
			HRSW	dobr	HRSW	wiot	dobr	pdar	wiot	jabr	pdar	
		oz/A	% Control									bu/A
1	Axial	8.2	0	55	0	100	65	98	100	45	99	15.4
2	Axial + Bronate Adv.	8.2 + 12.8	2	59	0	100	64	97	100	64	99	16.6
3	Discover NG + Bro Adv	12.8 + 12.8	2	55	0	100	61	93	100	68	99	14.4
4	Everest + Bro Adv	0.6 + 12.8	4	54	0	100	81	13	100	99	0	14.6
5	Everest+Dis NG+Bro Adv	0.6 + 12.8 + 12.8	2	79	0	100	89	81	100	99	99	17.7
6	Everest + Axial + Bro Adv	0.6 + 8.2 + 12.8	1	76	0	100	86	98	100	99	99	16.3
7	Olympus + Bro Adv	0.6 + 12.8	0	65	0	100	86	0	100	99	0	15.5
8	Olympus+Dis NG+Bro Adv	0.6 + 12.8 + 12.8	2	82	0	100	91	95	100	99	99	14.1
9	Olympus + Axial + Bro Adv	0.6 + 8.2 + 12.8	2	88	0	100	81	98	100	99	99	14.8
10	Untreated	--	0	0	0	0	0	0	0	0	0	8.3
C.V. %			182	33	0	0	27	15	0	26	0	14
LSD 5%			NS	29	NS	1	28	15	1	30	1	2.9

Summary

Crop injury was minor. Downy brome and Japanese brome had stunted growth caused by Axial and Discover NG (trts 1, 2 and 3). Treatments with Everest and Olympus had relatively good downy brome control and excellent Japanese brome control. The downy brome germinated during the Fall and was relatively large at the time of application, whereas, the Japanese brome germinated during the Spring and was relatively small. Wild oat control was excellent for all herbicide treatments. Everest and Olympus treatments alone (trts 3 and 7) did not have any efficacy on Persian darnel. Axial and Discover NG treatments provided excellent control of Persian darnel. All herbicide treatments had significantly higher yields than the untreated check and several of them had twice the yields of the untreated check.

Downy brome control. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established in an area without crop in rural Valley City, North Dakota. Treatments were applied on May 5 with 75° F, 3% humidity, 15% cloud cover, 4 to 5 mph wind at 315°, and dry soil with 51° F. Downy brome grass was 2 to 3 inches tall in the two- to three-leaf stage and tillering. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	5/19 Downy brome	6/15 Downy brome
	oz ai/A	%	%
Flucarbazone+Quad 7	0.42+1%	62	25
Propoxycarbazone+Quad 7	0.63+1%	69	83
Sulfosulfuron+Quad 7	0.5+1%	71	57
Mesosulfuron+Quad 7	0.045+1%	42	15
Clethodim+PO	1.5+0.25G	81	95
Quizalofop+PO	0.9+1%	79	95
Sethoxydim+PO	3+0.25G	77	57
Clodinafop-ng	1	0	12
Imazamox+NIS+UAN	0.5+0.25%+2.5%	82	91
Untreated	0	0	0
CV		7	18
LSD (P=0.05)		6	14

Fall-emerging downy brome is more difficult to control in the spring than the fall. Spring emerging downy brome may still become vernalized and produce seed. When glyphosate is not an option for control of downy brome, several other herbicides may fit into the production system for a particular crop. The ACCase inhibitors clethodim and quizalofop provided 95% control of downy brome on June 15. This is greater than other reports of ACCase activity on downy brome, but sethoxydim gave much less control at 57% and clodinafop gave essentially no control. One of the keys to the activity of clethodim and quizalofop may be the growth stage of the downy brome. Several observations indicate that downy brome is more difficult to control once rapid head development begins. This experiment was initiated when plants were still primarily vegetative. The ALS inhibitor imazamox provided 91% control and propoxycarbazone gave 83% control of downy brome. Other ALS inhibitors gave les than 60% control.

Downy brome control with flucarbazone. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established in an area without crop in rural Valley City, North Dakota. Treatments were applied on May 5 with 75° F, 3% humidity, 15% cloud cover, 4 to 5 mph wind at 315°, and dry soil with 51° F. Downy brome grass was 2 to 3 inches tall in the two- to three-leaf stage and tillering. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	5/19 Downy brome	6/15 Downy brome
	oz ai/A	%	%
Flucarbazone+NIS	0.42+0.25%	60	42
Flucarbazone+MSO	0.42+0.19G	60	47
Flucarbazone+NIS+AMS	0.42+0.25%+64	40	27
Flucarbazone+MSO+AMS	0.42+0.19G+64	35	0
Flucarbazone+NIS+UAN	0.42+0.25%+1	57	30
Flucarbazone+MSO+UAN	0.42+0.19G+1	62	30
Flucarbazone+Quad 7	0.42+1%	57	30
Flucarbazone+Renegade	0.42+1%	59	30
Flucarbazone	0.42	30	22
Untreated	0	0	0
CV		10	38
LSD (P=0.05)		7	14

Flucarbazone with AMS was very difficult to dissolve. This insolubility likely resulted in less control than with other treatments. Flucarbazone control of wild oat and yellow foxtail has been improved in other studies by the addition of a nitrogen source. Nitrogen did not increase the control of downy brome with flucarbazone in this study. Flucarbazone with MSO or NIS gave 60% control of downy brome on May 19, but control with each treatment was less on June 15 as plants had begun reproductive growth.

Broadleaf control with flucarbazone. Kirk Howatt, Ronald Roach, and Janet Harrington. 'Alsen' hard red spring wheat was seeded. Treatments were applied to three-leaf wheat, two-leaf wild mustard, one- to five-leaf wild buckwheat, cotyledon to four-leaf pigweed, one- to three-leaf common lambsquarters, cotyledon to two-leaf lance leaf sage, one-leaf common ragweed, and cotyledon to two-leaf Venice mallow on June 3 with air temperature of 69° F, 75% RH, 100% cloud cover, 8 to 10 mph wind at 180°, and damp soil at 61° F. Treatments were applied to five-leaf wheat, six-leaf to flowering wild mustard, one- to five-leaf wild buckwheat, two- to six-leaf pigweed, four- to six-leaf common lambsquarters, two- to four-leaf lance leaf sage, three-leaf common ragweed, and two- to four-leaf Venice mallow on June 21 with air temperature of 84° F, 47% RH, 100% cloud cover, 1 mph wind at 225°, and wet soil at 68° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

			7/01								7/18	8/04
Treatment	Rate	Timing	Wht	Wimu	Wibw	Pgwd	Colq	Llsa	Corw	Vema	all	all
	oz ai/A	leaf stage	%									
Flcz +NIS	0.28+0.25%	3	0	99	99	99	99	99	99	99	99	99
Flcz +NIS	0.35+0.25%	3	0	99	99	99	99	99	99	99	99	99
Flcz +NIS	0.42+0.25%	3	0	99	99	99	99	99	99	99	99	99
Flcz +brox&MCPA5	0.28+8	3	0	99	99	99	99	99	99	99	99	99
Flcz +brox&MCPA5	0.42+8	3	0	99	99	99	99	99	99	99	99	99
Flcz +Salvo	0.28+6	3	0	99	99	99	99	99	99	99	99	99
Flcz +Salvo	0.42+6	3	0	99	99	99	99	99	99	99	99	99
Flcz +flox	0.28+1.5	3	0	99	99	99	99	99	99	99	99	99
Flcz +flox	0.42+1.5	3	0	99	99	99	99	99	99	99	99	99
Flcz +clpy&flox	0.28+3	3	0	99	99	99	99	99	99	99	99	99
Flcz +clpy&flox	0.42+3	3	0	99	99	99	99	99	99	99	99	99
Flcz +NIS	0.28+0.25%	5	10	88	87	99	99	99	99	99	99	99
Flcz +NIS	0.35+0.25%	5	10	88	90	99	99	99	99	99	99	99
Flcz +NIS	0.42+0.25%	5	10	90	87	99	99	99	99	99	99	99
Flcz +brox&MCPA5	0.28+8	5	10	90	92	99	99	99	99	99	99	99
Flcz +brox&MCPA5	0.42+8	5	10	90	93	99	99	99	99	99	99	99
Flcz +Salvo	0.28+6	5	10	93	89	99	99	99	99	99	99	99
Flcz +Salvo	0.42+6	5	10	95	93	99	99	99	99	99	99	99
Flcz +flox	0.28+1.5	5	10	86	91	99	99	99	99	99	99	99
Flcz +flox	0.42+1.5	5	10	87	91	99	99	99	99	99	99	99
Flcz +clpy&flox	0.28+3	5	10	90	95	99	99	99	99	99	99	99
Flcz +clpy&flox	0.42+3	5	10	90	96	99	99	99	99	99	99	99
Untreated	0		0	0	0	0	0	0	0	0	0	0
CV			0	1	2	0	0	0	0	0	0	0
LSD (P=0.05)			0	2	2	0	0	0	0	0	0	0

All herbicide treatments provided exceptional control of the weed spectrum. Vigorous wheat growth enhanced overall weed control and prevented second flushes of weeds. Flucarbazone applied to three-leaf wheat did not injure wheat: however, flucarbazone applied to five- to six-leaf wheat resulted in early season stunting of 10% height reduction. The later application also resulted in deformed awns on the wheat heads and floret damage and abortion.

Annual broadleaf weed control in wheat with Bronate Advanced. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established in rural Felton, Minnesota. 'Granite' hard red spring wheat was seeded. Treatments were applied to five-leaf wheat, 1- to 3-inch kochia, four- to six-leaf common lambsquarters, cotyledon to four-leaf pigweed, and one- to three-leaf wild buckwheat on June 7 with 75° F, 52% RH, 10% cloud cover, 4 to 5 mph wind at 45°, and moist soil at 71°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		6/24				7/05			
Treatment	Rate	KOCZ	Colq	Rrpw	Wibw	KOCZ	Colq	Rrpw	Wibw
	oz ai/A	%							
Bromoxynil&MCPA5	8	98	98	81	98	98	98	98	98
Bromoxynil&MCPA5	10	98	97	80	98	98	98	98	98
Brox&MCPA5+clpy&flox	8+1.5	98	96	84	98	98	98	98	98
Broxl&MCPA5+thif&trib+NIS	8+0.1+0.25%	98	97	96	98	98	98	98	98
Brox&MCPA5+trib-sg+NIS	8+0.125+0.25%	98	98	97	98	98	98	98	98
Clpy&flox+thif&trib+NIS	2.25+0.1+0.25%	98	89	95	98	98	98	98	98
Untreated	0	0	0	0	0	0	0	0	0
CV		0	3	3	0	0	0	0	0
LSD (P=0.05)		0	4	3	0	0	0	0	0

Treatments did not cause visible injury to wheat. All herbicide treatments provided 98% control of kochia and wild buckwheat for either evaluation. All weeds were controlled at 98% on July 5, influenced by vigorous wheat growth as well as the herbicides. On June 24, treatments that included bromoxynil&MCPA5 provided at least 96% control of common lambsquarters. Bromoxynil&MCPA5 gave about 80% control of redroot pigweed. Addition of clopyralid&flyroxypyr improved pigweed control to 84%, but treatments with thifensulfuron or tribenuron provided 95 to 97% control of pigweed.

Broadleaf Weed Control in Wheat at Hettinger

Eric Eriksmoen

Reeder hard red spring wheat was seeded on April 18. Treatments were applied to 3 ½ leaf wheat, ¼" kochia and 1 ½" wild buckwheat on May 24 with 65°F, 40% RH, cloudy sky and 8 mph N wind. Treatments were applied with a tractor mounted CO^2 propelled plot sprayer delivering 10 gpa at 30 psi through PK-01E80 nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The experiment was a randomized complete block design with four replications. Kochia and wild buckwheat populations were 23 and 1 plants per ft^2, respectively. Plots were evaluated for crop injury on June 9 and for weed control on June 9, June 23 and July 22. The trial was harvested on August 5.

	Treatment	Product Rate	June 9			June 23		7/22	Grain Yield
			HRSW	Kocz	Wibw	Kocz	Wibw	Kocz	
		oz/Ac	% Control						bu/Ac
1	Starane & Salvo	16	0	88	50	95	91	99	15.5
2	Starane & Sward	12.3	0	84	48	94	88	96	14.2
3	Bronate Advance	12.8	0	91	91	95	96	99	16.0
4	Bromoxynil & 2,4-D	16	0	92	91	95	94	99	14.5
5	Aim + Clarity	0.5 + 2.0	0	92	45	94	50	99	14.7
6	Aim + Harmony XP + Salvo	0.5 + 0.3 + 8.5	0	92	85	94	90	96	14.2
7	WideMatch	16	0	91	81	96	92	99	17.4
8	WideMatch	10.7	0	85	50	94	90	99	15.1
9	WideMatch + Aim	10.7 + 0.5	0	91	52	97	94	99	16.8
10	WideMatch + Harmony XP	10.7 + 0.3	0	91	91	92	94	97	16.7
11	WideMatch + Bronate Adv.	10.7 + 9.6	0	94	91	97	98	99	15.0
12	WideMatch + Salvo	10.7 + 8.5	0	90	52	92	94	97	15.9
13	Untreated		0	0	0	0	0	0	11.0
C.V. %			0	4.7	13.9	4.2	5.3	2.7	12.5
LSD .05			--	6	13	5	6	4	2.7

Summary

No crop injury was observed. All herbicide treatments provided excellent season long kochia control. Treatments containing bromoxynil (trts 3, 4, 11) or Harmoney XP (trts 6 and 10) tended to have better activity on wild buckwheat however, all treatments, with the exception of Aim + Clarity (trt 5), provided very good season long control. Grain yields of all herbicide treatments were significantly higher than the untreated check.

Broadleaf Control in Wheat – Langdon 2005 (Lukach)

Alsen wheat was planted May 11. Post treatments were applied on June 13 between 9 and 10am to 5 leaf wheat. Conditions were 58F, 93RH, 8mph N wind. It was an overcast day with mist rain starting at 2pm. Application was made with a tractor mounted CO2 sprayer, with wind shield on, using 8001 tips to apply 8.5 gal/a solution at 40 psi. The general Puma application did not get made until June 25 so heavy wild oat caused crop competition. Broadleaf weeds populations were low.

Broadleaf weed control in wheat, Langdon, 2005

Treatment	Rate	inju	Kocz	Colq	Wibw	Wimu	Yield	Test Weight
				%			bu/a	lb/bu
Fluroxypyr&2,4-D	7.5	0	99	99	99	99	37.2	60.2
Fluroxypyr&MCPA	8	0	99	99	99	99	38.3	59.6
Bromoxynil&MCPA5	8	0	99	99	91	99	40.0	59.4
Bromoxynil&2,4-D	9	0	99	99	92	99	42.2	59.9
Carfentrazone+Dicamba	0.125+1.5	0	95	99	95	86	35.3	58.9
Carfentrazone+Thifensulfuron-sg+Salvo	0.125+0.1+4	0	99	99	99	96	37.4	60.0
Clopyralid&Fluroxypyr	3	0	99	99	98	96	41.7	59.6
Clopyralid&Fluroxypyr	2	0	97	91	97	86	42.0	60.4
Clopyralid&Fluroxypyr+Carfentrazone	2+0.125	0	99	99	99	99	42.6	59.8
Clopyralid&Fluroxypyr+Thifensulfuron-sg	2+0.1	0	98	96	99	96	40.3	59.9
Clopyralid&Fluroxypyr+Bromoxynil&MCPA5	2+6	0	99	99	98	99	35.1	59.2
Clopyralid&Fluroxypyr+Salvo	2+4	0	99	99	99	99	34.2	59.7
Untreated	0	0	0	0	0	0	37.7	57.6
	C.V. %		2.2	3.6	6.4	5.3	12.7	1.1
	LSD 5%		2.9	4.7	8.2	6.7	NS	0.9

BROADLEAF WEED CONTROL IN DURUM WHEAT

Broadleaf weed control in durum wheat, Williston 2005. (Riveland). The experiment was conducted to evaluate several herbicides for broadleaf weed control in wheat. 'Pierce' durum wheat was planted on recrop in 7 inch rows at 90 lbs/a on April 28. Treatments were applied on June 13 to 5-leaf wheat, 3-4 inch kochia, 6-10 inch common wild mustard, 2-3 inch Russian thistle and 4-5 inch common lambsquarters with 68 F, 55% RH, 100% cloudy sky, and 3-7mph NE wind with dry topsoil at 65 F. Treatments were applied with a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor and delivering 8.6 gals/a at 30 psi through 8001 flat fan nozzles to a 6.67 ft wide area the length of 10 by 25 ft plots. First rainfall event recorded after application was 0.81 inches on June 21. The experiment was a randomized complete block design with four replications. Weed densities were moderate to light and averaged 1-2 plants/ft2 for Russian thistle and 1 plant/yd2 for kochia. Densities for common lambsquarters ranged from 2-5/ft2 Plots were evaluated on July 13 and August 17 for weed control. Wheat was machine harvested on August 23.

Treatmenta	Rate	Kocz cntrl	Ruth Control 7-13	Ruth Control 8-17	Colq Control 7-13	Colq Control 8-17	Test Weight	Yield
		%	%		%		lbs/bu	bus/a
Fluroxypyr&2,4-D	7.5	97	98	98	98	98	59.4	32.5
Fluroxypyr&MCPA	8	98	90	81	99	91	59.6	32.4
Bromoxynil&MCPA5	8	96	99	92	99	96	59.3	29.5
Bromoxynil&2,4-D	9	94	99	99	99	97	59.8	38.0
Carfentrazone+Dicamba	0.125+1.5	99	99	99	99	98	59.8	36.7
Carf+Thifensulf+Salvo	0.125+0.1+4	98	99	98	99	99	59.4	35.8
Clopyralid&Fluroxpyr	3	97	92	86	95	96	60.4	39.5
Clopyralid&Fluroxpyr	2	97	79	79	91	89	59.9	27.0
Clopy&Fluro+Carfentrazone	2+0.125	99	97	92	99	97	59.8	39.5
Clopy&Fluro+Thifensulfuron	2+0.1	96	94	96	93	94	60.5	43.5
Clopy&Fluro+Bromox&MCPA5	2+6	98	95	96	99	93	60.0	36.8
Clopyralid&Flurox+Salvo	2+4	93	99	92	99	99	60.3	32.8
Untreated	0	0	0	0	0	0	58.4	26.8
HIGH MEAN		99	99	99	99	99	60.5	43.5
LOW MEAN		0	0	0	0	0	58.4	26.8
EXP MEAN		89	88	85	90	88	59.7	34.7
C.V. %		3	4	8	2	5	1.6	22.5
LSD 5%		4	5	10	3	6	NS	NS
LSD 1%		5	7	13	4	8	NS	NS
# OF REPS		4	4	4	4	4	2	4
F-TRT		476	224	59	597	176	.7	1.7

a - Thif = Thifensulfuron. Clopy - Clopyralid
Carf = Carfentrazone Flox = Fluroxypry

Summary: No crop injury was noted. There is a tendency toward increased yields as overall weed control increased. Test weight was not influenced by treatment. Clopyralid plus Fluroxpyr at 2 oz/a did not control Russian thistle adequately.

Broadleaf Weed Control with ET Herbicide in Wheat at Hettinger

This project was funded by Nichino America.

Eric Eriksmoen

Reeder hard red spring wheat was seeded on April 18. Treatments were applied to 5 leaf wheat, 1" kochia, 3" wild buckwheat and 4" field bindweed on June 3 with 70°F, 57% RH, mostly sunny sky and 2 mph W wind. Treatments were applied with a tractor mounted CO^2 propelled plot sprayer delivering 10 gpa at 30 psi through PK-01E80 nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The experiment was a randomized complete block design with four replications. Kochia, wild buckwheat and field bindweed populations were 28, 4 and 1 plants per ft^2, respectively. Plots were evaluated for crop injury on June 9 and June 17, and for weed control on June 9, June 17, July 1 and July 22. The trial was harvested on August 5.

Summary

Significant crop injury was observed on 2,4-D + ET treatments (trts 4 and 5) and on ET alone treatments (trts 8 and 9), and probably caused grain yield reductions. Injury symptoms appeared as leaf burning and leaf chlorosis which diminished over time. All treatments with the exception of the ET alone treatments (trts 8 and 9) provided excellent season long wild buckwheat control. All treatments except for the Harmony GT alone and the ET alone treatments (trts 2, 8 and 9) provided excellent season long field bindweed control. All treatments except for the Harmony GT alone and Harmony GT + ET treatments (trts 2 and 6) provided excellent season long kochia control. None of the treatments provided significantly higher or lower grain yields than the untreated check.

Broadleaf Weed Control with ET Herbicide in Wheat at Hettinger, North Dakota

	Treatment	Product Rate	June 9				June 17				July 1			7/22	Grain Yield
			HRSW	kocz	wibw	fibw	HRSW	kocz	wibw	fibw	kocz	wibw	fibw	kocz	
		oz/Ac	% Control												bu/Ac
1	2,4-D (LV4) + NIS	12 + 0.25%	2	69	48	50	0	70	84	89	94	95	94	91	16.5
2	Harmony GT + NIS	0.3 + 0.25%	2	38	90	35	0	32	92	60	30	94	72	45	16.2
3	Harmony GT + 2,4-D + NIS	0.3 + 8 + 0.25%	0	74	86	45	0	55	96	58	88	94	94	91	16.6
4	2,4-D + ET + NIS	8 + 0.25 + 0.25%	20	62	90	88	0	84	90	90	95	95	95	92	13.4
5	2,4-D + ET + NIS	8 + 1.0 + 0.25%	29	80	50	90	2	80	89	91	95	92	92	96	13.2
6	Harmony GT + ET + NIS	0.3 + 0.5 + 0.25%	5	82	90	86	0	45	91	91	85	90	91	82	15.7
7	2,4-D+Harm. GT+ET+NIS	8+0.3+0.5+ 0.25%	5	82	88	88	0	78	94	95	92	91	92	94	16.6
8	ET + NIS	1.0 + 0.25%	14	50	55	50	0	59	42	61	90	50	45	96	14.8
9	ET + NIS	2.0 + 0.25%	28	79	90	89	2	85	91	91	92	81	84	97	14.6
10	Untreated		0	0	0	0	0	0	0	0	0	0	0	0	15.0
C. V. %			17.5	16.0	6.3	10.4	233	25.2	7.2	15.0	6.9	7.3	14.0	7.6	8.1
LSD .05			3	14	6	9	1	21	8	16	14	8	15	9	1.8

Wild Buckwheat Control in Wheat, Fargo. Kirk Howatt, Ronald Roach, Janet Harrington. Treatments were applied in fallow to five- to seven-leaf wild oat and 6- to 12-inch wild buckwheat vines on June 23 with 81° F, 68% RH, 2% cloud cover, 7 mph wind at 180°, and moist soil at 70° F. The treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

		Wild buckwheat	
Treatment	Rate	7/15	7/28
	oz ai/A	%	
Thifensulfuron-sg+tribenuron-sg+NIS	0.24+0.06+0.25%	72	67
Thifensulfuron+tribenuron+NIS	0.24+0.06+0.25%	72	70
Thifensulfuron-sg+tribenuron-sg+NIS	0.48+0.12+0.25%	82	82
Thifensulfuron+tribenuron+NIS	0.48+0.12+0.25%	83	83
Thifensulfuron-sg+tribenuron-sg+NIS	0.1+0.1+0.25%	62	65
Thifensulfuron+tribenuron+NIS	0.1+0.1+0.25%	72	72
Thifensulfuron-sg+tribenuron-sg+NIS	0.2+0.2+0.25%	77	77
Thifensulfuron+tribenuron+NIS	0.2+0.2+0.25%	77	78
Thifensulfuron-sg+tribenuron-sg+NIS	0.3+0.15+0.25%	83	87
Thifensulfuron+tribenuron+NIS	0.3+0.15+0.25%	83	87
Thifensulfuron-sg+tribenuron-sg+NIS	0.6+0.3+0.25%	88	88
Thifensulfuron+tribenuron+NIS	0.6+0.3+0.25%	88	92
Untreated	0	0	0
CV		6	6
LSD (P=0.05)		5	5

The XP and SG formulations of thifensulfuron and tribenuron gave similar weed control when applied at similar rates in similar ratio except for the 1:1 ratio with 0.1 oz ai/A each. For this comparison the XP formulation provided slightly better wild buckwheat control than the SG formulation. Overall, the 2:1 ration provided the best control of wild buckwheat followed by the 4:1 ratio, and the 1:1 ratio gave the lowest level of wild buckwheat control. However, this is also the ranking of total active ingredient included in the treatment. Equivalent rates of active ingredient may have given more similar control ratings among the formulation ratios.

Wild Buckwheat Control in Wheat, Twin Valley. Kirk Howatt, Ronald Roach, Janet Harrington. The trial was established near Twin Valley Minnesota. Hard red spring wheat was seeded. Treatments were applied to five-leaf wheat with two tillers and cotyledon to five-leaf wild buckwheat on June 7 with 69° F, 52% RH, 6 mph wind at 45°, and soil temperature of 60°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/20 Wbw	7/20 stunt	7/05 Wibw	7/05 stunt	7/29 Wibw
	oz ai/A			%		
Thifensulfuron-sg+Trib-sg+NIS	0.24+0.06+0.25%	60	4	64	1	60
Thif+Tribenuron+NIS	0.24+0.06+0.25%	87	5	89	1	84
Thif-sg+Trib-sg+NIS	0.48+0.12+0.25%	86	8	91	3	86
Thif+Trib+NIS	0.48+0.12+0.25%	89	5	90	3	83
Thif-sg+Trib-sg+NIS	0.1+0.1+0.25%	81	6	85	1	79
Thif+Trib+NIS	0.1+0.1+0.25%	81	3	80	0	66
Thif-sg+Trib-sg+NIS	0.2+0.2+0.25%	81	8	85	3	80
Thif+Trib+NIS	0.2+0.2+0.25%	80	5	83	2	79
Thif-sg+Trib-sg+NIS	0.3+0.15+0.25%	86	6	87	3	83
Thif+Trib+NIS	0.3+0.15+0.25%	85	5	88	1	82
Thif-sg+Trib-sg+NIS	0.6+0.3+0.25%	91	10	93	5	90
Thif+Trib+NIS	0.6+0.3+0.25%	91	5	94	0	89
Untreated	0	0	0	0	0	0
CV		16	48	16	95	17
LSD (P=0.05)		17	4	18	2	18

Wheat was stunted by essentially all herbicide treatments regardless of rate, ratio, or formulation. Wheat response varied but injury was not more than 10%. Injury diminished through the season and was not detected on July 29. Herbicide treatments generally gave 80 to 90% control of wild buckwheat. Ratings among replicates were not consistent, resulting in LSDs of 17 and 18. There were no consistent trends for formulation, rate, or ratio of active ingredient.

Aminopyralid (DE-750) use in Wheat. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established at Twin Valley Minnesota. Hard red spring wheat was seeded. Treatments were applied to Five-leaf wheat with two tillers and cotyledon to five-leaf wild buckwheat on June 7 with air temperature of 69° F, 52% RH, 50% cloud cover, 6.3 mph wind at 45°, and soil temperature of 60° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		Wild buckwheat		
Treatment[a]	Rate	6/20	7/05	7/29
	oz ai/A		%	
Clpy&flox	3	93	98	98
Clpy&flox+MCPA	3+6	95	99	99
Clpy&flox+thifensulfuron-sg+NIS	3+0.063+0.25%	92	99	99
Clpy&flox+thif&trib-A+NIS	3+0.079+0.25%	95	99	99
Clpy&flox+thif&trib-A+NIS	2+0.3+0.25%	92	99	99
DE-750&fluroxypyr	2.14	97	99	99
DE-750&fluroxypyr+2,4-D	2.14+4	98	99	99
DE-750&flox+trib-sg+NIS	2.14+0.094+0.25%	78	73	69
DE-750&flox+thif-sg+NIS	2.14+0.063+0.25%	85	80	63
Flox+brox&MCPA5	1+8	98	99	99
Flox+Salvo	1.5+6	95	98	99
Untreated	0	0	0	0
CV		3	3	4
LSD (P=.05)		4	4	5

[a] Thif&trib-A was a 4:1 ratio of chemicals similar to Afinity Tankmix from DuPont.

Herbicides did not cause visible wheat injury. Treatments containing clopyralid and fluroxypyr provided 92% control or better of wild buckwheat on June 20 and 98 to 99% control on July 5. DE-750&fluroxypyr along or with 2,4-D provided 97% control or better, but DE-750&fluroxypyr plus tribenuron or thifensulfuron gave 78 and 85% control on June 20. These two treatments gave less than 70% control at the July 29 evaluation. This result leads to concern about the combination of DE-750 with SU herbicides, but reduced control of wild buckwheat with treatments containing DE-750 has not been observed by other researchers. The observed interaction will be investigated further.

Adjuvants with Bromoxynil Premixes. Kirk Howatt, Ronald Roach, Janet Harrington. The experiment was established in Twin Valley Minnesota. Hard red spring wheat was seeded. Treatments were applied to five-leaf wheat with two tillers and cotyledon to five-leaf wild buckwheat on June 7 with 60° F, 77% RH, 100% cloud cover, 2.5 mph wind at 45°, and soil temperature of 60° F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		Wild buckwheat		
Treatment	Rate	6/20	7/05	7/29
	oz ai/A		%	
Bromoxynil&2,4-D	6.7	98	99	99
Bromoxynil&2,4-D+WE 5001	6.7+0.25%	98	99	99
Bromoxynil&2,4-D+WE 5050	6.7+3	98	99	99
Bromoxynil&2,4-D+WE 5051	6.7+3	98	99	99
Bromoxynil&2,4-D+WE 5051	6.7+3	98	99	99
Bromoxynil&2,4-D	9	98	99	99
Bromoxynil&2,4-D+WE 5001	9+0.25%	98	99	99
Bromoxynil&2,4-D+WE 5050	9+4	98	99	99
Bromoxynil&2,4-D+WE 5051	9+4	98	99	99
Bromoxynil&2,4-D+WE 5051	9+4	98	99	99
Bromoxynil&MCPA5	8	98	99	99
Bromoxynil&MCPA5+WE 5001	8+0.25%	98	99	99
Bromoxynil&MCPA5+WE 5050	8+0.2%	98	99	99
Bromoxynil&MCPA5+WE 5051	8+3	98	99	99
Bromoxynil&MCPA5+WE 5051	8+3	98	99	99
Bromoxynil&MCPA	8	98	99	99
Bromoxynil&MCPA+WE 5001	8+0.25%	98	99	99
Bromoxynil&MCPA+WE 5050	8+4	98	99	99
Bromoxynil&MCPA+WE 5051	8+4	98	99	99
Bromoxynil&MCPA+WE 5051	8+4	98	99	99
CV		0	0	0
LSD (P=0.05)		0	0	0

The purpose of this experiment was to determine if bromoxynil premixes applied with adjuvants would provide better control of wild buckwheat than the herbicide alone. Exceptional activity of the herbicides and susceptibility of the buckwheat at this site resulted in complete control of wild buckwheat and precluded the separation of treatment means. Adjuvants included in the study did not reduce control of bromoxynil premixes for wild buckwheat activity, and treatments did not cause visible wheat injury.

Broadleaf weed control with different phenoxy formulations. Kirk Howatt, Ronald Roach, and Janet Harrington. The experiment was established in Twin Valley Minnesota. Hard red spring was seeded. Treatments were applied to five-leaf wheat and cotyledon to five-leaf wild buckwheat on June 7 with air temperature at 65° F, 45% RH, 25% cloud cover, 5.5 mph wind at 45°, and soil temperature at 60°. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		6/20		7/05		7/29
Treatment	Rate	Wibw	Wht	Wibw	Wht	Wibw
	oz ai/A			%		
NUP 2F 02	12	95	8	99	1	99
NUP 12C 04	11.9	95	8	98	1	99
NUP 12J 04	12.7	90	0	89	0	90
NUP 1A 05	12.7	95	3	96	0	99
NUP 12K 04	12.2	90	3	95	0	97
NUP 1B 05	12.2	93	3	95	0	94
AF 300	12.5	84	8	88	2	92
NUP 1E 05	12.5	93	8	97	2	99
NUP 11D 01	6.25	94	10	98	3	99
NUP 12D 04	6.25	95	11	98	2	99
NUP 11B 01	6.25	95	0	99	0	99
NUP 1C 05	6.25	95	8	98	0	99
Fluroxypyr+NUP 2F 02	3+7.7	95	5	99	1	99
Clopyralid&2,4-D	9.4	95	1	99	0	99
Salvo+carfentrazone+NIS	4+0.125+0.25	93	3	97	0	98
Untreated	0	0	0	0	0	0
CV		3	76	4	267	4
LSD (P=0.05)		3	5	5	3	6

Injury was expressed as stunting and necrotic spotting and diminished as the season progressed. NUP 11D 01 and 12D 04 caused 10 and 11% injury, respectively, on June 20. Injury was mostly non-distinguishable compared to the untreated during the July 5 evaluation. All herbicides except AF 300 provided 90% control or better of wild buckwheat on June 20. On July 29, NUP 12C 04 gave 90% control, AF 300 gave 92% control, and NUP 1B 05 gave 94% control. Other herbicides provided 97% control or better.

CIRAR control with Thifensulfuron&Tribenuron. Kirk Howatt, Ronald Roach, Janet Harrington. 'Alsen' hard red spring wheat was seeded April 29. Treatments were applied to three-leaf wheat, 3- to 10-inch Canada thistle, cotyledon to two-leaf wild buckwheat, cotyledon to one-leaf Venice mallow, and two- to five-leaf wild mustard on June 3 with air temperature at 71° F, 76% RH, 100% cloud cover, 5 to 7 mph wind with 180°, and moist soil at 61° F. The treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 8001 flat fan nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		6/10	6/22				7/15
Treatment	Rate	Wht	Cath	Wimu	Wibw	Vema	Cath
	oz ai/A				%		
Thif-sg+trib-sg+NIS	0.24+0.06+0.25%	0	85	99	95	91	85
Thif-sg+trib-sg+NIS	0.4+0.1+0.25%	0	88	99	95	91	89
Thif-sg+trib-sg+NIS	0.1+0.1+0.25%	0	88	99	93	91	90
Thif-sg+trib-sg+NIS	0.2+0.2+0.25%	0	91	99	94	89	93
Thif-sg+trib-sg+NIS	0.17+0.08+0.25%	0	87	99	93	90	89
Thif-sg+trib-sg+NIS	0.3+0.15+0.25%	0	92	99	94	90	94
Untreated	0	0	0	0	0	0	0
CV		0	4	0	3	3	2
LSD (P=0.05)		0	4	1	3	4	2

Herbicide treatments did not cause visible wheat injury. Control of wild mustard, wild buckwheat, and Venice mallow was similar for all herbicide treatments and was 99% for these weeds on July 15. Thifensulfuron and tribenuron at 0.3 and 0.15 oz ai/A provided 92% control of Canada thistle on June 22. The rate of tribenuron from 0.06 to 0.15 oz/A rather than the ratio of thifensulfuron to tribenuron seemed to be more important in determining Canada thistle control, although tribenuron at 0.2 oz/A did not extend this trend. Canada thistle control ratings essentially were the same on July 15 as they were on June 22.

Common milkweed control in barley (Minot, ND). Jenks, Markle, and Willoughby. A study was initiated in 2003 to determine the short- and long-term impact of herbicides on common milkweed control. Barley was seeded May 20, 2003 north of Minot, ND. The 2-leaf, 5-leaf, and pre-harvest (PRE-H) treatments listed below were applied June 11, June 17, and August 14, 2003 respectively. Air and soil temperatures were 62 and 60 F, respectively, on June 11, relative humidity was 77%. Air and soil temperatures were 80 and 70 F, respectively, on June 17, relative humidity was 47%. Air and soil temperatures were 94 and 87 F, respectively, on August 14, relative humidity was 31%. All milkweed plants in each plot were counted on June 17, 2003; June 21, 2004; and again on Jun 13 2005.

Glyphosate applied pre-harvest in 2003 significantly reduced milkweed densities more than in-crop treatments alone. Pre-harvest glyphosate reduced milkweed densities 91-98% compared to 54-74% and 45-50% for in-crop treatments containing Express and Aim, respectively.

Wheat was planted into the study area in 2004. A blanket treatment of Express (0.33 oz) + MCPE (0.75 pt) + Starane (0.5 pt) + Puma (0.66 pt) was applied June 24, 2004. Glyphosate was applied pre-harvest over the entire plot area September 7, 2004. Milkweed densities were counted again June 13, 2005. By 2005, all treatments, except one, reduced milkweed densities 86-96% compared to initial densities in 2003.

Table. Common milkweed control in barley (Minot, ND).

Herbicide treatment applied in 2002[ab]	Rate applied in 2002	Timing in 2002	Common milkweed			Reduction
			Jun 17 2003	Jun 21 2004	Jun 13 2005	2003-2005
			—— plants / plot ——			%
Express / Express + MCPA + Starane	0.167 oz / 0.167 oz + 0.75 pt + 0.5 pt	2-leaf / 5-leaf	112	45	8	90
Express + MCPA + Starane	0.33 oz + 0.75 pt + 0.5 pt	5-leaf	111	42	15	88
Express / Express + MCPA + Starane / Glyphosate	0.167 oz / 0.167 oz + 0.75 pt + 0.5 pt / 26 fl oz	2-leaf/ 5-leaf/ PRE-H	123	6	8	91
Express + MCPA + Starane / Glyphosate	0.33 oz + 0.75 pt + 0.5 pt / 26 fl oz	5-leaf/ PRE-H	132	11	6	96
Express + MCPA + Starane[c]	0.33 oz + 0.75 pt + 0.5 pt	5-leaf	130	32	8	92
Aim + MCPA	0.5 oz + 0.75 pt	5-leaf	121	60	13	89
Aim + MCPA	1 oz + 0.75 pt	5-leaf	74	35	24	69
Aim + MCPA / Glyphosate	0.5 oz + 0.75 pt / 26 fl oz	5-leaf/ PRE-H	97	2	9	91
Aim + MCPA / Glyphosate	1 oz + 0.75 pt / 26 fl oz	5-leaf/ PRE-H	128	3	5	95
Aim + MCPA[c]	0.5 oz + 0.75 pt	5-leaf	89	45	10	91
Aim + MCPA + Express	0.5 oz + 0.75 pt + 0.167 oz	5-leaf	107	32	11	90
Aim + MCPA + Express / Glyphosate	0.5 oz + 0.75 pt + 0.167 oz / 26 fl oz	5-leaf/ PRE-H	92	4	12	86
LSD (0.05)			NS	24	NS	10
CV			49	64	75	8

[a]*Glyphosate applied was Roundup Ultra Max with AMS at 2.5 gal/100 gal.*
[b]*Express (0.33 oz) + MCPE (0.75 pt) + Starane (0.5 pt) + Puma (0.66 pt) was applied as a blanket treatment in 2004.*
[c]*A post-harvest glyphosate application was planned, but not applied in 2003 due to no weed regrowth.*

Long-term milkweed control 2002-05 (Wolf Creek, ND). Jenks, Markle, and Willoughby. We monitored the long-term effect of herbicide applications on milkweed densities in a field near Wolf Creek, ND. The study was conducted in a field that was planted to wheat in 2002, canola in 2003, wheat in 2004, and canola in 2005.

Spring wheat was seeded May 13, 2002 near Wolf Creek, ND. POST and POST II treatments were applied June 7, and 14 2002, respectively, with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles to 4-leaf wheat, and up to 10-inch milkweed. Air and soil temperatures were 79 and 72 F, respectively, and relative humidity was 23% on June 7. Air and soil temperatures were 73 and 72 F, respectively, and relative humidity was 45% on June 14. Pre-harvest treatments were applied Aug 5, 2002 with a handboom delivering 10 gpa at 40 psi through XR 8001 nozzles. Air and soil temperatures were 72 and 71 F, respectively, and relative humidity was 46% on Aug 5. Individual plots were 10 x 30 ft and replicated four times. All common milkweed plants present in each plot were counted prior to the in-crop herbicide application on June 7, 2002. Canola was planted over the study area April 26, 2003. All milkweed plants present in each plot were counted June 4, 2003 prior to a single glyphosate application to canola. Spring wheat was seeded again in 2004. Milkweed plants were counted in the same fashion as previous years on June 7, 2004. A pre-harvest glyphosate application was made prior to harvest in 2004. Canola was seeded in 2005 and milkweed counted on June 13, 2005.

In 2003, all treatments had reduced milkweed densities compared to initial densities in 2002; however, treatments that received pre-harvest glyphosate had significantly lower milkweed densities in 2003.

Common milkweed densities generally increased slightly in most treatments in 2004 compared to 2003. The only herbicide applied in 2003 was a single in-crop glyphosate application to canola. Although milkweed density tended to increase slightly, the plants were very small when wheat was about 5-leaf. Fewer plants grew above the wheat canopy compared to previous years. Glyphosate was applied pre-harvest at 0.75 lb ae to the entire plot on July 27, 2004. By June 2005, all treatments had reduced milkweed densities over 90% compared to initial densities in 2002.

Table. Long-term milkweed control 2002-05 (Wolf Creek, ND).

		2003 Canola	2004 Wheat	Common milkweed				Stand Red.
Herbicide treatment in wheat in 2002[ab]	Timing in 2002	Applied in-crop	Applied pre-harvest	Jun 7 2002	Jun 4 2003	Jun 7 2004	Jun 13 2005	2002-2005
				plants / plot[d]				%
Express + 2,4-D	POST	Glyphosate[e]	Glyphosate[f]	56	16	16	3	94
And fb glyphosate[c]	PRE-H	Glyphosate	Glyphosate	154	12	23	2	96
Express + 2,4-D + Banvel	POST	Glyphosate	Glyphosate	60	28	36	2	97
And fb glyphosate	PRE-H	Glyphosate	Glyphosate	60	4	9	1	99
Express + 2,4-D + Starane	POST	Glyphosate	Glyphosate	98	34	49	4	93
And fb glyphosate	PRE-H	Glyphosate	Glyphosate	36	5	7	0	100
Express + 2,4-D/ Express	POST / II	Glyphosate	Glyphosate	107	54	41	6	90
And fb glyphosate	PRE-H	Glyphosate	Glyphosate	59	13	18	1	99
Express + Curtail	POST	Glyphosate	Glyphosate	153	66	44	3	96
And fb glyphosate	PRE-H	Glyphosate	Glyphosate	75	5	13	1	99
Paramount + Curtail + MSO	POST	Glyphosate	Glyphosate	84	49	22	3	96
And fb glyphosate	PRE-H	Glyphosate	Glyphosate	61	8	14	1	99

[a]*Express treatments were applied with Quad 7 at 1% v/v.*

[b]*Glyphosate applied in 2002 was Roundup Ultra Max at 0.75 lb ae with AMS at 2.5 gal/100 gal.*

[c]*Treatment listed above was applied in-crop followed by glyphosate applied pre-harvest.*

[d]*Represents the average number of milkweed plants over the four replications.*

[e]*Glyphosate applied in 2003 to canola was Roundup Ultra Max at 0.58 lb ae.*

[f]*Glyphosate in 2004 was applied to wheat pre-harvest.*

Weed control in Clearfield wheat. Kirk Howatt, Ronald Roach, Janet Harrington. 'AP603' hard red spring wheat was seeded May 17. Treatments were applied to four-leaf wheat, six-leaf yellow foxtail, one- to four-leaf wild mustard, and 2-inch wild buckwheat and redroot pigweed on June 21 with 85°F, 49% RH, 0% cloud cover, 2 to 3 mph wind at 225°, and wet soil with 72°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. Soil type was silty clay with 7.5 pH and OM of 5%.

		7/05				7/18				8/04			8/12
Treatment	Rate	Wht	Yeft	Pgwd	Wimu	Wht	Yeft	Pgwd	Wimu	Wht	Pgwd	Yeft	Yield
	oz ai/A	%											bu/A
Imazamox+NIS+UAN	0.5+0.25%+2.5%	0	75	77	98	0	87	82	99	0	88	94	50
BAS 777+NIS+UAN	4.5+0.25%+2.5%	4	86	85	98	0	93	87	99	0	90	94	48
BAS 777+brox+NIS+UAN	4.5+4+0.25%+2.5%	2	77	82	98	0	86	78	99	0	77	90	48
Fenx+brox&MCPA5	0.73+8	3	78	80	98	0	94	82	99	0	47	88	48
Clfp-ng+broxl&MCPA5	0.8+8	6	85	78	98	0	89	78	99	0	50	92	47
Flcz+brox&MCPA5+Quad 7	0.42+8+1%	23	89	87	98	9	86	90	99	10	96	78	42
Untreated	0%	0	0	0	0	0	0	0	0	0	0	0	49
CV		49	7	5	0	35	4	4	0	0	13	6	4
LSD (P=0.05)		5	8	6	1	1	5	6	0	0	15	8	3

Flucarbazone caused 23% injury to wheat on July 5. Injury was expressed as stunting and slight chlorosis. Flucarbazone injury to wheat was evident throughout the season and when heads emerged sterile florets were observed on the apex of the spike. This injury rather than weed competition was considered the reason for 14% less yield of wheat with this treatment. Injury from other herbicides was minor and short-lived. BAS 777 gave slightly better early season yellow foxtail control than imazamox, but the addition of bromoxynil to BAS 777 negated the advantage. Control of yellow foxtail on August 8 was 88 to 94% for all herbicides except flucarbazone at 78%. Bromoxynil&MCPA5 control of pigweed was 50% or less on August 4 because of plant survival. Other herbicide treatments include ALS-inhibiting herbicides and provided better control of pigweed. Flucarbazone provided 96% control of pigweed. All Herbicide treatments provided complete control of wild mustard.

Evaluation of Clearfield HRSW Herbicide Programs at Hettinger, North Dakota. (Eriksmoen) AgriPro 603CL hard red spring wheat was seeded on April 18. Treatments were applied to 3 ½ leaf wheat (HRSW), 3 ½ leaf wild oats (wiot), 1 ½ inch tall wild buckwheat (wibw) and ½ inch tall kochia (kocz) on May 24 with 66° F, 38% RH, cloudy sky and 8 mph N wind. Treatments were applied with a tractor mounted CO^2 propelled plot sprayer delivering 10 gpa at 40 psi through PK-01E80 nozzles to a 5 foot wide area the length of 10 by 28 foot plots. The experiment was a randomized complete block design with four replications. Wild oat, wild buckwheat and kochia populations were 6, 0.66 and 6 plants per sq. foot, respectively. Evaluations for crop injury and weed control were on June 9, June 22 and July 22. The trial was harvested on August 5.

	Treatment	Rate	June 9				June 22				July 22			Grain yield
			HRSW	kocz	wibw	wiot	HRSW	kocz	wibw	wiot	HRSW	kocz	wiot	
		oz/A	% Control											bu/A
1	Beyond + NIS + UAN	4.0 + 0.25% + 32	8.75	60	82	100	5.0	80	94	100	0.0	94	100	15.5
2	BAS 777 + NIS + UAN	6.0 + 0.25% + 32	2.5	61	91	100	0.0	78	100	100	0.0	82	100	14.5
3	BAS 777 + Clarity + NIS + UAN	6.0 + 2.0 + 0.25% + 32	1.25	76	98	100	1.25	94	100	100	0.0	99	100	14.7
4	BAS 777 + Starane + NIS + UAN	6.0 + 8.0 + 0.25% + 32	1.25	84	92	98	1.25	94	96	100	0.0	99	100	14.7
5	BAS 777 + Widematch + NIS + UAN	6.0 + 16 + 0.25% + 32	2.5	92	97	100	2.5	96	98	100	0.0	99	100	15.8
6	Untreated	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	12.4
C.V. %			164	23	15	2.5	285	18	5.1	0	0	12	0	9.6
LSD 5%			NS	21	17	3	NS	20	6	1	NS	15	1	2.0

Summary

Crop injury was generally minor and diminished over time. The addition of Clarity, Starane and Widematich to BAS 777 improved kochia control. All herbicide treatments provided excellent control of wild buckwheat and wild oat. All herbicide treatments had significantly higher yields than the untreated check.

Evaluation of BAS 777 for weed control in Clearfield wheat. Jenks, Markle, and Willoughby. CL 602 Clearfield wheat was seeded April 28 at 90 lb/A into 7.5-inch rows. Herbicide treatments were applied June 6 to 4- to 5-leaf wheat with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. At application time, yellow foxtail was about 3-leaf, 1-3" tall, and 50-100 plants/ft^2. Wild buckwheat was emerging to 8" tall and 5-15 plants/ft^2. Common mallow was 1- to 6-leaf, 1- to 5-inches tall, and 0-5 plants/ft^2. Air and soil temperatures were 70 and 62 F, respectively, and relative humidity was 71%. Individual plots were 10 x 30 ft and replicated three times.

The primary objective of this study was to compare BAS777 to Beyond and standard wheat herbicides for yellow foxtail control and crop tolerance. BAS777 is a premix of Beyond + MCPA. None of the treatments caused visible crop injury. Beyond and BAS777 provided greater than 90% yellow foxtail control. Puma and Discover tankmixed with Bronate provided good yellow foxtail control, while Everest provided poor control. All treatments provided good to excellent wild buckwheat control, with Beyond alone providing slightly less control than treatments containing bromoxynil. All treatments provided excellent shepherdspurse control. None of the treatments provided good common mallow control. The crop was very vigorous and competitive with weeds.

Table. Evaluation of BAS 777 for weed control in Clearfield wheat.

		Yellow foxtail			Wild buckwheat			Shepherdspurse			Mallow	
		Jun	Jul	Aug	Jun	Jul	Aug	Jun	Jul	Aug	Jun	Jul
Treatment[a]	Rate	21	6	15	21	6	15	21	6	15	21	6
		% control										
Untreated		0	0	0	0	0	0	0	0	0	0	0
Beyond	4 fl oz	93	93	91	63	75	88	98	99	100	63	67
BAS 777	6 fl oz	95	93	91	80	80	93	100	100	100	70	73
BAS 777 + Moxy	6 fl oz + 1 pt	89	93	91	95	95	100	100	100	100	70	75
Bronate + Puma	0.8 pt + 0.4 pt	83	83	83	95	95	100	95	100	100	40	40
Bronate + Discover	0.8 pt + 12.8 fl oz	93	90	87	95	95	100	97	100	100	40	40
Bronate + Everest	0.8 pt + 0.6 oz	52	43	53	95	97	100	100	100	100	43	58
LSD (0.05)		5	6	13	18	22	11	5	1	—	8	8
CV		4	5	10	14	16	7	4	1	0	10	8

[a]*Beyond and BAS 777 were each applied with NIS and 28% N at 0.25% v/v and 2.5% v/v, respectively. Bronate = Bronate Advanced, Moxy = bromoxynil, and Discover = Discover NG.*

Harvest aid in Wheat. Kirk Howatt, Ronald Roach, Janet Harrington. 'Alsen' hard red spring wheat was seeded April 26. Treatments, 10 days before harvest (DBH), were applied to hard dough wheat with 27% grain moisture, headed foxtail, 24- to 30-inch wild buckwheat vines, and 12- to 18-inch pigweed on August 1 with 70°F, 73% RH, 0% cloud cover, 2 mph wind at 225°, and dry soil at 70°F. Treatments, 7 DBH, were applied to hard dough wheat with 21% grain moisture, headed foxtail, 24- to 30-inch wild buckwheat vines, and 12- to 18-inch pigweed on August 4 with 64°F, 64% RH, 0% cloud cover, 7 to 9 mph wind at 315°, and dry soil at 69°F. Treatments, 3 DBH, were applied to hard dough wheat with 13% grain moisture, heading foxtail, 26-inch buckwheat vines, and 12- to 18-inch pigweed on August 8 with 75°F, 65% RH, 20% cloud cover, 5.2 mph wind at 221°, dry soil at 70° F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles (17 gpa through 11002 TT nozzles for A7813) to a 7 ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Soil texture was a silty clay with 7.5 pH and OM of 5%. Study coordinates were N 46.93242, W 096.85692.

			8/4/05				8/10/05			8/12/05	
Treatment[a]	Rate	Appl.	Wht	Rrpw	brdlf	grass	Rrpw	brdlf	grass	Moisture	Yield
	oz ai/A	DBH				%				%	bu/A
A7813+NIS	8+0.125%	10	85	86	79	81	97	92	96	10.7	60
A7813+PO	8+1%	10	83	86	78	85	95	88	95	9.2	59
Glyphosate-HT+AMS+NIS	12.6+18+0.25%	10	0	23	13	20	98	93	94	10.6	61
Glyphosate-WM+AMS+NIS	12+18+0.125%	10	0	13	10	13	96	90	90	10.8	60
Metsulfuron+2,4-D LV4+NIS	0.06+8+0.125%	7	-	-	-	-	18	18	3	8.1	62
A7813+NIS	8+0.125%	7	-	-	-	-	93	85	94	9.4	61
A7813+PO	8+1%	7	-	-	-	-	92	88	89	10.4	60
Glyphosate-HT+AMS+NIS	12.6+18+0.25%	7	-	-	-	-	38	32	20	10.7	63
Glyphosate-WM+AMS+NIS	12+18+0.125%	7	-	-	-	-	15	15	13	7.8	61
A7813+2,4-D LV4+NIS	7.5+8+0.125%	7	-	-	-	-	93	86	91	10.7	62
2,4-D LV4	16	7	-	-	-	-	18	18	0	8.5	63
A7813+NIS	8+0.125%	3	-	-	-	-	94	84	94	13.0	61
A7813+PO	8+1%	3	-	-	-	-	91	88	92	11.5	63
Carfentrazone+MSO	0.25+1%	3	-	-	-	-	13	15	8	9.7	63
Untreated	0		0	0	0	0	0	0	0	11.5	63
CV			9	14	16	13	8	9	8	23	4
LSD (P=0.05)			4	9	9	8	7	8	6	3.4	3

[a] A7813 was paraquat as Gramoxone Inteon from Syngenta, Glyphosate-HT was Touchdown HiTech from Syngenta, and Glyphosate-WM was Roundup WeatherMax from Monsanto.

A7813 provided very rapid desiccation of weeds and wheat, which was consistent with previous paraquat formulations. Glyphosate applied 10 DBH provided at least 90% control of weeds, but control with glyphosate applied 7 DBH gave less than 40% control on August 10 with the Hitech formulation giving slightly better activity than the WeatherMax formulation. Metsulfuron plus 2,4-D or carfentrazone gave less than 20% control of weeds on August 10. Visual evaluation of treatment effect on desiccation of wheat vegetation could not separate herbicide treatments from untreated wheat on August 10. Grain moisture also was largely unaffected by herbicide desiccation.