2008 Evaluation of Fall and Spring Applications of Everest Herbicide in Winter Wheat

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Fall pre-plant treatments (PP) were applied on September 6, 2007 to 2 leaf mixed bromus species (downy brome (dobr) and Japanese brome (jabr)) with 68° F, 44% RH, cloudy sky and east wind at 6 mph. 'Jerry' HRWW was seeded on September 14, 2007. Fall pre-emergence treatments (PRE) were applied on September 24 to 4 leaf mixed bromus species with 45° F, 82% RH, clear sky and northwest wind at 12 mph. Fall post emergence treatments (FPOST) were applied on October 4 to 2 leaf winter wheat and to 2" tall mixed bromus species with 51° F, 49% RH, cloudy sky and north wind at 7 mph. Winter crop survival was very poor (<15%). Spring dormancy break treatments (SPOST1) were applied on May 4 to 3 ½ leaf winter wheat and to tillering downy brome, 3 leaf Japanese brome (jabr) and to one leaf wild oat (wiot) with 50° F, 48% RH, clear sky and northeast wind at 2 mph. The trial was re-seeded no-till with 'Dapps' HRSW on May 28. This re-seeding did not take due to weed competition and droughty growing conditions. Spring tiller initiation treatments (SPOST2) were applied on June 16 to 3 leaf spring wheat and to flowering downy brome, Japanese brome in the late boot stage, 5 leaf wild oat and to 4 leaf Persian darnel (peda) with 46° F, 92% RH, clear sky and calm 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 trial was a randomized complete block design with four replications. Downy brome, Japanese brome, wild oat and Persian darnel populations averaged 22, 6, 0.1 and 2 plants per square foot, respectively. The trial was located on a clay loam soil with 24% sand, 42% silt and 34% clay. Plots were evaluated for crop injury on October 11 and for weed control on June 18 and on July 31. The trial was not harvested.

Summary

Crop injury was not observed. Although control was marginal, it appears that Everest has some activity on Russian thistle in this trial and little activity on kochia or wild buckwheat. Field bindweed control was excellent with most treatments. This control may be attributed to fall applied glyphosate uptake, although, there may also be some synergism with Everest. All treatments provided excellent season long control of downy brome and Japanese brome regardless of application timing. All herbicide treatments had very little activity on Persian darnel. Fall applications (trts 2, 3, 4, 6, 7, 8 and 10) did not provide adequate carryover to control wild oats, with the exception of fall applied Olympus (trt 14).

	Treatment	Product rate	App. timing	10/11	June 18							Plant	July 31			
				inj	kocz	ruth	fibw	wibw	dobr	jabr	peda	height	dobr	jabr	wiot	peda
		oz/A		% control								cm	% control			
1	Untreated			0	0	0	0	0	0	0	0	60	0	0	0	0
2	Glyphosate + NIS + AMS	24 + 0.5% + 1.5 lb	PP	0	0	52	96	2	99	99	0	71	99	99	0	0
3	Glyphosate + NIS + AMS + Everest	24 + 0.5% + 1.5 lb + 0.61	PP	0	0	81	99	0	99	99	0	66	99	99	10	0
4	Glyphosate + NIS + AMS + Everest / Everest + Basic Blend	24 + 0.5% + 1.5 lb + 0.306 / 0.306 + 1%	PP / FPOST	0	20	84	94	0	99	99	0	65	99	99	5	2
5	Glyphosate + NIS + AMS + Everest / Everest + 28% N + Basic Blend	24 + 0.5% + 1.5 lb + 0.306 / 0.306 + 50% + 1%	PP / SPOST1	0	0	85	96	18	99	99	0	64	97	99	88	0
6	Glyphosate + NIS + AMS	24 + 0.5% + 1.5 lb	PRE	0	0	12	72	0	99	99	0	65	99	97	0	0
7	Glyphosate + NIS + AMS + Everest	24 + 0.5% + 1.5 lb + 0.61	PRE	0	0	21	84	1	99	99	0	64	99	99	5	0
8	Glyphosate + NIS + AMS + Everest / Everest + Basic Blend	24 + 0.5% + 1.5 lb + 0.306 / 0.306 + 1%	PRE / FPOST	0	0	45	97	0	99	99	0	64	97	99	25	0
9	Glyphosate + NIS + AMS + Everest / Everest + 28% N + Basic Blend	24 + 0.5% + 1.5 lb + 0.306 / 0.306 + 50% + 1%	PRE / SPOST1	0	0	69	66	0	99	99	0	64	99	99	94	12
10	Glyphosate + NIS + AMS / Everest + Basic Blend	24 + 0.5% + 1.5 lb / 0.61 + 1%	PP / FPOST	0	12	71	99	0	99	99	0	63	99	99	30	0

continued		Product	App.	10/11	June 18							Plant	July 31			
	Treatment	rate	timing	inj	kocz	ruth	fibw	wibw	dobr	jabr	peda	height	dobr	jabr	wiot	peda
		oz/A		% control								cm	% control			
11	Glyphosate + NIS + AMS / Everest + 28% N + Basic Blend	24 + 0.5% + 1.5 lb / 0.61 + 50% + 1%	PP / SPOST1	0	5	85	94	42	99	99	0	66	97	99	96	25
12	Glyphosate + NIS + AMS / Everest + Basic Blend / Everest + 28% N + Basic Blend	24 + 0.5% + 1.5 lb / 0.306 + 1% / 0.61 + 50% + 1%	PP / FPOST / SPOST1	0	0	84	98	12	99	99	0	66	97	99	97	2
13	Glyphosate + NIS + AMS / Everest + Basic Blend / Everest + Basic Blend	24 + 0.5% + 1.5 lb / 0.306 + 1% / 0.306 + 1%	PP / FPOST / SPOST2	0	22	84	94	15	99	99	0	61	94	99	99	25
14	Glyphosate / Olympus + NIS	24 / 0.92 + 0.5%	PP / FPOST	0	0	84	94	0	99	99	0	64	99	99	87	0
15	Glyphosate / Rimefire + Basic Blend	24 / 1.75 + 1%	PP / SPOST2	0	42	58	93	1	99	99	0	63	99	99	99	25
	C.V. %			0	303	33	20	231	0	0	0	6	4	1	23	239
	LSD 5%			NS	NS	29	25	22	1	1	NS	NS	5	2	11	21

NS = no statistical difference between treatments.

Evaluation of Fall and Spring Applications of PowerFlex Herbicide for Tough Grassy Weed Control in Winter Wheat

Eric Eriksmoen, Hettinger, ND

'Jerry' HRWW was seeded on September 14, 2007. Fall treatments were applied on October 4 to two leaf winter wheat and to one leaf downy brome (dobr) with 51° F, 49% RH, cloudy sky and north wind at 7 mph. Winter crop survival was very poor (<15%). Spring treatments were applied on May 4 to 3 ½ leaf winter wheat and to tillering downy brome, 3 leaf Japanese brome (jabr) and to one leaf wild oat (wiot) with 54° F, 51% RH, clear sky and west wind at 9 mph. 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 trial was sprayed with 10 oz/A Starane to control broadleaf weeds on June 16. The trial was a randomized complete block design with four replications. Downy brome, Japanese brome, wild oat and Persian darnel populations averaged 22, 6, 0.1 and 2 plants per square foot, respectively. Plots were evaluated for crop injury on October 11, May 12, June 10 and on July 2, and for grassy weed control on June 10, July 2 and on July 31. The trial was not harvested.

Summary

Crop injury was not observed. Initial observations showed excellent downy brome control from all treatments except for the fall applied Olympus Flex treatment (trt 3), however, later observations of this treatment also showed excellent control. All treatments provided excellent season long control of Japanese brome. All treatments provided excellent wild oat control except for the fall applied PowerFlex treatment (trt 1). Fall applied Maverick (trt 4) and spring applied PowerFlex (trt 5) were the only treatments that had significant activity on Persian darnel.

	Treatment	Product rate	App. timing	10/11 inj	5/12 inj.	June 10 inj	June 10 dobr	June 10 jabr	July 2 inj	July 2 dobr	July 2 jabr	July 2 wiot	July 2 peda	July 31 dobr	July 31 jabr	July 31 peda
		oz/A		% control												
1	PowerFlex+Agral 90+AMS	3.5+0.5%+1.7kg	Fall	0	0	0	97	99	0	97	99	77	0	94	99	0
2	Olympus + Agral 90	0.9 + 0.5%	Fall	0	0	0	98	99	0	82	99	96	0	94	99	0
3	Olympus Flex+Agral 90+AMS	3.17+0.5%+1.7kg	Fall	0	0	0	74	99	0	74	97	93	0	97	99	0
4	Maverick + Agral 90	0.67 + 0.5%	Fall	0	0	0	94	99	0	99	99	90	60	97	99	88
5	PowerFlex + Agral 90 + AMS	3.5+0.5%+1.7kg	Spg	0	0	0	99	99	0	94	99	94	72	94	99	58
6	Olympus + Agral 90	0.9 + 0.5%	Spg	0	0	0	97	99	0	94	97	99	8	92	99	0
7	Olympus Flex+Agral 90+AMS	3.17+0.5%+1.7kg	Spg	0	0	0	97	99	0	90	99	97	12	94	99	5
8	Maverick + Agral 90	0.67 + 0.5%	Spg	0	0	0	99	99	0	62	99	92	5	84	87	0
9	Untreated	0		0	0	0	0	0	0	0	0	0	0	0	0	0
	C.V. %			0	0	0	12	0	0	15	2	11	61	10	9	38
	LSD 5%			NS	NS	NS	15	1	NS	17	3	13	16	12	12	9

NS = no statistical difference between treatments.

Wheat variety tolerance to Everest. Williston 2007. Neil Riveland

Five hard red spring wheat varieties and five durum varieties were planted on May 8th into land fallowed in 2006 using a cone seeder having 6 inch row spacing, seeding at 1,000,000 PLS/a. Each plot was 8 rows wide (four feet) and 16 feet long. HRS Wheat varieties included were Vida, Reeder, Faller, Howard and Steele-ND. Durum varieties included were Mountrail, Lebsock, Alkabo, Grenora and Divide. All treatments were applied perpendicular to seeding, within each block or range. Each block was then a treatment and there were six treatments and three replications. The experiment design was a split plot in a RCBD with Everest treatments as whole plots and varieties as split plots with three replications. Pre-emergence (PE) treatments were applied on May 10 to a dry soil surface with 42 F temperature, 75% clear sky, wind from 10 degrees at 5-7 mph and RH 75%. Post-emergence treatments were applied June 5 to 3-4 leaf wheat with 75 F air temperature, 73 F soil temperature, 85% clear sky, wind from 165 degrees at 6-8 mph and 34% RH. We used one 15 foot boom with wind cones, mounted on a G-Allis Chalmers tractor to apply all the treatments, delivering 10 gals/a at 40 psi through 8001 flat fan nozzles to each 16 foot range of varieties. First rain received after application was 0.91 inches on May 13 and 14. No other herbicides were applied for weed control since there was no early plan to harvest the plots. Plots were evaluated for crop injury on June 3 (PE treatments only) June 16 and June 30. Plant height was measured on July 25. Wheat was machine harvested on August 24. Soil pH was 6.2 and organic matter content was 1.7%.

Table 1: Summary of Wheat Variety Tolerance to Everest - RCBD Analysis

Treatment/Timing/Rate a	Variety	Heading Date	Crop Injury-b- June 3	June 16	June 30	Plant cms	Height inches	Test Weight lbs/b	Yield bus/a
		fr 6/1	%						
Untreated Check	Vida	28	0.0	0.0	0.0	71.7	28.2	55.7	37.1
Untreated Check	Reeder	28	0.0	0.0	0.0	68.3	26.9	56.1	37.0
Untreated Check	Faller	30	0.0	0.0	0.0	66.7	26.3	53.7	34.8
Untreated Check	Howard	27	0.0	0.0	0.0	74.3	29.2	55.7	34.5
Untreated Check	Steele-ND	27	0.0	0.0	0.0	75.7	29.8	56.7	39.9
Untreated Check	Lebsock	29	0.0	0.0	0.0	72.0	28.3	57.1	27.9
Untreated Check	Mountrail	30	0.0	0.0	0.0	67.0	26.4	55.5	26.4
Untreated Check	Alkabo	30	0.0	0.0	0.0	70.7	27.8	56.8	31.2
Untreated Check	Grenora	29	0.0	0.0	0.0	66.7	26.3	55.2	31.8
Untreated Check	Divide	31	0.0	0.0	0.0	70.0	27.6	55.4	28.2
Everest PE .408 oz	Vida	28	6.7	8.3	5.0	70.3	27.7	55.1	35.8
Everest PE .408 oz	Reeder	29	13.3	18.3	15.0	64.3	25.3	56.7	32.8
Everest PE .408 oz	Faller	30	20.0	25.0	21.7	66.7	26.2	53.1	30.7
Everest PE .408 oz	Howard	28	25.0	25.0	18.3	70.3	27.7	55.7	31.2
Everest PE .408 oz	Steele-ND	27	16.7	15.0	11.7	70.3	27.7	56.4	32.7
Everest PE .408 oz	Lebsock	31	30.0	53.3	51.7	62.0	24.4	55.7	18.4
Everest PE .408 oz	Mountrail	31	26.7	53.3	41.7	60.7	23.9	54.4	21.1
Everest PE .408 oz	Alkabo	30	28.3	41.7	36.7	63.3	24.9	55.8	21.8
Everest PE .408 oz	Grenora	31	30.0	56.7	38.3	61.3	24.1	53.4	22.5
Everest PE .408 oz	Divide	32	35.0	48.3	41.7	65.7	25.9	54.9	20.3

Table 1: Summary of Wheat Variety Tolerance to Everest - RCBD Analysis continued.

Treatment/Timing/Rate a	Variety	Heading Date fr 6/1	-----Crop Injury-b--- June 3	June 16	June 30	Plant cms	Height inches	Test Weight lbs/b	Yield bus/a
			----------%----------						
Everest PE .816 oz	Vida	29	16.7	18.3	16.7	66.3	26.1	54.3	31.9
Everest PE .816 oz	Reeder	29	28.3	40.0	35.0	59.7	23.5	54.5	31.0
Everest PE .816 oz	Faller	31	30.0	45.0	33.3	62.3	24.5	52.0	28.7
Everest PE .816 oz	Howard	30	43.3	55.0	45.0	66.7	26.3	53.9	27.6
Everest PE .816 oz	Steele-ND	28	23.3	23.3	21.7	70.0	27.6	54.9	32.4
Everest PE .816 oz	Lebsock	32	50.0	70.0	63.3	60.0	23.6	55.0	15.0
Everest PE .816 oz	Mountrail	33	51.7	75.0	70.0	56.7	22.3	53.6	13.3
Everest PE .816 oz	Alkabo	31	53.3	71.7	70.0	59.7	23.5	55.2	15.3
Everest PE .816 oz	Grenora	32	58.3	75.0	66.7	52.7	20.7	53.1	13.2
Everest PE .816 oz	Divide	34	53.3	71.7	75.0	58.3	23.0	53.2	14.5
Everest PE .306 oz/Post .306	Vida	28	3.3	16.7	20.0	65.7	25.9	55.7	32.1
Everest PE .306 oz/Post .306	Reeder	29	15.0	25.0	20.0	61.3	24.1	55.4	33.0
Everest PE .306 oz/Post .306	Faller	32	28.3	43.3	33.3	62.0	24.4	51.8	29.2
Everest PE .306 oz/Post .306	Howard	28	18.3	30.0	21.7	66.3	26.1	53.9	30.1
Everest PE .306 oz/Post .306	Steele-ND	29	8.3	28.3	23.3	64.7	25.5	55.7	30.3
Everest PE .306 oz/Post .306	Lebsock	32	50.0	73.3	55.0	58.3	23.0	55.5	14.9
Everest PE .306 oz/Post .306	Mountrail	33	36.7	76.7	50.0	59.7	23.5	54.6	16.9
Everest PE .306 oz/Post .306	Alkabo	32	21.7	63.3	41.7	60.7	23.9	56.1	20.0
Everest PE .306 oz/Post .306	Grenora	31	26.7	75.0	50.0	53.7	21.1	53.7	18.5
Everest PE .306 oz/Post .306	Divide	33	43.3	66.7	46.7	60.3	23.8	54.3	19.5
Everest PE .408 oz/Post .408	Vida	29	10.0	21.7	16.7	63.7	25.1	54.1	31.0
Everest PE .408 oz/Post .408	Reeder	29	13.3	28.3	20.0	64.3	25.3	55.4	32.8
Everest PE .408 oz/Post .408	Faller	31	28.3	48.3	36.7	62.7	24.7	51.6	26.6
Everest PE .408 oz/Post .408	Howard	28	26.7	35.0	30.0	65.3	25.7	53.8	28.1
Everest PE .408 oz/Post .408	Steele-ND	28	15.0	38.3	30.0	65.0	25.6	55.9	31.2
Everest PE .408 oz/Post .408	Lebsock	33	50.0	78.3	53.3	58.7	23.1	55.2	17.2
Everest PE .408 oz/Post .408	Mountrail	33	46.7	76.7	53.3	63.0	24.8	54.0	16.8
Everest PE .408 oz/Post .408	Alkabo	32	33.3	75.0	53.3	60.0	23.6	55.6	20.1
Everest PE .408 oz/Post .408	Grenora	33	46.7	76.7	53.3	56.3	22.2	53.0	17.9
Everest PE .408 oz/Post .408	Divide	34	36.7	63.3	53.3	64.7	25.5	53.7	18.7

Treatment/Timing/Rate a	Variety	Heading Date fr 6/1	Crop Injury-b- June 3	June 16	June 30	Plant cms	Height inches	Test Weight lbs/b	Yield bus/a
			----------%						
Everest Post .408 oz	Vida	30	0.0	8.3	33.3	74.0	29.1	56.1	34.8
Everest Post .408 oz	Reeder	30	0.0	18.3	40.0	68.0	26.8	57.1	33.9
Everest Post .408 oz	Faller	32	0.0	25.0	33.3	66.3	26.1	53.5	30.9
Everest Post .408 oz	Howard	29	0.0	15.0	38.3	71.0	28.0	56.7	34.2
Everest Post .408 oz	Steele-ND	29	0.0	18.3	40.0	70.0	27.6	56.9	35.0
Everest Post .408 oz	Lebsock	32	0.0	30.0	40.0	65.3	25.7	58.8	25.0
Everest Post .408 oz	Mountrail	32	0.0	21.7	51.7	63.3	24.9	57.7	24.9
Everest Post .408 oz	Alkabo	32	0.0	20.0	50.0	65.7	25.9	58.7	28.9
Everest Post .408 oz	Grenora	32	0.0	21.7	45.0	63.0	24.8	56.0	27.2
Everest Post .408 oz	Divide	34	0.0	35.0	45.0	69.0	27.2	57.2	26.6
HIGH MEAN		34	58.3	78.3	75.0	75.7	29.8	58.8	39.9
LOW MEAN		27	0.0	0.0	0.0	52.7	20.7	51.6	13.2
EXP MEAN		30	20.0	35.7	32.6	64.7	25.5	55.1	26.8
C.V. %		2	39.6	24.2	33.1	6.4	6.4	1.2	8.9
LSD 5%		1	12.8	14.0	17.5	6.7	2.7	1.1	3.9
LSD 1%		2	16.9	18.5	23.1	8.9	3.5	1.4	5.1

a = All PE treatments included Quad 7, a basic blend adjuvant from Agsco, at 0.25%v/v. All post treatments included Quad 7 at 1%.

b = Crop injury based on stunting and delay in growth and plant development.

MAIN EFFECT

Table 2: Performance of six Everest application rates averaged over ten wheat varieties

Treatment/Timing/Rate	Heading Date fr 6/1	Crop Injury June 3 %	Crop Injury June 16 %	Crop Injury June 30 %	Plant Height inches	Test Weight lbs/b	Yield bus/a
Untreated Check	29.0	0.0	0.0	0.0	27.6	55.7	32.8
Everest PE .408 oz	29.6	23.2	34.5	28.2	25.7	55.1	26.7
Everest PE .816 oz	30.8	40.8	54.5	49.7	24.1	53.9	22.2
Everest PE .306 oz/Post .306 oz	30.7	25.2	49.8	36.2	24.1	54.6	24.4
Everest PE .408 oz/Post .408 oz	31.0	30.7	54.2	40.0	24.5	54.2	24.0
Everest Post .408 oz	31.2	0.0	21.3	41.7	26.6	56.8	30.1
LSD 5%	0.9	8.6	11.4	12.2	1.46	0.71	2.16
LSD 1%	1.2	12.2	16.2	17.3	2.07	1.01	3.07

MAIN EFFECT

Table 3: Performance of ten wheat varieties averaged over six Everest treatments.

Variety	Heading Date fr 6/1	Crop Injury June 3 %	Crop Injury June 16 %	Crop Injury June 30 %	Plant Height inches	Test Weight lbs/b	Yield bus/a
HRSW							
Vida	28.7	6.1	12.2	15.3	27.0	55.1	33.7
Reeder	29.0	11.7	21.7	21.7	25.3	55.8	33.4
Faller	30.8	17.8	31.1	26.4	25.3	52.6	30.1
Howard	28.3	18.9	26.7	25.6	27.1	54.9	30.9
Steele-ND	27.7	10.6	20.6	21.1	27.2	56.0	33.5
DURUM							
Lebsock	31.4	30.0	50.8	43.9	24.6	56.2	19.7
Mountrail	32.1	26.9	50.6	44.4	24.3	54.9	19.8
Alkabo	31.3	22.8	45.3	41.9	24.9	56.3	22.8
Grenora	31.3	26.9	50.8	42.2	23.2	54.0	21.8
Divide	33.1	28.1	47.5	43.6	25.4	54.7	21.2
LSD 5%	0.4	4.6	4.5	6.1	1.01	0.37	1.46
LSD 1%	0.5	6.0	5.9	8.1	1.34	0.49	1.94

Table 4: Performance of ten wheat varieties at six Everest application rates

Treatment/Timing/Rate	Variety	Heading Date fr 6/1	Crop Injury June 3	Crop Injury June 16	Crop Injury June 30	Plant Height inches	Test Weight lbs/b	Yield bus/a
			%	%	%			
Untreated Check	Vida	28.0	0.0	0.0	0.0	28.20	55.7	37.1
Everest PE .408 oz	Vida	28.3	6.7	8.3	5.0	27.67	55.0	35.7
Everest PE .816 oz	Vida	29.0	16.7	18.3	16.7	26.13	54.3	31.9
Everest PE .306 oz/Post .306 oz	Vida	28.3	3.3	16.7	20.0	25.87	55.6	32.0
Everest PE .408 oz/Post .408 oz	Vida	28.7	10.0	21.7	16.7	25.07	54.1	30.9
Everest Post .408 oz	Vida	29.7	0.0	8.3	33.3	29.10	56.1	34.8
Untreated Check	Reeder	28.3	0.0	0.0	0.0	26.9	56.0	37.0
Everest PE .408 oz	Reeder	28.7	13.3	18.3	15.0	25.3	56.7	32.7
Everest PE .816 oz	Reeder	28.7	28.3	40.0	35.0	23.4	54.5	31.0
Everest PE .306 oz/Post .306 oz	Reeder	29.3	15.0	25.0	20.0	24.1	55.4	32.9
Everest PE .408 oz/Post .408 oz	Reeder	29.3	13.3	28.3	20.0	25.3	55.4	32.7
Everest Post .408 oz	Reeder	29.7	0.0	18.3	40.0	26.8	57.0	33.8
Untreated Check	Faller	29.7	0.0	0.0	0.0	26.2	53.6	34.7
Everest PE .408 oz	Faller	29.7	20.0	25.0	21.7	26.2	53.1	30.6
Everest PE .816 oz	Faller	31.0	30.0	45.0	33.3	24.5	52.0	28.7
Everest PE .306 oz/Post .306 oz	Faller	31.7	28.3	43.3	33.3	24.4	51.7	29.1
Everest PE .408 oz/Post .408 oz	Faller	30.7	28.3	48.3	36.7	24.6	51.5	26.6
Everest Post .408 oz	Faller	32.0	0.0	25.0	33.3	26.1	53.5	30.9
Untreated Check	Howard	27.3	0.0	0.0	0.0	29.2	55.7	34.5
Everest PE .408 oz	Howard	27.7	25.0	25.0	18.3	27.7	55.6	31.2
Everest PE .816 oz	Howard	29.7	43.3	55.0	45.0	26.2	53.9	27.6
Everest PE .306 oz/Post .306 oz	Howard	27.7	18.3	30.0	21.7	26.1	53.9	30.1
Everest PE .408 oz/Post .408 oz	Howard	28.3	26.7	35.0	30.0	25.7	53.7	28.0
Everest Post .408 oz	Howard	29.0	0.0	15.0	38.3	27.9	56.6	34.2
Untreated Check	Steele-ND	26.7	0.0	0.0	0.0	29.7	56.7	39.8
Everest PE .408 oz	Steele-ND	26.7	16.7	15.0	11.7	27.7	56.3	32.7
Everest PE .816 oz	Steele-ND	27.7	23.3	23.3	21.7	27.5	54.8	32.4
Everest PE .306 oz/Post .306 oz	Steele-ND	28.7	8.3	28.3	23.3	25.4	55.6	30.2
Everest PE .408 oz/Post .408 oz	Steele-ND	28.0	15.0	38.3	30.0	25.6	55.8	31.1
Everest Post .408 oz	Steele-ND	28.7	0.0	18.3	40.0	27.5	56.8	34.9
Untreated Check	Lebsock	29.0	0.0	0.0	0.0	28.3	57.1	27.9
Everest PE .408 oz	Lebsock	30.7	30.0	53.3	51.7	24.4	55.6	18.3
Everest PE .816 oz	Lebsock	32.0	50.0	70.0	63.3	23.6	55.0	15.0
Everest PE .306 oz/Post .306 oz	Lebsock	31.7	50.0	73.3	55.0	22.9	55.5	14.9
Everest PE .408 oz/Post .408 oz	Lebsock	32.7	50.0	78.3	53.3	23.0	55.2	17.2
Everest Post .408 oz	Lebsock	32.3	0.0	30.0	40.0	25.7	58.8	25.0

Table 4: Performance of ten wheat varieties at six Everest application rates continued

Treatment/Timing/Rate	Variety	Heading Date fr 6/1	Crop Injury June 3 %	Crop Injury June 16 %	Crop Injury June 30 %	Plant Height inches	Test Weight lbs/b	Yield bus/a
Untreated Check	Mountrail	30.0	0.0	0.0	0.0	26.4	55.4	26.3
Everest PE .408 oz	Mountrail	31.3	26.7	53.3	41.7	23.9	54.4	21.0
Everest PE .816 oz	Mountrail	32.7	51.7	75.0	70.0	22.3	53.6	13.2
Everest PE .306 oz/Post .306 oz	Mountrail	33.0	36.7	76.7	50.0	23.5	54.6	16.9
Everest PE .408 oz/Post .408 oz	Mountrail	33.3	46.7	76.7	53.3	24.8	53.9	16.8
Everest Post .408 oz	Mountrail	32.3	0.0	21.7	51.7	24.9	57.6	24.9
Untreated Check	Alkabo	30.3	0.0	0.0	0.0	27.8	56.7	31.2
Everest PE .408 oz	Alkabo	30.3	28.3	41.7	36.7	24.9	55.8	21.8
Everest PE .816 oz	Alkabo	31.3	53.3	71.7	70.0	23.4	55.2	15.2
Everest PE .306 oz/Post .306 oz	Alkabo	32.0	21.7	63.3	41.7	23.8	56.0	19.9
Everest PE .408 oz/Post .408 oz	Alkabo	32.0	33.3	75.0	53.3	23.6	55.5	20.1
Everest Post .408 oz	Alkabo	32.0	0.0	20.0	50.0	25.8	58.7	28.9
Untreated Check	Grenora	29.3	0.0	0.0	0.0	26.2	55.1	31.8
Everest PE .408 oz	Grenora	30.7	30.0	56.7	38.3	24.1	53.4	22.4
Everest PE .816 oz	Grenora	32.0	58.3	75.0	66.7	20.7	53.1	13.1
Everest PE .306 oz/Post .306 oz	Grenora	31.3	26.7	75.0	50.0	21.1	53.6	18.4
Everest PE .408 oz/Post .408 oz	Grenora	32.7	46.7	76.7	53.3	22.2	52.9	17.8
Everest Post .408 oz	Grenora	32.0	0.0	21.7	45.0	24.8	55.9	27.1
Untreated Check	Divide	31.3	0.0	0.0	0.0	27.5	55.3	28.1
Everest PE .408 oz	Divide	32.3	35.0	48.3	41.7	25.8	54.8	20.2
Everest PE .816 oz	Divide	33.7	53.3	71.7	75.0	22.9	53.2	14.4
Everest PE .306 oz/Post .306 oz	Divide	33.3	43.3	66.7	46.7	23.7	54.3	19.5
Everest PE .408 oz/Post .408 oz	Divide	34.0	36.7	63.3	53.3	25.4	53.6	18.6
Everest Post .408 oz	Divide	34.0	0.0	35.0	45.0	27.1	57.1	26.6
	LSD 5%	1.0	11.2	10.9	15.0	NS	0.91	3.59
	LSD 1%	1.3	14.8	14.5	19.9	NS	1.21	4.75

Pre-emergence control of wild oat. Howatt, Roach, and Harrington. Preplant incorporated (PPI) treatments were applied to soil and incorporated twice with a field cultivator at 9:30 AM, May 6 with 59°F, 10% RH, 5% cloud cover, 4 mph wind at 180°, and damp soil at 42°F. 'Alsen' hard red spring wheat was seeded near Fargo and preemergence (PRE) treatments were applied to soil on May 6 with 81°F, 17% RH, 5% cloud cover, 2 mph wind at 180°, and dry soil at 59°F. The post emergence treatment (2-3L) was applied to three-leaf wheat and wild oat (3,000 plants/yd^2) on June 6 with 57°F, 86% RH, 100% cloud cover, 5 to 8 mph wind at 45° and wet soil at 58°F. Treatments were applied with a backpack sprayer delivering 17 (PPI and PRE) and 8.5 (2-3L) gpa at 38 psi through 11002 and 11001 TT nozzles, respectively, to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

			5/28	7/2	7/21
Treatment	Rate	Growth Stg	Wild oat	Wild oat	Wht population
	oz/A		%		plants/m^2
Triallate	12	PPI	93	93	30
Trifluralin	5	PPI	88	77	35
Triallate+Trifluralin	12+5	PPI	95	88	55
Flucarbazone	0.21	PRE	60	27	36
Pyroxasulfone	2	PRE	77	27	28
Pyroxasulfone	3	PRE	82	57	31
Clodinafop-ng	0.8	2-3L	0	96	67
Untreated	0		0	0	16
			15	11	42
			16	12	28

Wheat injury was not visible on wheat tissue. Treatments with triallate provided greater than 90% control of wild oat on 5/28. Pyroxasulfone gave 77 and 82% control depending on rate, but flucarbazone only provided suppression of 60% control. Without post emergence herbicide only triallate was able to maintain wild oat control, providing near 90% control. Clodinafop provided 96% control. Wheat population generally was greater with clodinafop than herbicides applied to the soil. This could mean that herbicide residues in the soil cause more damage to wheat stands than initial competition with weeds. Although not demonstrated here, yield of treatments that include a preemergence component typically result in greater yield than post emergence only counterparts.

Effect of preemergence flucabazone on post emergence wild oat control. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 12. Treatments (PRE) were applied preemergence on May 6 with 81°F, 17% RH, 5% cloud cover, 3 mph wind at 180°, and dry soil at 59°F. Treatments (2L) were applied to two- to three-leaf wheat and wild oat (3,000 plants/yd^2) on June 5 with 57°F, 86%RH, 100% cloud cover with a dew present, 5 to 8 mph wind at 45°, and wet soil at 58°F. A backpack sprayer delivering 8.5 gpa at 38 psi was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

			6/20	7/02
Treatment	Rate	Appl	Wioa	Wioa
	oz/A	timing	%	
Flcz	0.21	PRE	17	0
Flcz/Flcz+Basic Blend	0.21/0.14+1%	PRE/2L	87	75
Flcz/GF-1847+MSO	0.21/0.1+16	PRE/2L	91	82
Flcz/Fenx	0.21/0.8	PRE/2L	96	90
Flcz/Clodinafop-ng	0.21+0.4	PRE/2L	96	98
Flcz/Tral-SC+Supercharge+AMS	0.21/1.5+0.5%+9.5	PRE/2L	92	73
Flcz/Pinoxaden	0.21/0.42	PRE/2L	94	98
Flcz+Basic Blend	0.14+1%	2L	92	77
GF-1847+MSO	0.1+16	2L	93	82
Fenx	0.8	2L	94	93
Clodinafop-ng	0.4	2L	95	98
Tral-SC+Supercharge+AMS	1.5+0.5%+9.5	2L	94	83
Pinoxaden	0.42	2L	94	96
CV			2	4
LSD			4	7

Herbicides did not cause injury to wheat. Flucarbazone applied PRE had a minor effect on this wild oat density. On 6/20, PRE flucarbazone appeared to result in less control with post emergence flucarbazone, but control was at least 87%. Control between other post emergence herbicide pairs was similar with and without preemergence flucarbazone. By 7/2, control with post emergence flucarbazone was not affected by PRE flucarbazone, but tralkoxydim was 10 percentage points less when PRE flucarbazone was included compared with tralkoxydim alone.

Weed control with flucarbazone applied pre-emergence. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 21. Pre-emergence treatments were applied to rosette to 8 inch curly dock (5 plants/yd^2) and rosette to 6 inch field pennycress (2 to 15 plants/yd^2) on May 14 with 59°F, 33% RH, 0% cloud cover, 4 mph wind at 180°, and dry soil at 45°F. Treatments (2L) were applied to two-leaf wheat, 2 to 3 ft tall curly dock, and 1 ft tall field pennycress on June 23 with 84°F, 37% RH, 20% cloud cover, 2 to 5 mph wind at 210°, and dry soil at 77°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates, excluding the wheat evaluated on July 30 and height that included only three replicates.

			5/21	5/21	5/28	5/28	6/20	6/20	6/20	7/14	7/14	7/21	7/30	8/29
Treatment	Rate	Application timing	Curly dock	Field pennycress	Curly dock	Field pennycress	Wheat	Curly dock	Field pennycress	Wheat	Curly dock	Wheat height	Wheat	Yield
	oz/A						%					inch	%	bu/A
Glyphosate[a]+AMS	6.5+16	Pre	33	40	65	93	0	96	99	0	88	37	0	33
Glyt+Flcz+Dicamba+AMS	6.5+0.21+1+16	Pre	38	53	75	93	0	96	99	0	89	37	0	34
Glyt+Flcz+Dica+AMS/Flcz+BB	6.5+0.21+1+16/0.14+1%	Pre/2L	25	55	60	96	0	96	99	8	99	34	3	37
Glyt+Flcz+Dica+AMS/Flcz+BB	6.5+0.21+1+16/0.21+1%	Pre/2L	40	53	86	95	0	96	99	18	99	31	7	33
Glyt+Flcz+Dica+AMS/Prcz+BB	6.5+0.21+1+16/0.14+1%	Pre/2L	35	48	91	95	0	98	99	4	99	35	0	40
Glyt+Flcz+Dica+AMS/Clf-ng	6.5+0.21+1+16/0.4	Pre/2L	40	53	91	96	0	98	99	0	90	35	0	39
Glyt+AMS/Pinoxaden	6.5+16/0.86	Pre/2L	30	38	78	93	0	95	99	0	84	36	0	34
Untreated	0		0	0	0	0	0	0	0	0	0	35	0	20
CV			24	10	22	3	0	1	0	56	4	3	86	25
LSD			10	6	23	4	0	2	0	3	5	2	2	15

[a] Glyphosate was RoundUp WeatherMax from Monsanto.

Preemergence treatments did not cause wheat injury; however, flucarbazone or propoxycarbazone applied post emergence caused injury that was expressed as stunting. The injury was greater for flucarbazone than propoxycarbazone and there was greater stunting with the higher rate of flucarbazone. Injury from propoxycarbazone was not noticed later in the season, but flucarbazone stunting remained through the season with 0.21 oz/A causing a 4-inch reduction in height. Potential effect of herbicide injury on wheat yield was confounded by surviving curly dock plants which resulted in a large LSD.

Addition of flucarbazone and dicamba to glyphosate preemergence did not improve curly dock control. Post emergence herbicide was needed to maximize curly dock control. Flucarbazone and dicamba with glyphosate provided better field pennycress control initially than glyphosate alone, but the benefit was not lasting as field pennycress is susceptible to glyphosate. Lack of a post-seeding flush of weeds minimized the benefit of soil residual products.

Wild oat control with Pre-Pare + glyphosate tank mixes. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 20 at 90 lb/A into 6-inch rows in a conventionally tilled field. Herbicides treatments were applied either preemergence (PRE) on May 22 or postemergence (POST) on June 17 at the 3- to 4-leaf stage. Wild oat (Wioa) ranged from 2- to 4-leaf with 3-15 plants/ft^2. Green foxtail (Grft) was 1.5-4 inches tall with 0-10 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

Pre-Pare is labeled for preemergence use in wheat for residual control of wild oat and green foxtail. Pre-Pare has the same active ingredient as Everest. This study compared Pre-Pare applied PRE to Pre-Pare followed by Everest or other herbicides applied postemergence. Pre-Pare alone or Pre-Pare followed by Everest caused light to moderate crop injury, mostly in the form of stunting. This injury subsided to less than 10% by late July. Pre-Pare alone provided good wild oat and foxtail control, while Pre-Pare followed by Everest, Olympus, or Discover provided excellent wild oat and foxtail control. Despite the early stunting caused by Pre-Pare and/or Everest, there was no significant difference in wheat yield or test weight between treatments.

			HRSW					Wioa[b]	Grft[b]	HRSW	
Treatment[a]	Rate	Timing	June 21	July 3	July 15	July 25	Height Jul 21	July 25	July 25	Yield	TW
			----------% injury----------				inches	--% control--		bu/A	lb/bu
Glyphosate	0.40 lb ae	PRE	0	0	0	0	26.4	0	0	35.5	61.3
Pre-Pare + dicamba	0.3oz + 2oz	PRE	14	11	8	3	25.8	87	88	37.5	61.8
Pre-Pare + dicamba / Everest + Quad 7	0.3oz + 2oz / 0.2oz + 1%	PRE / POST	22	17	14	4	26.9	99	98	41.0	61.6
Pre-Pare + dicamba / Everest + Quad 7	0.3oz + 2oz / 0.3oz + 1%	PRE / POST	26	22	16	9	24.9	100	98	35.9	61.4
Pre-Pare + dicamba / Olympus + Quad 7	0.3oz + 2oz / 0.2oz + 1%	PRE / POST	17	15	10	3	26.1	95	93	38.4	61.9
Pre-Pare + dicamba / Discover NG	0.3oz + 2oz / 6.4 fl oz	PRE / POST	14	9	7	1	25.7	95	95	41.2	61.5
Axial XL	16.4 fl oz	POST	0	0	0	0	26.4	100	96	40.6	62.0
Untreated			0	0	0	0	26.9	0	0	37.6	61.7
LSD (0.05)			3.4	5.1	5.6	3.9	NS	3.5	4.7	NS	NS
CV			17	32	47	88	5	3	4	18	1

[a] *Glyphosate (0.4 lb ae) + AMS (2.5 lb) applied PRE to all treatments.*
[b] *Wioa=Wild oat; Grft=Green foxtail*

PrePare Herbicide in Spring Wheat

Eric Eriksmoen, Hettinger, ND

Pre-plant treatments (PP) were applied on May 4 to 2" tall mixed bromus species (downy brome and Japanese brome) with 46° F, 66% RH, clear sky and northwest wind at 5 mph. 'Dapps' HRSW was seeded on May 28. Post-emergence treatments (POST) were applied on June 16 to 3 leaf wheat and to flowering downy brome (dobr), Japanese brome (jabr) in the late boot, 4 ½ leaf wild oat (wiot) and to 4 leaf Persian darnel (peda) with 48° F, 90% RH, clear sky and south wind at 2 mph. 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 trial was a randomized complete block design with four replications. Downy brome, Japanese brome, wild oat and Persian darnel populations averaged 22, 6, 0.1 and 2 plants per square foot, respectively. The trial was located on a clay loam soil with 24% sand, 42% silt and 34% clay. Plots were evaluated for crop injury and weed control on June 10, June 26 and on August 1, and for plant height on July 18. The trial was not harvested due to poor crop development caused by drought.

Summary

Crop injury was not observed on any treatment (data not shown). Glyphosate alone (trt 1) provided excellent season long control of both bromus species but did not control either wild oat or Persian darnel which had not emerged prior to the pre-plant application. The addition of PrePare + Banvel with glyphosate (trt 2) did not enhance grassy weed control above the glyphosate alone treatment. POST applied Everest treatments (trt 3 & 4) provided some activity on Persian darnel with the higher rate (trt 4) providing comparable control to Discover NG (trt 6) but not as good as the Axial XL treatment (trt 7). All POST application treatments provided excellent wild oat control. There were no significant differences for plant height between treatments.

	Treatment	Product rate	App. timing	- June 10 - dobr	jabr	------ June 26 ------ dobr	jabr	peda	Plant height	---------- August 1 ---------- dobr	jabr	peda	wiot
		oz/A		---------- % control ----------					cm	--------- % control ---------			
1	Glyphosate + AMS	11.4 + 1lb	PP	99	99	99	99	0	48	99	99	0	0
2	Glyph + AMS + PrePare + Banvel	11.4 + 1lb + 0.306 + 2.0	PP	99	99	99	99	0	49	99	99	0	0
3	Glyph + AMS + PrePare + Banvel / Everest + Basic Blend	11.4 + 1lb + 0.306 + 2.0 / 0.204 + 1%	PP / POST	99	99	99	99	20	48	99	99	0	96
4	Glyph + AMS + PrePare + Banvel / Everest + Basic Blend	11.4 + 1lb + 0.306 + 2.0 / 0.306 + 1%	PP / POST	99	99	99	99	48	46	99	99	42	94
5	Glyph + AMS + PrePare + Banvel / Olympus + Basic Blend	11.4 + 1lb + 0.306 + 2.0 / 0.2 + 1%	PP / POST	99	99	99	99	0	48	99	99	0	94
6	Glyph + AMS + PrePare + Banvel / Discover NG	11.4 + 1lb + 0.306 + 2.0 / 6.4	PP / POST	99	99	99	99	45	44	97	99	42	97
7	Glyphosate + AMS / Axial XL	11.4 + 1lb / 16.4	PP / POST	99	99	99	99	82	46	94	94	98	98
	C.V. %			0	0	0	0	74	6.9	2.5	2.0	50	4.4
	LSD 5%			NS	NS	NS	NS	30	NS	NS	3	20	5

NS = no statistical difference between treatments.

PrePare Herbicide on Light Soils in Spring Wheat

Eric Eriksmoen, Hettinger, ND

Howard' HRSW was seeded on April 30. Pre-emergence treatments (PRE) were applied on May 5 to 2" tall mixed bromus species (downy brome and Japanese brome) with 71° F, 22% RH, partly cloudy sky and west wind at 8 mph. Post-emergence treatments (POST) were applied on June 1 to 4 leaf wheat and to heading downy brome (dobr), tillering Japanese brome (jabr), 2 leaf wild buckwheat (wibw) and to 3 leaf volunteer canola (cano) with 61° F, 64% RH, clear sky and northwest wind at 4 mph. 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 trial was a randomized complete block design with four replications. Bromus species, wild buckwheat and volunteer canola populations averaged 10, 2.75 and 2 plants per square foot, respectively. The trial was located on a loamy soil with 41% sand, 35% silt and 24% clay. Plots were evaluated for crop injury on June 12, for plant height on July 18 and for weed control on June 12 and August 1. The trial was harvested on August 9.

Summary

Crop injury was initially observed on all treatments but at very low levels. There were significant differences between treatments for plant height, however, there did not appear to be any trends associated with these differences. There were no significant differences for weed control between herbicide treatments. Test weights from the herbicide treatments were all significantly higher than the untreated check, with the exception of treatment 12. All herbicide treatments were significantly higher in grain yield than the untreated check. There were also significant differences between herbicide treatments, however, there did not appear to be any clear trends associated with these differences.

	Treatment	Product rate	App. timing	June 12 inj.	June 12 brom	June 12 cano	June 12 wibw	Plant height	August 1 jabr	August 1 dobr	August 1 wibw	Test weight	Grain yield
		oz/A		% control				cm	% control			lbs/bu	bu/A
1	Untreated	--	--	0	0	0	0	64	0	0	0	52.9	8.2
2	Glyphosate + AMS /	11.4 + 1lb /	PRE /										
	Widematch + MCPA	16 + 8	POST	2	94	91	94	67	98	97	95	56.4	16.6
3	Glyph + AMS + PrePare /	11.4 + 1lb + 0.204 /	PRE /										
	Widematch + MCPA	16 + 8	POST	3	96	92	94	69	99	95	92	57.6	19.1
4	Glyph + AMS + PrePare /	11.4 + 1lb + 0.306 /	PRE /										
	Widematch + MCPA	16 + 8	POST	2	92	92	97	72	96	94	95	57.9	20.9
5	Glyph + AMS + PrePare + Banvel /	11.4 + 1lb + 0.204 + 2.0 /	PRE /										
	Widematch + MCPA	16 + 8	POST	2	91	91	92	68	97	93	92	57.9	19.0
6	Glyph + AMS + PrePare + Banvel /	11.4 + 1lb + 0.306 + 2.0 /	PRE /										
	Widematch + MCPA	16 + 8	POST	4	96	94	95	71	99	96	95	56.2	17.4
7	Glyph + AMS + PrePare + ET /	11.4 + 1lb + 0.204 + 1.0 /	PRE /										
	Widematch + MCPA	16 + 8	POST	1	94	94	95	72	99	94	96	59.6	18.4
8	Glyph + AMS + PrePare + ET /	11.4 + 1lb + 0.306 + 1.0 /	PRE /										
	Widematch + MCPA	16 + 8	POST	2	92	92	95	71	99	94	96	58.7	15.7
9	Glyph + AMS + PrePare /	11.4 + 1lb + 0.204 /	PRE /										
	Everest + Widematch + MCPA	0.204 + 16 + 8	POST	2	95	94	95	69	99	94	95	57.4	18.3
10	Glyph + AMS + PrePare /	11.4 + 1lb + 0.306 /	PRE /										
	Everest + Widematch + MCPA	0.204 + 16 + 8	POST	2	94	95	96	71	98	96	96	57.6	16.6
11	Glyph + AMS + PrePare /	11.4 + 1lb + 0.204 /	PRE /										
	Discover NG + Widematch + MCPA	6.4 + 16 + 8	POST	3	92	91	94	71	99	98	95	58.0	17.6
12	Glyph + AMS + PrePare /	11.4 + 1lb + 0.306 /	PRE /										
	Discover NG + Widematch + MCPA	6.4 + 16 + 8	POST	2	92	92	96	72	99	92	95	56.0	17.5
13	Glyph + AMS /	11.4 + 1lb /	PRE /										
	Everest + Widematch + MCPA	0.408 + 16 + 8	POST	6	95	95	95	67	99	96	92	58.3	16.3
14	Glyph + AMS /	11.4 + 1lb /	PRE /										
	Discover NG + Widematch + MCPA	12.8 + 16 + 8	POST	4	89	92	95	69	97	94	95	58.7	16.5
	C.V. %			125	3.7	3.0	2.5	4.7	2.7	4.9	2.3	3.9	12.1
	LSD 5%			NS	5	4	3	5	3	6	3	3.2	2.9

NS = no statistical difference between treatments.

Weed control with Pre-Pare, glyphosate, ET, and dicamba. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 15 at 90 lb/A into 7.5-inch rows in a conventionally tilled field. Herbicides treatments were applied either preemergence (PRE) on May 20 or postemergence (POST) on June 16 at the 5- to 5.5-leaf stage. Yellow foxtail (Yeft) ranged from 0.5-3 inches tall with 0-6 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

Pre-Pare is labeled for preemergence use in wheat for residual control of wild oat and green foxtail. Pre-Pare has the same active ingredient as Everest. Pre-Pare applied PRE did not cause visible crop injury. Everest applied POST caused slight crop injury, mostly in the form of stunting. This injury subsided to less than 10% by mid-July. Pre-Pare alone provided about 45% yellow foxtail control. Pre-Pare followed by Everest provided about 90% yellow foxtail control, which was better than Everest applied alone POST at a higher rate (0.4 oz). The split application of Pre-Pare/Everest provided similar yellow foxtail control to Discover NG. There were no significant differences in wheat yield or test weight between treatments.

			HRSW			Yeft[b]		HRSW	
Treatment[a]	Rate[b]	Timing	Jun 21	Jul 14	Height Jul 21	Jun 21	Jul 24	Yield	TW
			% injury		inches	% control		bu/A	lb/bu
Untreated Check			0	0	33.2	0	0	69.7	61.4
Widematch + MCPA	1 pt + 0.5 pt	POST	0	0	34.0	0	0	70.5	63.2
Pre-Pare / Widematch + MCPA	0.3 oz / 1 pt + 0.5 pt	PRE / POST	0	0	33.9	57	43	63.6	62.2
Pre-Pare + Dicamba / Widematch + MCPA	0.3 oz + 2 oz / 1 pt + 0.5 pt	PRE / POST	0	0	33.8	57	47	73.3	62.9
Pre-Pare + ET / Widematch + MCPA	0.3 oz + 1 fl oz / 1 pt + 0.5 pt	PRE / POST	0	0	34.3	60	45	72.5	62.4
Pre-Pare + Dicamba / Everest + Widematch + MCPA	0.3 oz + 2 oz / 0.2 oz + 1 pt + 0.5 pt	PRE / POST	8	5	32.8	70	90	70.0	62.5
Pre-Pare + ET / Everest + Widematch + MCPA	0.3 oz + 1 fl oz / 0.2 oz + 1 pt + 0.5 pt	PRE / POST	7	5	31.0	70	91	67.8	62.5
Everest + Widematch + MCPA	0.4 oz + 1 pt + 0.5 pt	POST	15	9	33.0	22	76	61.5	61.2
Discover NG + Widematch + MCPA	12.8 oz + 1 pt + 0.5 pt	POST	0	0	33.9	27	86	67.5	61.9
LSD (0.05)			2.1	0.9	NS	7	12.7	NS	NS
CV			37	25	4	10	14	8	1

[a] *Glyphosate (0.4 lb ae) + AMS (2.5 lb) applied PRE to all treatments.*
[b] *Yeft=Yellow foxtail*

Safety of preplant saflufenacil in wheat. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 21. Treatments were applied preplanting to 6 to 8 inch tall curly dock (3 plants/yd^2) and 6 inch tall field pennycress (2 to 15 plants/yd^2) on May 14 with 59°F, 33% RH, 0% cloud cover, 4 mph wind at 180°, and dry soil at 45°F. Treatments were applied with a backpack sprayer delivering either 5 or 10 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates, except for the July 31 wheat evaluation of wheat height and yield which did not include the first replicate. Harvest for yield was on August 29.

			6/20	7/14	7/21	7/31	5/21	5/21	5/28	5/28	6/20	6/20	7/14	8/29
Treatment	Rate	Spray volume	Wheat	Wheat	Wheat height	Wheat	Curly dock	Field pennycress	Curly dock	Field pennycress	Curly dock	Field pennycress	Curly dock	Yield
	oz/A	gpa	%		inch	%								bu/A
Saflufenacil+Agridex+AMS	0.26+1%+24	10	0	0	33	0	3	18	8	73	53	75	40	7
Glyt[a]+Agridex+AMS	12+1%+24	10	0	0	33	0	30	38	86	93	99	99	96	36
Saflufenacil+Glyt+Agridex+AMS	0.26+12+1%+24	10	0	0	33	0	33	40	91	97	96	99	78	31
Saflufenacil+Glyt+Agridex+AMS	0.36+12+1%+24	10	0	0	33	0	40	50	91	95	93	99	71	25
Saflufenacil+Glyt+Agridex+AMS	0.72+12+1%+24	10	0	0	33	0	43	53	91	94	97	99	75	26
Carfentrazone+Glyt+Agridex+AMS	0.128+12+1.5%+32	10	0	0	34	0	43	58	92	96	93	99	74	24
Saflufenacil+Glyt+Agridex+AMS	0.36+12+1%+12	5	0	0	35	0	40	50	95	97	97	99	97	38
Untreated	0		0	0	30	0	0	0	0	0	0	0	0	2
CV			0	0	5	0	11	9	3	3	4	2	5	20
LSD			0	0	3	0	5	5	4	3	5	3	5	8

[a] Glyphosate was Buccaneer from West Central.

Saflufenacil did not cause a response in wheat, but poor control of curly dock resulted in very low yield, 7 bu/A. Glyphosate alone was slow to kill weeds but the curly dock did not recover. When saflufenacil or carfentrazone was included with glyphosate weed response was more rapid but control was less complete. Glyphosate plus saflufenacil or carfentrazone provided 93 to 97% control of curly dock on 6/20, but control was less than 80% on 7/14.

Preplant weed control with Saflufenacil. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 21. Treatments were applied preplant to 4 to 8 inch tall curly dock (3 plants/yd^2) and 6 inch tall field pennycress (5 to 10 plants/yd^2) on May 14 with 58°F, 26% RH, 0% cloud cover, 4 mph wind at 180°, and dry soil at 50°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates except for wheat evaluation on July 30 and wheat height which did not include replicate one.

Treatment	Rate	6/20 Wheat	7/14 Wheat	7/21 Wheat height	7/30 Wheat	5/21 Curly dock	5/21 Field pennycress	5/28 Curly dock	5/28 Field pennycress	6/20 Curly dock	6/20 Field pennycress	7/14 Curly dock	8/29 Yield
	oz/A	%		inch	%								bu/A
Glyt[a]+NIS+AMS	12+0.25%+24	0	0	35	0	23	30	66	72	96	99	99	42
Glyt+Saflufenacil+PO+AMS	12+0.26+1%+24	0	0	37	0	40	43	89	93	92	99	81	41
Glyt+2,4-D Amine[b] + NIS+AMS	12+8+0.25%+30	0	0	35	0	53	58	96	99	99	99	97	41
Glyt+Carf&2,4-D+NIS+AMS	6+4.06+0.25%+12	0	0	36	0	15	48	25	85	90	99	81	39
Glyt+Saflufenacil+PO+AMS	6+0.26+1%+12	0	0	36	0	23	33	71	68	88	99	66	33
Untreated	0	0	0	35	0	0	0	0	0	0	0	0	17
CV		0	0	3	0	30	31	35	34	2	0	7	16
LSD		0	0	2	0	11	16	30	35	3	0	8	10

[a] Glyphostae was Buccaneer from West Central.
[b] 2,4-D Amine was Weedar 64.

Herbicide treatments did not cause a visible response in wheat or reduce wheat height compared with nontreated wheat. Control with glyphosate plus saflufenacil or 2,4-D was greater than glyphosate alone at early evaluations, but saflufenacil antagonized glyphosate control of curly dock by 7/14. Weed control with glyphosate at 6 oz/A and saflufenacil was not as good as control with glyphosate at 12 oz/A plus saflufenacil. Late-season control of curly dock with glyphosate plus carfentrazone and 2,4-D was better than glyphosate plus saflufenacil, but not as good as when glyphosate was included at a higher rate.

Sharpen for preplant weed control in wheat, Carrington, 2008. (Greg Endres). The field trial was established under conventional till on a Heimdahl-Emrick loam soil with 2.8% organic matter and 6.8 pH. The experimental design was a randomized complete block with three replicates. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 35 psi through 8001 flat-fan nozzles to the center 6.7 ft of 10 by 25 ft plots on June 4 with 52 F, 99% RH, 100% cloudy sky, and 4 mph wind to tillering (4-leaf) volunteer wheat, 1-inch tall common lambsquarters and 0.5- to 1-inch tall wild buckwheat. Rainfall totaled 0.32 inches during 2 days before and 1.34 inches 2 days after herbicide application. 'Faller' HRS wheat was seeded on June 17.

Volunteer wheat control ranged from 75 to 76% with all herbicide treatments (Table). Common lambsquarters control was excellent with all treatments three weeks after treatment. Sharpen plus glyphosate provided improved common lambsquarters control compared to other treatments eight weeks after application. Wild buckwheat control was highest three weeks after treatment, and control was 74% eight weeks after treatment with Sharpen plus glyphosate. No crop response was observed.

Table.

Herbicide		Weed control[1]								
		6/9			6/26		7/18		7/29	
Treatment[2]	Rate	vwht	colq	wibw	colq	wibw	colq	wibw	colq	wibw
	fl oz product/A	%								
Glyphosate + NIS + AMS	32 + 0.25% + 0.5% v/v	76	98	65	90	67	57	48	53	58
Sharpen + glyt + COC + AMS	0.72 + 32 + 1% + 0.5% v/v	75	99	99	92	88	73	73	76	74
2,4-D + glyt + NIS + AMS	16 + 32 + 0.25% + 0.5% v/v	75	98	70	96	58	67	60	47	52
Untreated check	0	0	0	0	0	0	0	0	0	0
C.V. (%)		5.0	1.2	4.9	3.1	17.5	14.6	21.6	15.5	24.0
LSD (0.05)		6	2	6	4	19	14	20	14	22

[1]vwht=volunteer wheat;colq=common lambsquarters; wibw=wild buckwheat.

[2]Glyt=MiragePlus (UAP); NIS=Preference (WinField); AMS=Blue Diamond Activator; COC=Destiny (Winfield); 2,4-D=Cornbelt 4 lb Amine.

2008 Kixor Herbicide Applied Pre-Plant to Hard Red Spring Wheat at Hettinger, ND (Eriksmoen)

Treatments were applied on May 6 to 1/2" kochia (kocz), 1/2" Russian thistle (ruth), 1 leaf wild buckwheat (wibw), 1 leaf field bindweed (fibw) and volunteer canola (cano) had not emerged with 57 deg. F, 57% RH, heavy dew, cloudy sky and south wind at 7 mph. 'Howard' HRSW was seeded on May 14. Treatments were applied with a tractor mounted CO2 propelled plot sprayer delivering 10 gpm at 30 psi through PK-01E80 nozzles to 5' by 28' plots. The trial was a randomized complete block design with three replications. Kochia, Russian thistle, wild buckwheat, canola and field bindweed populations were 25, 27, 8, 3 and 0.25 plants per sq. ft, respectively. Plots were evaluated for crop injury and weed control on May 13, May 27, June 10, June 29 and on July 27. The trial was harvested on August 7.

		May 13				May 27					June 10					
Treatment	Product Rate	kocz	ruth	wibw	fibw	inj	kocz	ruth	wibw	cano	inj	kocz	ruth	wibw	fibw	cano
	oz/A	% control														
1 Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 Glyphosate + NIS + AMS	32 + 0.25% + 17 lbs	30	47	43	23	0	57	96	47	0	0	50	90	3	0	0
3 Kixor + Glyphosate + COC + AMS	0.72 + 32 + 1% + 17 lbs	57	80	73	30	0	68	99	99	0	0	57	95	95	0	0
4 2,4-D + Glyphosate + NIS + AMS	16 + 32 + 0.25% + 20 lbs	60	47	80	53	0	68	99	98	83	0	47	93	87	2	47
CV %		24	8	12	51	0	11	4	13	35	0	9	9	10	346	65
LSD 5%		17	7	12	27	NS	11	5	16	15	NS	7	12	9	NS	15

continued:

		June 29						July 27						Grain
Treatment	Product Rate	inj	kocz	ruth	wibw	fibw	cano	inj	kocz	ruth	wibw	fibw	cano	yield
		% control												bu/A
1 Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	7.6
2 Glyphosate + NIS + AMS	32 + 0.25% + 17 lbs	0	53	50	0	0	0	0	50	50	0	0	0	10.1
3 Kixor + Glyphosate + COC + AMS	0.72 + 32 + 1% + 17 lbs	0	53	90	77	0	0	0	80	83	57	0	0	9.7
4 2,4-D + Glyphosate + NIS + AMS	16 + 32 + 0.25% + 20 lbs	0	67	92	3	3	80	0	80	90	0	0	96	8.4
CV %		0	18	4	20	346	0	0	0	5	41	0	11	13.8
LSD 5%		NS	16	5	8	NS	1	NS	1	6	12	NS	5	2.4

Summary: Crop injury was not observed. Kochia and Russian thistle populations were very high and hindered stand establishment. The addition of Kixor or 2,4-D to glyphosate (trts 3 and 4) enhanced season long kochia and Russian thistle control over glyphosate alone (trt 2). All treatments provided some initial supression (leaf burn) of wild buckwheat and field bindweed but these symptoms tended to deminish over time. Treatments were applied prior to canola emergence, however, there appeared to be enough residual 2,4-D in treatment 4 to provide significant season long control of canola. Grain yields were very poor due to hot and dry growing conditions and due to a poor stand caused by intense weed competition during crop emergence.

Pyroxasulfone use in wheat. Howatt, Roach, and Harrington. Preemergence treatments were applied May 14 with 63°F, 22% RH, 5% cloud cover, and dry soil surface at 52°F. 'Alsen' hard red spring wheat was seeded near Fargo on May 12. Treatments were applied with a backpack sprayer delivering 17 gpa at 38 psi through 11002 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. The plots were harvested for yield on August 26.

		6/11	7/2	8/26
Treatment	Rate	Wheat	Wheat	Yield
	oz/A	——— % ———		bu/A
Flucarbazone	0.21	0	0	49
Pyroxasulfone	1	0	0	53
Pyroxasulfone	1.5	0	0	47
Pyroxasulfone	2	0	0	45
Pyroxasulfone	3	0	0	38
Pyroxasulfone	4	0	0	44
Pyroxasulfone	6	0	0	42
Untreated	0	0	0	41
		0	0	17
		0	0	14

Weeds did not emerge in the study area in large enough populations to evaluate residual weed control. Herbicides did not cause visible wheat injury. Yield was not confounded by competition with weeds; therefore, yield differences would demonstrate crop response to the herbicides. Herbicides did not affect wheat yield. There appeared to be a general trend for less yield as pyroxasulfone rate increased, but even the high rate of 6 oz/A pyroxasulfone wheat yield was 42 bu/A. Pyroxasulfone appears to be a viable weed control option for wheat.

Pyroxasulfone use in wheat, second location. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded at Casselton ND on May 9. Treatments were applied on May 9 with 58°F, 34% RH, 20% cloud cover, 4 mph wind at 0°, and damp soil at 50°F. Treatments were applied with a backpack sprayer delivering 17 gpa at 38 psi through 11002 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. The plot was harvested for yield on August 19.

Treatment	Rate	6/16 Wheat	7/2 Wheat	8/19 Yield
	oz/a	%	%	bu/A
Flucarbazone	0.21	0	0	51
Pyroxasulfone	1	0	0	43
Pyroxasulfone	1.5	0	0	48
Pyroxasulfone	2	0	0	49
Pyroxasulfone	3	0	0	48
Pyroxasulfone	4	0	0	48
Pyroxasulfone	6	0	0	53
Untreated	0	0	0	56
CV		0	0	13
LSD		0	0	10

Weeds did not emerge in the study area for evaluation of residual weed control. Herbicides did not cause visible wheat injury. Yield was not confounded by competition with weeds; therefore, yield differences would demonstrate crop response to the herbicides. Herbicides did not affect wheat yield. Unlike the experimental location in Fargo, higher rates of pyroxasulfone did not tend to decrease wheat yield. The high rate of 6 oz/A pyroxasulfone resulted in wheat yield of 53 bu/A, while nontreated wheat produced 56 bu/A and wheat treated with flucarbazone produced 51 bu/A. Pyroxasulfone appears to be a viable weed control option for wheat.

Wild oat control with Pyroxasulfone. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo May 12. Preemergence treatments were applied May 6 with 81°F, 17% RH, 5% cloud cover, 5 mph wind at 180°, and dry soil at 59°F. A backpack sprayer delivering 17 gpa at 38 psi through 11002 TT nozzles was used to apply treatments to an area 7ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

		6/11	7/2
Treatment	Rate	Wheat	Wild oat
	oz/A	%	
Flucarbazone	0.21	0	3
Pyroxasulfone	1	0	3
Pyroxasulfone	1.5	0	3
Pyroxasulfone	2	0	3
Pyroxasulfone	3	0	78
Pyroxasulfone	4	0	80
Pyroxasulfone	6	0	90
Untreated	0	0	0
CV		0	11
LSD		0	6

Herbicide treatments did not cause visible wheat injury. Dry soil likely inhibited the activity of herbicides on wild oat. Less than 3 oz/A pyroxasulfone did not result in visible reduction of wild oat growth. However, this is a very dense population that typically exceeds 3,000 plants/yd^2. From 3 to 6 oz/A pyroxasulfone, wild oat control increased from 78 to 90%. Additional experiments will be included in a graduate project to further characterize the activity of pyroxasulfone on wild oat.

Wild oat control in wheat. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2) on June 5 with 57°F, 72% RH, 100% cloud cover, 5 to 6 mph wind at 45°, and wet soil at 60°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. Plots were machine harvested for yield on August 20.

		6/20	7/2	8/20
Treatment	Rate	Wioa	Wioa	Yield
	oz/A	——— % ———		bu/A
Mess+Brox&MCPA5+MSO	0.036+8+1%	68	68	15
Flucarbazone+Brox&MCPA5+Basic Blend	0.32+8+1%	70	67	15
Prcz&Mess+Brox&MCPA5+Basic Blend	0.178+8+1%	68	73	17
Immb+Brox&MCPA5+Basic Blend	5+8+1%	43	13	9
Prcz+Brox&MCPA5+Basic Blend	0.32+8+1%	70	53	18
GF-1847+Brox&MCPA5+NIS	0.21+8+0.25%	78	82	21
GF-1848[a]+NIS	1.68+0.25%	80	85	19
Tral-SC+Brox&MCPA5+Supercharge+AMS	2.9+8+0.5%+9.5	91	93	23
Fenoxaprop+Brox&MCPA5	0.8+8	90	77	26
Fenoxaprop+Brox&MCPA5	1.32+	90	94	26
Clodinafop+Brox&MCPA5	0.8+8	82	57	15
Pinoxaden+Brox&MCPA5	0.86+8	91	97	30
Difenzoquat+Brox&MCPA5	16+8	70	82	16
Untreated	0	0	0	3
CV		3	8	13
LSD		4	9	4

[a] GF-1848 was the premix of pyroxsulam, florasulam, and fluroxypyr, which will be sold as Goldsky from Dow Agrosciences.

ALS-inhibiting herbicides gave 68 to 80% control of wild oat on 6/20 except for imazamethabenz at 43%, while ACCase-inhibiting herbicides provided 82 to 91% control. Clodinafop gave less control than other ACCase inhibitors, but the reason was unknown. By 7/2, the foxtail rate of fenoxaprop gave only 77% control while the wild oat rate maintained 94% control, similar to pinoxaden and tralkoxydim. Difenzoquat gave 82% control, which was similar to GF compounds and better than other ALS inhibitors. ALS inhibitors were disadvantaged because of the cool, wet weather before, during, and after herbicides were applied. Intense competition early in the season substantially affected yield potential. Yield was greatest with pinoxaden at 30 bu/A, but fenoxaprop at either rate resulted in 26 bu/A.

Wild oat control in HRSW, Langdon 2008. John Lukach. 'Glenn' hrsw was seeded May 6 on conventional tillage. Pre-emergence Everest treatments were applied May 15 at 11am, 63F, 47RH, 8mph N wind, clear sky and dry foliage. The first weeds were emerging on May 15 so Glyphosate was included. The first rain was on May 19, 0.08 inch and next rain May 25, 0.13 inch. A tractor mounted CO2 sprayer used with hood on and XR8002 tips with four 20" spaced nozzles delivering 15 gal/a at 40psi was used. Post treatments were applied June 3, on 4 leaf wheat and wild oat, at 10am, 58F, 44RH, 13mph SE wind, cloudy with dry foliage. DG8001.5 tips on the same sprayer were used to deliver 10 gal/a at 35psi. Bronate Advanced, 0.8 pt/a, was applied to Everest PE only treatment on June 3. Wild oats was 1-4lf with 20-30/ft2, wild buckwheat 2 lf 1/ft2, common mallow 2 lf 1/ft2, and redroot pigweed 1" tall 2/ft2. Plot length was 25 feet and in a RCBD design with four replications.

Treatment	Rate oz ai/A	11-Jun Inju	26-Jun Wioa	7-Aug Wioa	26-Jun Wibw	26-Jun Coma	26-Jun Rrpw	Height	Yield	T. Wt.
		%						cm	bu/a	lb/bu
Prcz&Mess+Brox&MCPA5+Basic Blend	0.178+8+1%	0.5	98	98	90	100	100	103	60	61.1
GF-1848+NIS	1.68+0.25%	6.3	97	99	97	100	100	100	59	61.5
Pinoxaden+Brox&MCPA5+Adigor	0.86+8+0.075G	7.0	90	96	66	98	83	100	58	61.5
Mess+Brox&MCPA5+MSO	0.036+8+1%	6.3	86	91	88	99	100	106	52	61.7
GF-1847+Brox&MCPA5+NIS	0.21+8+0.25%	8.8	80	94	80	100	100	95	51	61.5
Flucarbazone+glyphosate+NIS+AMS PE / Flucarbazone+Brox&MCPA5	0.14+0.38lb+0.125%+8lb / 0.14 +8	5.0	66	80	100	100	100	102	51	61.5
Flucarbazone+Brox&MCPA5+Basic Blend	0.32+8+1%	10.0	79	82	95	100	100	102	50	61.8
Fenoxaprop+Brox&MCPA5	1.32+8	5.0	94	76	94	100	100	99	48	61.9
Immb+Brox&MCPA5+Basic Blend	5+8+1%	2.5	73	50	92	100	100	103	47	61.1
Tral-SC+Brox&MCPA5+Supercharge+AMS	2.9+8+0.5%+9.5	0.0	38	45	99	100	100	101	38	61.7
Prcz+Brox&MCPA5+Basic Blend	0.32+8+1%	0.8	44	48	100	100	100	98	37	61.2
Difenzoquat+Brox&MCPA5	16+8	57.5	59	43	80	100	100	95	30	58.6
Fenoxaprop+Brox&MCPA5	0.8+8	0.0	38	23	100	100	100	94	30	62.0
Flucarbazone+glyphosate+NIS+AMS PE / Brox&MCPA5	0.14+0.38lb+0.125%+8lb / 8	0.0	8	0	100	100	100	99	22	60.5
Clodinafop+Brox&MCPA5	0.8+8	0.0	3	0	100	100	100	96	14	61.5
Untreated	0	0.0	0	0	0	0	0	97	11	60.6
	C.V. %	102.7	33.2	29.8	14.8	1.5	6.4	4.7	22.8	1.1
	LSD 5%	10.0	28.1	24.5	18.2	2.0	8.4	6.7	13.3	0.9

The site has both ALS and ACC resistant wild oat. In 2008, Olympus and Discover gave poorer wild oat control that seen in previous years while Puma and Assert had better control than previously seen. Avenge had serious injury on the Glenn wheat which had not been seen previously at Langdon

Wild oat control in durum wheat, Williston 2008. Neil Riveland.

'Alkabo' durum wheat was planted on recrop (land cropped to wheat in 2007) in 7 inch rows at 90 lbs/a on April 25. All treatments were applied on June 10 with 59 F., 71% RH, soil temp 55 F, 90% clear sky and wind at 5-7 mph from 106 degrees to 5 leaf durum wheat and 3-5 leaf wild oats (most in the 4 to 5-leaf).We used a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor to apply the treatments, delivering 8.5 gals/a at 30 psi through 8001vs flat fan nozzles to a 6.67 ft wide area the length of 10 by 24 ft plots. First rain received after application was 0.11 inches on June 6. Experimental design was a randomized complete block design with four replications. Wild oat density averaged 5-9 plants/ft2 and green foxtail density was 12-15 plants/ft2 in reps 1,2 and 3. Rep 4 was abandon. Plots were evaluated for wild oat control July 5 and July 26. Wheat was not harvested.

Treatment a	Rate	Wioa Control 7/5	7/26
	oz/a	---- %	----
Mess+Brox&MCPA5+MSO	0.036+8+1%	73	79
Flucarbazone+Brox&MCPA5+Basic Blend	0.32+8+1%	89	93
Prcz&Mess+Brox&MCPA5+Basic Blend	0.178+8+1%	96	97
Immb+Brox&MCPA5+Basic Blend	5+8+1%	78	84
Prcz+Brox&MCPA5+Basic Blend	0.32+8+1%	90	95
GF-1847+Brox&MCPA5+NIS	0.21+8+0.25%	84	92
GF-1848+NIS	1.68+0.25%	78	88
Tral-SC+Brox&MCPA5+Supercharge+AMS	2.9+8+0.5%+9.5	94	97
Fenoxaprop+Brox&MCPA5	0.8+8	72	70
Fenoxaprop+Brox&MCPA5	1.32+8	60	58
Clodinafop+Brox&MCPA5	0.8+8	50	52
Pinoxaden+Brox&MCPA5+Adigor	0.86+8+0.075G	98	98
Difenzoquat+Brox&MCPA5	16+8	47	60
Untreated	0	0	0
EXP MEAN		72	76
C.V. %		19	19
LSD 5%		23	25

a - MSO, a methylated seed oil from Loveland
Quad 7 used as the basic blend adjuvant
NIS = R-11 from Wilbur-Ellis

Summary: No crop injury was recorded but was very difficult to rate by the variability in stand caused by dry growing season conditions and was the reason the crop was not harvested.

Wild oat control with pyroxsulam. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2), cotyledon to eight-leaf wild mustard (20 plants/yd^2), and cotyledon to three-leaf wild buckwheat (10 plants/yd^2) on June 5 with 56°F, 70% RH, 100% cloud cover, 5 to 7 mph wind at 45°, and wet soil at 60°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

		6/20	6/20	7/2	7/2	7/2	7/30	7/30
Treatment	Rate	Wheat	Wild oat	Wild oat	Wild mustard	Wild buckwheat	Wild oat	Wild buckwheat
	oz/A				%			
GF-1848[a]+Agral 90+AMS	1.26+0.5%+24	3	77	73	96	93	80	89
GF-1848+Agral 90	1.68+0.5%	3	78	82	97	92	87	93
GF-1848+Agral 90+AMS	1.68+0.5%+24	3	75	78	97	93	78	92
GF-1848+Assist	1.68+0.8%	3	68	82	98	89	75	83
GF-1848+MSO	1.68+0.8%	3	68	80	98	92	80	83
GF-1848+2,4-D+AMS	1.68+4+24	3	77	77	98	94	75	92
GF-1848+MCPA+AMS	1.68+6+24	3	77	78	97	95	85	95
GF-1848	1.68	3	75	85	97	92	87	96
GF-1847+Agral 90	0.21+0.5%	3	80	82	96	86	82	80
GF-1847+Agral 90+AMS	0.21+0.5%+24	3	82	77	97	82	75	27
GF-1847+Clpy&Flox+MCPA+ AMS	0.21+3+4+ 24	3	80	72	97	92	75	95
GF-1847+Flox+2,4-D+AMS	0.21+1.5+4+24	3	77	73	97	92	73	88
GF-1847+GF-2257+Agral 90+ AMS	0.21+1.5+0.5%+ 24	3	75	75	97	93	73	92
GF-1847	0.21	3	77	80	98	93	80	75
Pxdn+Clpy&Flox+MCPA	0.86+3+6	9	95	96	99	96	97	97
Fenx+Brox&Pyrasulfotol+AMS	1.32+2.9+24	3	91	90	99	96	92	97
Clfp+Thif-sg+Trib-sg	0.8+0.16+0.04	3	91	94	99	93	93	93
Flucarbazone+2,4-D	0.28+6	3	67	73	99	93	68	96
Prcz&Mess+Brox&MCPA5+ Agral 90+AMS	0.178+8+ 0.25%+24	3	72	78	99	95	77	96
Untreated	0	0	0	0	0	0	0	0
CV		8	3	5	1	4	6	11
LSD		1	4	6	1	6	8	15

[a] GF-1848 was the premix of pyroxsulam, florasulam, and fluroxypyr, which will be sold as Goldsky from Dow Agrosciences.

Pinoxaden plus clopyralid and fluroxypyr with MCPA caused 9% injury to wheat. Plants developed a general brownish-yellow discoloration over the entire foliage and tip margins of leaves were necrotic. Other herbicides caused 3% injury as slight chlorosis. Both levels of injury were not observed on 7/2. Adjuvants did not significantly improve control of wild oat with GF-1848. ACCase herbicides provided better control of wild oat than GF-1848, but GF-1848 gave similar wild oat control to other ALS herbicides. GF-1847 gave 82 to 86% control of wild buckwheat, but other herbicide treatments provided 92 to 96% control. All herbicides provided excellent control of wild mustard.

Evaluation of wild oat control with GoldSky in HRSW. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 20 at 90 lb/A into 7.5-inch rows into a conventionally tilled field. Herbicides treatments were applied postemergence (POST) on June 20 at the 4- to 5-leaf stage. Wild oat was 3- to 4-leaf with 0-3 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

GoldSky is a new grass and broadleaf herbicide for wheat. The objective of this study was to evaluate wild oat control and crop safety. Most treatments caused early chlorosis, but these symptoms quickly disappeared within two weeks after treatment. GoldSky generally provided good wild oat control (80-90%), which was similar to other herbicides. Axial provided the best wild oat control at 97%.

Pyroxsulam is one of three active ingredients in GoldSky. Pyroxsulam alone provided similar wild oat control to GoldSky. Wild oat control was enhanced slightly by AMS.

		HRSW						Wioa[c]		
Treatment[a]	Rate[b]	Jun 23	Jun 27	Jul 5	Jun 27	Jul 5	Jul 18	Jul 5	Jul 18	Jul 29
		--% chlorosis--			-% growth red-			----% control----		
GoldSky + NIS + AMS	0.75 pt + 0.5% + 0.5 lb	7	3	0	0	0	0	70	84	84
GoldSky + NIS	1 pt + 0.5%	7	3	0	0	0	0	81	83	83
GoldSky + NIS + AMS	1 pt + 0.5% + 1.5 lb	7	3	0	0	0	0	83	87	87
GoldSky + Assist	1 pt + 0.8%	7	3	0	0	0	0	68	78	78
GoldSky + MSO	1 pt + 0.8%	7	3	0	0	0	0	80	89	87
GoldSky + 2,4-De + AMS	1 pt + 0.5 pt + 1.5 lb	7	3	0	0	0	0	80	91	89
GoldSky + MCPe + AMS	1 pt + 0.75pt + 1.5 lb	7	3	0	0	0	0	83	92	92
GoldSky	1 pt	7	3	0	0	0	0	83	87	85
Pyrox + NIS	0.21 oz + 0.5%	7	3	0	0	0	0	73	85	85
Pyrox + NIS + AMS	0.21oz + 0.5% +1.5lb	7	3	0	0	0	0	87	94	90
Pyrox + MCPe + WideMatch + AMS	0.21 oz + 0.5pt + 1pt + 1.5 lb	7	3	0	0	0	0	83	86	86
Pyrox + Starane + 2,4-De + AMS	0.21 oz + 0.5pt + 0.5 pt + 1.5 lb	7	3	0	0	0	0	76	89	85
Pyrox + Exp + NIS + AMS	0.21 oz + 1.5oz + 0.5% + 1.5 lb	7	3	0	0	0	0	71	84	82
Pyrox	0.21 oz	6	3	0	0	0	0	79	86	83
Axial XL + WideMatch + MCPe	16.4 oz + 1 pt + 0.75 pt	3	0	0	0	0	0	93	99	97
Puma + Huskie + AMS	0.67 pt + 11 oz + 0.5 lb	0	0	0	0	0	0	85	78	76
Discover NG + AffinityTM	12.8 fl oz + 0.6 oz	0	0	0	0	0	0	81	61	59
Everest + 2,4-De	0.4 oz + 0.75 pt	4	2	0	4	5	0	69	85	85
Rimfire + Bro Adv + NIS + AMS	1.75 oz + 0.8 pt + 0.25% + 1.5 lb	8	3	0	0	3	0	75	84	85
Untreated		0	0	0	0	0	0	0	0	0
LSD (0.05)		0.7	0.6	NS	NS	1.3	NS	13.3	10.4	10.3
CV		7	16	0	0	195	0	11	8	8

[a] *All treatments were applied at the 4-leaf stage.*
[b] *Pyrox = Pyroxsulam (expressed in oz ai/A); NIS=Agral 90*
[c] *Wioa=Wild oat*

Wild oat control with SP20025 and SP17228. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2), cotyledon to eight-leaf wild mustard (20 plants/yd^2), and cotyledon to three-leaf wild buckwheat (10 plants/yd^2) on June 5 with 57°F, 73% RH, 100% cloud cover, 6 to 7 mph wind at 45°, and wet soil at 60°F with dew. The second treatment received bromoxynil and MCPA at 8 oz/A 10 d after treatment to provide broadleaf weed control. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. The plots were harvested for yield on August 20.

		6/20	7/2	7/2	7/2	7/30	8/20
Treatment	Rate	Wioa	Wioa	Wimu	Wibw	Wioa	Yield
	oz/A			%			bu/A
SP20025+AMS	4.5+8	94	93	98	80	92	40
SP17228	2	94	96	98	94	95	37
Fenx+Brox&Pyrasulfotol+AMS	1.32+2.9+8	90	89	98	80	90	40
SP20025+UAN	4.5+0.25	87	90	95	80	93	37
SP20025+NIS	4.5+0.25%	91	91	95	67	96	42
SP20025	4.5	91	89	96	82	97	46
Untreated	0	0	0	0	0	0	1
CV		2	4	2	6	2	10
LSD		3	6	4	8	3	6

Herbicides did not cause injury to wheat. SP17228 provided slightly better control of wild oat than fenoxaprop with broadleaf herbicides or SP20025 alone. Addition of AMS to SP20025 improved wild oat control to bring it equal to SP17228, 94% on 6/20. Effects to wild oat were similar on 7/2, but control of wild buckwheat was substantially better when bromoxynil and MCPA were applied in a separate treatment after SP17228 than for other treatments. This could result from more buckwheat exposure during application or the higher rate of bromoxynil, which is very active on wild buckwheat, in bromoxynil and MCPA compared with bromoxynil and pyrasulfotol. Addition of AMS or UAN slightly antagonized wild oat control with SP20025 on 7/30, but control with herbicides was at least 90%.

Weed control with two numbered compounds in wheat. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 8. Treatments were applied to four-leaf wheat; two- to four-leaf common cocklebur (8 plants/yd^2), common mallow (4 plants/yd^2), and redroot pigweed (15 plants/yd^2); 3 to 4 inch tall common lambsquarters (20 plants/yd^2); six- to eight-leaf wild mustard (12 plants/yd^2); two- to four-leaf yellow foxtail (60 plants/yd^2); and three- to five-leaf wild oat (20 plants/yd^2) on June 19 with 66°F, 56% RH, 0 % cloud cover, 1.4 mph wind at 360°, and moist soil at 68°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates. Harvest for yield was on August 19.

		7/02	7/02	7/02	7/02	7/02	7/02	7/02	7/02	7/11	7/11	7/11	7/11	7/11	7/11	7/11	7/22	7/22	8/19
Treatment	Rate	Wht	Cocb	Coma	Wimu	Rrpw	Colq	Yeft	Wioa	Cocb	Coma	Wimu	Rrpw	Colq	Yeft	Wioa	All bl	Wioa	Yield
	oz/A	%									%								bu/A
SP20025+AMS	4.5+8	0	90	90	97	97	97	96	96	99	99	99	99	99	99	99	99	99	51
SP17228	2	0	0	0	0	0	0	97	96	0	0	0	0	0	99	99	0	99	55
Fenx+Brox&Pyst+AMS	1.32+2.9+8	0	96	96	97	90	97	96	96	99	99	99	99	99	99	88	99	82	55
SP20025+UAN	4.5+0.25G	0	91	93	97	90	92	96	96	99	99	99	99	99	99	99	99	99	56
SP20025+NIS	4.5+0.25%	0	88	94	97	93	93	96	96	99	99	99	99	99	99	99	99	99	59
SP20025	4.5	0	96	97	97	90	95	93	93	99	99	99	99	99	99	99	99	99	58
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
CV		0	3	3	0	1	3	2	2	0	0	0	0	0	0	1	0	1	11
LSD		0	3	4	1	1	4	3	3	1	1	1	1	1	1	1	0	2	10

Herbicides did not cause injury to wheat. Vigorous wheat growth promoted rapid control of weeds with herbicides. SP17228 did not affect broadleaf weeds but provided excellent control of yellow foxtail and wild oat. Weed control with other treatments was excellent on broadleaf and grass weeds. The only anomaly occurred with fenoxaprop plus bromoxynil and pyrasulfotol, which did not maintain control of wild oat throughout the season. This treatment was the only herbicide combination to have wild oat remaining at the end of the season and was rated as 82% wild oat control. Surviving wild oat did not adversely affect wheat yield with this treatment, but a substantial amount of wild oat seed was returned to the soil.

Wild Oat control with a new product for grass control in wheat. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2), cotyledon to eight-leaf wild mustard (20 plants/yd^2), and cotyledon to three-leaf wild buckwheat (10 plants/yd^2) on June 5 with 58°F, 77% RH, 100% cloud cover, 4 to 7 mph wind at 45°, wet soil at 58°F with dew. The first and second treatments received bromoxynil and MCPA at 8 oz/A 10 d after treatment to provide broadleaf weed control. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. The plots were harvested for yield on August 20.

Treatment	Rate	6/20 Wioa	7/02 Wioa	7/02 Wimu	7/02 Wibw	7/30 Wioa	7/30 Wibw	8/20 Yield
	oz/A				%			bu/A
Fenoxaprop	1.32	91	97	92	89	96	72	33
SP 17228	2	90	98	96	93	98	78	33
Fenx+Broxl&Pyrasulfotol+AMS	1.32+2.9+8	88	95	98	92	90	87	33
SP 17228+Brox&Pyst+AMS	2+2.9+8	87	95	97	87	94	73	31
Fenx+Brox&MCPA5	1.32+8	91	95	98	89	90	78	32
Untreated	0	0	0	0	0	0	0	2
CV		2	2	2	6	2	10	9
LSD		4	3	3	9	3	13	5

Herbicides did not cause wheat injury. Wild oat control on 6/20 was essentially similar across herbicide treatments. On 7/2, wild oat control was slightly antagonized by treatments that included bromoxyil, but control was 95% with tank-mixes compared with 98% for SP 17228 alone. This trend was apparent on 7/30 with control of at least 90% compared with 96 to 98%. Wild buckwheat control was similar among treatments on 7/2, 87 to 93% control. Control of wild buckwheat declined slightly for all treatments to 7/30. Yield in nontreated plots was nearly nonexistent, but herbicides allowed wheat to produce 31 to 33 bu/A.

Evaluation of new Puma formulation in HRSW. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 5 at 100 lb/A into 6-inch rows in a conventionally tilled field. Herbicides treatments were applied postemergence on June 10 at the 4- to 5-leaf stage. Wild oat (Wioa) ranged from 3- to 6-leaf with 3-15 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

This study evaluated wild oat control with Puma compared to a new Puma formulation. Essentially no crop injury was observed with any treatment. Wild oat control was slightly higher with the standard Puma 1EC compared to an experimental formulation, but statistically they were not different. However, wheat yield and test weight also tended to be higher with the standard Puma 1EC formulation.

			HRSW			Wioa[a]		HRSW	
Treatment	Rate	Timing	Jun 21	Jun 26	Jul 9	Jul 9	Jul 22	Yield	TW
			------ % injury ------			% control		bu/A	lb/bu
Untreated			0	0	0	0	0	11.87	60.4
Puma 1 EC + Huskie	0.66 pt + 11 oz	4-5 leaf / + 7 day	0	0	0	95	94	32.4	62.7
New Puma + Huskie	14 fl oz + 11 oz	4-5 leaf / + 7 day	1	0	0	89	88	24.8	61.7
Puma 1 EC + Huskie + Dry AMS	0.66 pt + 11 oz + 0.5 lb	4-5 leaf	0	0	0	92	90	32.9	62.5
New Puma + Huskie + Dry AMS	14 fl oz + 11 oz + 0.5 lb	4-5 leaf	0	0	0	89	88	28.9	62.0
LSD (0.05)			NS	NS	NS	9.1	12	6.7	0.91
CV			387	0	0	7	9	14	0.8

[a] *Wioa=Wild oat*

Weed control and crop tolerance with Wolverine in HRSW. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 20 at 90 lb/A into 6-inch rows in a conventionally tilled field. Herbicides treatments were applied postemergence (POST) on June 17 at the 4-leaf stage. Wild oat (Wioa) ranged from 3- to 4-leaf with 0-15 plants/ft^2. Green foxtail (Grft) ranged from 1.5-4 inches tall with 0-10 plants/ft^2. Common lambsquarters (Colq) was 2-4 inches tall with 0-12 plants/ft^2. Wild buckwheat (Wibw) ranged from 2- to 4-leaf with 0-11 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

Wolverine is a new premix herbicide from Bayer that combines the ingredients from Puma and Huskie. The objective of this study was to evaluate weed control with Wolverine plus different adjuvants. In addition, a new Puma formulation was compared to the standard Puma formulation. All treatments provided good to excellent control of wild oat, green foxtail, lambsquarters, and wild buckwheat. It should be noted that there was a heavy population of larger wild oat in one corner of the study that resulted in slightly lower control for some treatments. Control was greater than 90% where wild oat was smaller and less dense.

			Wioa[a]	Grft[a]	Colq[a]	Wibw[a]	HRSW	
Treatment	Rate	Timing	July 25				Yield	TW
			---------- % control ----------				bu/A	lb/bu
Untreated			0	0	0	0	39.9	61.1
Wolverine + AMS	27.4 oz + 0.5 lb	POST	85	98	100	100	46.9	62.0
New Puma / Huskie[b] + AMS	14 oz / 11 oz + 0.5 lb	POST / + 7 day	93	98	100	100	45.1	62.6
Puma 1EC + Huskie + AMS	0.66 pt + 11 oz + 0.5 lb	POST	93	97	100	100	48.6	62.4
Wolverine + 28%N	27.4 oz + 1 qt	POST	82	98	100	100	50.1	62.3
Wolverine + NIS	27.4 oz + 0.25%	POST	87	97	100	100	49.2	62.1
Wolverine	27.4 oz	POST	95	97	100	100	49.5	62.2
LSD (0.05)			18.8	1.8	NS	NS	NS	0.73
CV			14	1	0	0	8	1

[a] *Wioa=Wild oat; Grft=Green foxtail; Colq=Common lambsquarters; Wibw=Wild buckwheat*
[b] *Huskie + AMS was applied 7 days after the New Puma application*

Adjuvant comparison with propoxycarbazone and mesosulfuron. Howatt, Roach, and Harrington. An experiment was established to compare MSO and basic blend adjuvants for propoxycarbazone and mesosulfuron activity. 'Alsen' hard red spring wheat was seeded May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2), cotyledon to eight-leaf wild mustard (20 plants/yd^2), and cotyledon to three-leaf wild buckwheat (10 plants/yd^2) on June 5 with 56°F, 70% RH, 100% cloud cover, 5 to 7 mph wind at 45°, and wet soil at 60°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. The plots were harvested for yield on August 20.

Treatment	Rate	6/20 Wioa	7/02 Wioa	7/02 Wimu	7/02 Wibw	7/30 Wioa	7/30 Wibw	8/20 Yield
	oz/A			%				bu/A
Prcz&Mess+MSO	0.178+0.19G	70	77	97	88	87	80	25
Prcz&Mess+BB	0.178+1%	72	80	97	91	86	78	21
Prcz&Mess+Brox&Pyst+ MSO	0.178+2.9+ 0.19G	62	78	97	78	87	65	24
Prcz&Mess+Brox&Pyst+ BB	0.178+2.9+ 1%	60	70	97	83	80	87	20
Prcz&Mess+Brox&MCPA5+ MSO	0.178+8+ 0.19G	62	72	97	83	82	80	24
Prcz&Mess+Brox&MCPA5+ BB	0.178+8+ 1%	60	78	97	83	84	80	26
Untreated	0	0	0	0	0	0	0	1
CV		3	3	0	7	5	16	20
LSD		3	4	NS	9	6	20	7

Herbicides did not cause injury to wheat. Adjuvant did not influence wild oat control on 6/20, but additional broadleaf herbicides antagonized control of wild oat by about 10 percentage points. By 7/30, bromoxynil and MCPA tended to reduce control of wild oat, but only bromoxynil and pyrasulfotol with basic blend adjuvant was less than control with propoxycarbazone and mesosulfuron alone. Bromoxynil and MCPA gave about 80% control of wild buckwheat. This was less than expected but plants were underneath wild oat foliage. Bromoxynil and pyrasulfotol with basic blend provided 87% control of wild buckwheat. Bromoxynil and pyrasulfotol with MSO provided 90% control of wild buckwheat in two of three replicates, while the other replicate received a 40% rating because of small plants that remained. Whether the plants emerged after herbicide application or the plants were shielded from spray by other plants could not be determined. Wild buckwheat control with propoxycarbazone and mesosulfuron was higher than expected at 78 to 80%.

Wild oat control with Rimfire tank mixes. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 20 at 90 lb/A into 6-inch rows in a conventionally tilled field. Herbicides treatments were applied postemergence on June 17 at the 3- to 4-leaf stage or June 24 at the 5-leaf stage. Wild oat (Wioa) ranged from 2- to 4-leaf with 3-15 plants/ft^2. Common lambsquarters (Colq) was 2-4 inches tall with 0-12 plants/ft^2. Wild buckwheat (Wibw) was 2- to 4-leaf with 0-11 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

All Rimfire + Huskie treatments provided excellent control of wild oat, common lambsquarters, and wild buckwheat. All Rimfire treatments caused early slight chlorosis at 4 and 8 days after treatment. However, chlorosis was no longer visible two weeks after treatment. There was no significant difference in wheat yield between treatments.

			HRSW			Wioa[a]		Colq[a]	Wibw[a]	HRSW	
Treatment	Rate	Timing	Jun 21	Jun 25	Jul 4	Jul 4	Jul 25	Jul 25	Jul 25	Yield	TW
			--% chlorosis--			--------- % control ----------				bu/A	lb/bu
Untreated			0	0	0	0	0	0	0	42.4	61.1
Rimfire + MSO / Huskie + AMS	1.75 oz + 1.5 pt / 11 oz + 0.5 lb	4-leaf / + 7 day	8	3	0	94	100	100	98	51.1	62.2
Rimfire + Quad7 / Huskie + AMS	1.75 oz + 1% / 11 oz + 0.5 lb	4-leaf / + 7 day	8	3	0	93	100	100	98	40.6	62.3
Rimfire + Huskie + MSO	1.75 oz + 11 oz + 1.5 pt	4-leaf	8	3	0	94	100	100	97	46.1	62.4
Rimfire + Huskie + Quad 7	1.75 oz + 11 oz + 1%	4-leaf	8	3	0	94	100	100	97	51.7	62.0
Rimfire + Bronate Adv + MSO	1.75 oz + 0.8 pt + 1.5 pt	4-leaf	8	3	0	94	100	100	96	48.9	61.9
Rimfire + Bronate Adv + Quad 7	1.75 oz + 0.8 pt + 1%	4-leaf	8	3	0	93	100	100	95	51.2	62.0
LSD (0.05)			NS	0.7	NS	1.1	NS	NS	3.2	NS	0.73
CV			0	16	0	0.8	0	0	2	14	0.66

[a] *Wioa=Wild oat; Colq=Common lambsquarters; Wibw=Wild buckwheat*

Rimfire for wild oat control in HRSW, Langdon 2008. John Lukach. 'Glenn' hrsw was seeded May 6 on conventional tillage. A tractor mounted CO2 sprayer used with hood on and XR8002 tips with four 20" spaced nozzles delivering 15 gal/a at 40psi was used. Post treatments were applied June 3, on 3.5-4 leaf wheat and wild oat, at 3pm, 57F, 59RH, 15mph SE wind, cloudy with dry foliage. Light showers started about ½ hour after completion. A tractor mounted CO2 sprayer with hood on was used with DG8001.5 tips and four 20" spaced nozzles delivering 10 gal/a at 35psi. Wild oats was 1-4lf with 20-30/ft2, wild buckwheat 2 lf 1/ft2, wild mustard was 4lf 1/ft2, lambsquarter 1-1.5" tall 1/ft2. Plot length was 25 feet and in a RCBD design with four replications.

Treatment	Rate	11-Jun	2-Jul	2-Jul	2-Jul	2-Jul	7-Aug	7-Aug	7-Aug	7-Aug			
	oz/A	Inju	Wioa	Wibw	Wimu	Colq	Wioa	Wibw	Wimu	Colq	Height	Yield	T. Wt.
						%					cm	bu/a	lb/bu
Rimfire+MSO+Huskie	1.75+24+11	0.0	88	86	100	100	98	96	100	100	98	57	61.5
Rimfire+MSO	1.75+24	0.0	94	13	100	53	98	0	100	45	103	55	60.9
Rimfire+MSO+BrAd	1.75+24+12..8	0.0	95	63	100	100	99	81	100	100	97	54	61.2
Rim+BB+BrAd	1.75+1%+12.8	1.3	91	85	100	100	92	91	100	100	98	53	61.2
Rimfire+BB+Huskie	1.75+1%+11	0.0	83	92	98	100	89	97	100	100	99	53	61.3
Rimfire+Basic Blend	1.75+1%	0.0	80	5	100	63	92	0	100	43	98	47	60.5
check	----	0.0	0	0	0	0	0	0	0	0	97	13	60.8
	C.V. %	529.2	11	35	2	13	7	19	0	15	4	11	0.8
	LSD 5%	NS	13	26	3	14	8	15	NS	15	NS	7	NS

BrAd – Bronate Advanced, BB – Basic Blend

The site has both ALS and ACC resistant wild oat.

Rimfire for wild oat control in durum wheat, Williston 2008. Neil Riveland.

'Alkabo' durum wheat was planted on recrop (land cropped to durum wheat in 2007) in 7 inch rows at 90 lbs/a on April 25. All treatments were applied on May 30 with 65 F, 73% relative humidity, 90% clear sky and wind at 2-3mph from 197 degrees to 4 leaf wheat and 3-5 leaf wild oats (Wioa),2-4 lf green foxtail (Grft)and 1-4 inch common lambsquarters(Colq); We used a small plot in the 3-4 leaf stage and 25% in the 5 leaf stage. Soil temperature was 63 F. We used a 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 30 ft plots. First rain received after application was 0.05 inches on June 3. Experimental design was a randomized complete block design with three replications. Wild oat density averaged 6-10 plant/ft2, green foxtail,10 plants/ft2 and Russian thistle, 5-6 plants/ft2. Plots were evaluated for crop injury on June 20, June 29 and July 26 and for weed control on June 20 and July 26. Green foxtail had dried up and died due to droughty condition in July. Durum was machine harvested for yield on August 18.

Treatment a	Product Rate oz/a	- Crop Injury- 6/20	6/29	7/26	Test Weight lbs/bu	Yield bus/a	--- Wioa -- 6/20	7/26	Grft 6/20	Ruth 6/20
							------ % control -----			
Untreated Check	0	0	0	0	54.7	4.1	0	0	0	0
Rimfire+MSO	1.75+24	3	2	2	54.7	4.8	73	90	67	35
Rimfire+Basic Blend(BB)	1.75+1%	0	0	0	55.1	5.9	77	92	75	33
Rimfire+Bronate Advanced+MSO	1.75+12.8+24	0	0	0	55.9	6.3	90	96	73	96
Rimfire+Bronate Advanced+BB	1.75+12.8+1%	2	2	2	56.2	6.2	73	92	80	96
Rimfire+Huskie+MSO	1.75+11+24	1	2	2	55.6	6.3	87	96	83	97
Rimfire+Huskie+Basic Blend	1.75+11+1%	4	4	4	56.0	5.9	88	95	90	98
EXP MEAN		1	1	1	55.5	5.7	70	80	67	65
C.V. %		164	123	134	1.6	12.5	15	2	11	13
LSD 5%		NS	NS	NS	NS	1.3	19	3	13	15

a - MSO is a methylated seed oil from Loveland
Quad 7 from Agsco was used as the basic pH blend adjuvant.

Summary: No significant crop injury was observed or recorded for any treatment. Yields were very low due to droughty conditions during July and August. Harvested 100 sq ft.

Herbicide rotations for wild oat control. Howatt, Roach, and Harington. 'Alsen' hard red spring wheat and 'Marksman Roundup Ready' canola was seeded May 14. Treatments were applied to five-leaf wheat and canola and four- to five-leaf wild oat on June 24 with 89°F, 32% RH, clear sky, 2 mph wind at 45°, and dry soil at 71°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to a 7 ft wide area the length of 20 by 25 ft plots. The experiment was a randomized split block design with four replicates.

Crop	Treatment	Rate	7/22/08 Wild oat
		oz/A	% control
Canola2	Fenoxaprop+Clopyralid	1.32+2	67
Canola2	Clethodim+Clopyralid+PO	1+2+0.18G	98
Canola2	Glyphosate	6	97
Canola2	Glyphosate	6	97
Canola2	Glyphosate	6	99
Wheat3	Fenoxaprop+Brox&MCPA5	1.32+8	93
Wheat3	Pinoxaden+Brox&MCPA5	0.86+8	99
Wheat3	Pinoxaden+Broxl&MCPA5	0.86+8	99
Wheat3	Flcz+Brox&MCPA5+Basic Blend	0.32+8+1%	99
Wheat3	Flcz+Brox&MCPA5+Basic Blend	0.32+8+1%	99
Canola4	Fenx+Clopyralid	1.32+2	72
Canola4	Cleth+Clpy+PO	1+2+0.18G	99
Canola4	Glyphosate	6	99
Canola4	Cleth+Clpy+PO	1+2+0.18G	96
Canola4	Glyphosate	6	99
Wheat1	Fenx+Brox&MCPA5	1.32+8	92
Wheat1	Pinoxaden+Brox&MCPA5	0.86+8	99
Wheat1	Pinoxaden+Brox&MCPA5	0.86+8	97
Wheat1	Pinoxaden+Brox&MCPA5	0.86+8	96
Wheat1	Pinoxaden+Brox&MCPA	0.86+8	96
CV			16
LSD			21

Fenoxaprop tended to give less control than other treatments. Fenoxaprop in canola gave less control than fenoxaprop in wheat. It is likely too soon to declare resistance but this is a curious anomaly that will warrant close review next year.

Improving wild oat control through deposition aid. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2) on June 5 with 58°F, 77% RH, 100% cloud cover with a dew present, 4 to 7 mph wind at 45°, and wet soil at 58°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was use to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	6/20 Wioa	7/2 Wioa	7/30 Wioa
	oz/A		%	
Fenoxaprop+Brox&MCPA5	1+8	78	80	86
Fenoxaprop+Brox&MCPA5	0.8+8	80	74	80
Fenoxaprop+Brox&MCPA5+InPlace	1+8+5.2	83	89	95
Fenoxaprop+Brox&MCPA5+InPlace	0.8+8+4.8	85	88	88
Pinoxaden+Brox&MCPA5	0.54+8	87	87	90
Pinoxaden+Brox&MCPA5	0.43+8	86	88	83
Pinoxaden+Brox&MCPA5+InPlace	0.54+8+5.8	90	89	93
Pinoxaden+Brox&MCPA5+InPlace	0.43+8+5.3	91	88	85
Flucarbazone+Brox&MCPA5	0.32+8	63	40	67
Flucarbazone+Brox&MCPA5	0.25+8	62	40	72
Flucarbazone+Brox&MCPA5+InPlace	0.32+8+3.3	60	43	75
Flucarbazone+Brox&MCPA5+InPlace	0.25+8+3.3	62	50	70
GF-1848[a]	1.68	70	73	70
GF-1848	1.34	68	72	65
GF-1848+InPlace	1.68+4	72	77	75
GF-1848+InPlace	1.34+3.2	72	80	78
CV		2	4	5
LSD		4	6	8

[a] GF-1848 was the premix of pyroxsulam, florasulam, and fluroxypyr, which will be sold as Goldsky from Dow Agrosciences.

Fenoxaprop control of wild oat was improved more with the addition of In Place than by increasing the rate from 0.8 to 1 oz/A. Addition of In Place to fenoxaprop increased control in each situation. Pinoxaden control of wild oat was generally not affected by increasing the rate or by adding In Place, although In Place tended to improve control. Only on 7/30 with In Place did increasing the rate of pinoxaden result in better control with pinoxaden. Flucarbazone, a granule ALS formulation, control was not affected by the addition of In Place. Wild oat control with GF-1848, an oil dispersion ALS formulation, was improved with the addition of In Place only at the reduced rate of 1.34 oz/A, and it was improved at each evaluation.

Difenzoquat combinations in cereals. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 6. Treatments were applied to three-leaf wheat and wild oat (3,000 plants/yd^2) on June 5 with 57°F, 73% RH, 100% cloud cover, 5 to 6 mph wind at 45°, and wet soil at 60°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	6/20 Wioa	7/2 Wioa
	oz/A	%	
Difenzoquat	16	70	80
Difenzoquat+Brox&MCPA5	16+8	70	75
Difenzoquat+Brox&Pyrasulfotol	16+2.9	70	78
Dife+Florasulam&MCPA	16+5.07	70	77
Dife+Pyraclostrobin	16+2.3	70	82
Dife+Brox&MCPA5+Pyraclostrobin	16+8+2.3	70	82
Dife+Broxl&Pyrasulfotol+Pyraclostrobin	16+2.9+2.3	70	85
Dife+Florasulam&MCPA+Pyraclostrobin	16+5.07+2.3	70	83
CV		0	4
LSD		NS	5

Treatments did not cause injury to wheat. Difenzoquat gave 70% control of wild oat on 6/20 regardless of the tank-mix partners. On 7/2, wild oat control tended to increase with the addition of pyraclostrobin, a fungicide, but maximum control was 85%. This was consistent with previous experiments that demonstrated increased crop injury when strobylurin fungicides were included with herbicides. Addition of broadleaf herbicides tended to reduce control to a low of 75% when bromoxynil and MCPA was included with difenzoquat. This was opposite from what was expected according to consumer comments.

Difenzoquat combinations in cereals. Howatt, Roach, and Harrington. An experiment was established in Fargo to evaluate whether small grain cultivars are more susceptible to injury with difenzoquat when a strobylurin fungicide is included. 'Glenn', 'Oklee', and 'Traverse' hard red spring wheat; 'Divide' durum; and 'Stellar-ND', 'Pinnacle', 'Drummond', and 'Tradition' barley were seeded in adjacent drill strips on May 13. Treatments were applied to 4 to 5 leaf crops species on June 18 with 87°F, 24% RH, 80% cloud cover, 0 to 1 mph wind at 90° to 180°, and wet soil at 78°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/2 All crops	7/18 All crops
	oz/A		
Difenzoquat	16	5	0
Difenzoquat+Bromoxynil&MCPA5	16+8	5	0
Difenzoquat+Bromoxynil&Pyrasulfotol	16+2.9	5	0
Difenzoquat+Florasulam&MCPA	16+5.07	5	0
Difenzoquat+Pyraclostrobin	16+2.3	5	0
Difenzoquat+Brox&MCPA5+Pyraclostrobin	16+8+2.3	5	0
Dife+Brox&Pyrasulfotol+Pyraclostrobin	16+2.9+2.3	5	0
Dife+Florasulam&MCPA+Pyraclostrobin	16+5.07+2.3	5	0
CV		0	0
LSD		0	0

Injury was consistent across all cultivars and herbicide treatments. Wheat and barley expressed symptoms of chlorotic streaks and slight necrosis at the extreme tips of leaves. Injury due to herbicide treatment was not evident on 7/18.

Foxtail control in spring wheat, Carrington, 2008. (Kirk Howatt and Greg Endres). The experiment was conducted at the NDSU Carrington Research Extension Center on a conventionally-tilled Heimdahl loam soil with 6.8 pH and 2.8% organic matter. The experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was seeded April 30. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 35 psi through 8001 flat fan nozzles to the center 6.7 ft of 10 by 25 ft plots. POST treatments were applied on June 14 with 55 F, 86% RH, clear sky, and 12 mph wind to 4- to 5-leaf wheat and 1- to 3-leaf yellow and green foxtail. Average plant density in untreated plots on June 16: wheat, 53 plants/ft^2 and 65 foxtail plants/ft^2. The trial was harvested by a plot combine on August 19.

Minor crop response was noted four days after application with several treatments (Table). Wheat yield was over 60 bu/A with the low rate of fenoxaprop and pinoxaden. Foxtail control two and four weeks after application was 80% or greater with flucarbazone, GF-1847, and clodinafop (all with tank mixtures of bromoxynil&MCPA).

Table.

Herbicide			Wheat response			Foxtail control (%)[1]		
Treatment		Rate	6/19	Yield	TW	7/1	7/15	
No.		oz ai/A	injury (%)	bu/A	lb/bu	fxtl	grft	yeft
1	Mess+Brox&MCPA5+MSO	0.036+8+1%	3	56.5	62.8	33	7	7
2	Flucarbazone+Brox&MCPA5+ Basic Blend	0.32+8+1%	3	54.6	62.5	80	91	89
3	Prcz&Mess+Brox&MCPA5+ Basic Blend	0.178+8+1%	6	55.8	63.0	43	0	0
4	Immb+Brox&MCPA5+Basic Blend	5+8+1%	3	54.4	63.1	0	13	13
5	Prcz+Brox&MCPA5+Basic Blend	0.32+8+1%	3	50.4	62.6	47	47	70
6	GF-1847+Brox&MCPA5+NIS	0.21+8+0.25%	0	48.8	61.6	81	85	91
7	GF-1848+NIS	1.68+0.25%	0	54.6	63.1	75	83	85
8	Tral-SC+Brox&MCPA5+ Supercharge+AMS	2.9+8+0.5%+9.5	3	50.6	62.0	74	78	83
9	Fenoxaprop+Brox&MCPA5	0.8+8	1	60.1	63.3	76	82	82
10	Fenoxaprop+Brox&MCPA5	1.32+8	2	52.3	62.0	77	78	87
11	Clodinafop+Brox&MCPA5	0.8+8	3	52.2	62.4	81	86	91
12	Pinoxaden+Brox&MCPA5+Adigor	0.86+8+0.075G	4	64.6	63.0	84	78	87
13	Difenzoquat+Brox&MCPA5	16+8	4	57.2	63.1	0	0	0
14	Untreated	0	0	50.4	62.3	0	0	0
C.V. (%)			37.5	9.4	1.3	12.0	23.4	10.7
LSD (0.05)			2	1.4	NS	11	20	10

[1]foxtail=yellow and green.

Antagonism of pinoxaden with broadleaf herbicides. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 12. Treatments were applied to three-leaf wheat and one- to two-leaf yellow foxtail (15 to 30 plants/yd^2) on June 18 with 80°F, 32% RH, 5% cloud cover, 2 mph wind at 180°, and damp soil at 69°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 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.

		7/3	7/3	7/18	7/18	8/26
Treatment	Rate	Wheat	Yellow foxtail	Wheat	Yellow foxtail	Yield
	oz/A		%			bu/A
A15351A+Adigor	0.93+0.075G	0	85	0	94	53
Pinoxaden+Florasulam&MCPA	0.86+5.1	0	85	0	97	55
Pinoxaden+Bromoxynil&MCPA5	0.86+8	0	83	0	93	57
Pinoxaden+Clopyralid&Fluroxypyr+MCPA	0.86+3+4	0	83	0	91	46
Pinoxaden+Thif-sg+Trib-sg+MCPA	0.86+0.24+0.06+4	0	83	0	94	55
Pinoxaden+Thif-sg+Trib-sg+Clpy&Flox	0.86+0.24+0.06+3	0	88	0	96	53
Pinoxaden+Bromoxynil&Pyrasulfotol	0.86+2.9	0	88	0	96	56
Flucarbazone+Bromoxynil&MCPA5+MSO	0.42+8+0.125G	18	70	15	87	46
Fenoxaprop+Bromoxynil&MCPA5	0.8+8	0	83	0	91	54
Untreated	0	0	0	0	0	56
CV		49	4	105	2	5
LSD		2	5	3	4	4

Flucarbazone caused 18% injury to wheat. Injury manifested as stunting and slight chlorosis. Injury was still obvious, because of stunting, on 7/18 and rated as 15% injury. Wheat yield was 46 bu/A for flucarbazone and for pinoxaden plus clopyralid and fluroxypyr with MCPA. Since pinoxaden did not cause visible injury, it is questionable whether the lower yield compared to nontreated wheat, 56 bu/A, was due to herbicide. Competition is not a likely cause because fenoxaprop, which also provided 91% control, did not affect yield compared to the control.

Flucarbazone gave 70% control on 7/3. Other herbicides provided 83 to 88% control of yellow foxtail. Pinoxaden plus florasulam and MCPA provided 97% control on 7/18. Flucarbazone, fenoxaprop, and pinoxaden plus clopyralid and fluroxypyr with MCPA gave less control at 87 to 91%, but only two of these treatments resulted in less yield compared with nontreated wheat.

Foxtail control with A15351A in spring wheat, Carrington, 2008. (Greg Endres). The experiment was conducted at the NDSU Carrington Research Extension Center on a conventionally-tilled Heimdahl loam soil with 6.8 pH and 2.8% organic matter. The experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was seeded April 30. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 35 psi through 8001 flat fan nozzles to the center 6.7 ft of 10 by 25 ft plots. POST treatments were applied on June 14 with 51 F, 91% RH, clear sky, and 9 mph wind to 4- to 5-leaf wheat and 1- to 3-leaf yellow and green foxtail. Average plant density in untreated plots on June 16: wheat, 53 plants/ft^2 and 65 foxtail plants/ft^2.

Minor wheat height reduction was noted 12 days after application with several treatments (Table), but was not present on July 14. Foxtail control ranged from 84-93% with all herbicide treatments one month after application. A15351A provided 90% foxtail control when evaluated on August 7.

Table.

Herbicide			Wheat response[1]	Foxtail control[2]	
Treatment		Rate	6/26	7/11	8/14
No.		fl oz product/A	% injury	%	
1	A15351A	8.85	0	87	80
	Adigor	9.6			
2	A15351A	8.85	1	88	81
	Adigor	9.6			
	MCPAe	5.3			
3	A15351A	8.85	0	92	90
	Adigor	9.6			
	Starane	5.3			
4	A15351A	8.85	3	87	72
	Adigor	9.6			
	Starane	5.3			
	Sword	12			
5	A15351A	8.85	1	88	76
	Adigor	9.6			
	Starane NXT	14			
6	A15351A	8.85	0	86	71
	Adigor	9.6			
	Bronate Advanced	12.8			
7	A15351A	8.85	0	84	73
	Adigor	9.6			
	Bromac	16			
8	A15351A	8.85	0	87	82
	Adigor	9.6			
	WideMatch	10			
9	Puma	8	0	93	88
	Huskie	11			
	UAN	32			
10	Puma	8	0	91	82
	Bronate Advanced	12.8			
11	Puma	8	0	91	86
	WideMatch	16			
	MCPAe	12			
C.V. (%)			253.6	4.2	7.8
LSD (0.05)			NS	NS	11

[1]injury=height reduction.
[2]foxtail=yellow and green.

Foxtail control with Pyroxsulam. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 12. Treatments were applied to three-leaf wheat and one- to two-leaf yellow foxtail (15 to 30 plants/yd^2) on June 18 with 80°F, 32% RH, 5% cloud cover, 1 to 2 mph wind at 180°, and damp soil at 69°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

		6/20	7/3	7/3	7/18	8/6
Treatment	Rate	Wheat	Wheat	Yeft	Yeft	Yeft
	oz/A	% injury		% control		
GF-1848[a]+Agral 90+AMS	1.26+0.5%+24	3	0	82	91	99
GF-1848+Agral 90	1.68+0.5%	3	0	85	96	99
GF-1848+Agral 90+AMS	1.68+0.5%+24	3	0	87	97	99
GF-1848+Assist	1.68+0.8%	3	0	82	96	99
GF-1848+MSO	1.68+0.8%	3	0	90	91	99
GF-1848+Pxdn+Agral 90+AMS	1.68+0.21+0.5%+24	3	0	88	96	99
GF-1848	1.68	2	0	82	97	99
GF-1847+Agral 90	0.21+0.5%	3	0	83	96	99
GF-1847+Agral 90+AMS	0.21+0.5%+24	3	0	80	97	99
GF-1847+Pxdn+Agral 90+AMS	0.21+0.21+0.5%+24	3	0	80	95	99
GF-1847+Agral 90+AMS	0.26+0.5%+24	2	0	85	94	99
GF-1847	0.21	2	0	82	93	99
Pinoxaden+Clpy&Flox+MCPA	0.86+3+6	0	0	85	97	99
Fenoxaprop+Brox&Pyst+AMS	0.8+2.9+8	0	0	88	96	99
Clfp-ng+Thif-sg+Trib-sg	0.8+0.16+0.04	0	0	78	87	91
Flucarbazone+2,4-D	0.28+6	0	0	67	83	85
Untreated	0	0	0	0	0	0
CV		38	0	4	2	2
LSD		1	0	5	2	4

[a] GF-1848 was the premix of pyroxsulam, florasulam, and fluroxypyr, which will be sold as Goldsky from Dow Agrosciences.

GF-1847 and GF-1848 caused slight injury to wheat, 2 to 3%, but the injury was short in duration and not observed 7/3. Commercial standards, including flucarbazone, did not cause visible injury to wheat. Most treatments gave 80 to 90% yellow foxtail control on 7/3. Addition of pinoxaden at one-quarter of the labeled use rate did not improve yellow foxtail control with GF- products. Clodinafop gave 78% control and flucarbazone gave 67% control. Pyroxsulam, the ALS-inhibiting herbicide in GF- products, provided better control than flucarbazone, also an ALS inhibitor, at each evaluation. By 7/18, pyroxsulam gave at least 91% control regardless of adjuvant. By 8/6, only clodinafop and flucarbazone gave less than 99% control of yellow foxtail.

Yellow foxtail control with GoldSky in spring wheat. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 15 at 90 lb/A into 7.5-inch rows into a conventionally tilled field. Herbicides treatments were applied postemergence (POST) on June 16 at the 5-leaf stage. Yellow foxtail was 0.5-3 inches tall with 0-6 plants/ft^2. Common lambsquarters ranged from 2-5 inches tall with 0-8 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

GoldSky is a new grass and broadleaf herbicide for wheat. The objective of this study was to evaluate yellow foxtail control and crop safety. Most treatments caused early chlorosis, but these symptoms quickly disappeared within two weeks after treatment. GoldSky generally provided good yellow foxtail control (80-90%), which was similar to or better than other herbicides. When tank mixed with NIS + AMS, GoldSky provided good control of lambsquarters (86%). Pyroxsulam is one of three active ingredients in GoldSky. Pyroxsulam alone provided good yellow foxtail control, but only fair control of lambsquarters. In general, weed control was enhanced by the addition of adjuvants such as NIS and AMS, especially on lambsquarters. Lambsquarters control was excellent with MCPA ester, Huskie, Affinity, or 2,4-D.

		HRSW		Yeft[c]		Colq[c]	
Treatment[ab]	Rate	Jun 21	Jun 26	Jul 3	Jul 24	Jul 3	Jul 24
		% chlorosis		---------- % control ----------			
GoldSky + NIS + AMS	0.75 pt + 0.5% + 1.5 lb	3	0	77	82	70	79
GoldSky + NIS	1 pt + 0.5%	3	0	83	84	74	81
GoldSky + NIS + AMS	1 pt + 0.5% + 1.5 lb	3	0	85	89	74	86
GoldSky + Assist Mineral Oil	1 pt + 0.8%	3	0	78	78	72	74
GoldSky + MSO	1 pt + 0.8%	3	0	79	83	70	75
GoldSky+Axial XL+NIS+AMS	1 pt + 4.1 oz + 0.5% + 1.5 lb	3	0	84	89	72	83
GoldSky	1 pt	3	0	73	74	60	58
Pyrox + NIS	0.21 oz + 0.5%	3	0	81	83	70	72
Pyrox + NIS + AMS	0.21 oz + 0.5% + 1.5 lb	3	0	86	86	73	77
Pyrox + Axial XL + NIS + AMS	0.21oz + 4.1oz + 0.5%+1.5lb	3	0	82	90	70	75
Pyrox + NIS + AMS	0.25 oz + 0.5% + 1.5 lb	3	0	85	86	72	73
Pyrox	0.21 oz	3	0	70	78	50	57
Axial XL+WideMatch + MCPe	16.4 oz + 1 pt + 0.75 pt	3	0	83	86	95	100
Puma[d] + Huskie + AMS	0.33 pt + 11 fl oz + 0.5 lb	0	0	48	68	96	100
Discover NG + Affinity TM	12.8 fl oz + 0.6 oz	0	0	43	57	80	92
Everest + 2,4-De	0.4 oz + 0.75 pt	0	1	60	73	93	100
Untreated		0	0	0	0	0	0
LSD (0.05)		0.6	0.6	5.4	8.4	6.1	11.1
CV		16	396	5	7	5	9

[a] *All treatments were applied at the 5-leaf stage.*
[b] *Pyrox = Pyroxsulam (expressed in oz ai/A); NIS=Agral 90*
[c] *Yeft=Yellow foxtail; Colq=Common lambsquarters*
[d] *Puma rate was lower than recommended for yellow foxtail*

Yellow foxtail control with pyroxsulam and adjuvants. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 12. Treatments were applied to three-leaf wheat and one- to two-leaf yellow foxtail (15 to 30 plants/yd^2) on June 18 with 83°F, 24% RH, 0% cloud cover, 0 to 2 mph wind at 225°, and wet soil at 73°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	7/03 Wheat	7/03 Yeft	7/18 Yeft
	oz/A		%	
GF-1848[a]	0.21	0	75	82
GF-1848+N-Pak	0.21+0.437G	0	83	90
GF-1848+Preference	0.21+0.5%	0	82	94
GF-1848+Class Act NG	0.21+2.5%	0	82	91
GF-1848+AG 07046	0.21+2.5%	0	80	92
GF-1848+Prime Oil	0.21+1%	0	75	90
GF-1848+SuperbHC	0.21+0.5%	0	77	90
GF-1848+SuperbHC+AG 07046	0.21+0.25%+1.25%	0	72	91
GF-1848+Destiny	0.21+1%	0	73	90
GF-1848+AG 05006	0.21+0.5%	0	83	90
GF-1848+AG 05006+AG 07046	0.21+0.5%+1.25%	0	77	89
GF-1848+Class Act NG+AG 02013	0.21+2.5%+.03125G	0	75	93
GF-1848+AG05006+AG07046+AG02013	0.21+0.5%+1.25%+4	0	83	93
GF-1848+AG 05055	0.21+1.5%	0	83	89
GF-1848+MCPA+AG 05006+AG 07046	0.21+4+0.5%+1.25%	0	72	89
GF-1848+2,4-D+AG 05006+AG 07046	0.21+4+0.5%+1.25%	0	73	89
GF-1848+Dicamba+AG 05006+AG 07046	0.21+1.5+0.5%+1.25%	0	75	93
GF-1848+Brox&Pyst+AG 05006+AG07046	0.21+2.9+0.5%+1.25%	0	83	93
GF-1848+Carf&2,4-D+AG05006+AG07046	0.21+4.06+0.5%+1.25%	0	83	94
CV		0	4	4
LSD 5%		0	5	7

[a] GF-1848 was the premix of pyroxsulam, florasulam, and fluroxypyr, which will be sold as Goldsky from Dow Agrosciences.

Herbicides did not cause injury to wheat. Several adjuvant treatments enhanced control of yellow foxtail to 82 to 83% compared to GF-1848 alone at 75% on 7/3. Known adjuvants in this category tended to include NIS and/or a nitrogen source. By 7/18, all adjuvants improved the efficacy of GF-1848 compared with no adjuvant. Treatments with adjuvant were similar and provided 89 to 94% control of yellow foxtail compared with 82% control with GF-1848 alone.

Foxtail control with propoxycarbazone and mesosulfuron plus adjuvants. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 12. Treatments were applied to three-leaf wheat and one- to two-leaf yellow foxtail (15 to 30 plants/yd^2) on June 18 with 83°F, 20% RH, 5% cloud cover, 1.7 mph wind at 180°, and wet soil at 75°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	7/3 Wheat	7/3 Yeft	7/18 Yeft
	oz/A		%	
Prcz&Mess	0.178	0	72	73
Prcz&Mess+N-Pak	0.178+0.25	0	83	85
Prcz&Mess+Preference+N-Pak	0.178+0.25%+0.25G	0	81	83
Prcz&Mess+Class Act NG	0.178+.5%	0	80	85
Prcz&Mess+AG 07046	0.178+2.5%	0	73	77
Prcz&Mess+Class Act NG+AG 02013	0.178+2.5%+0.0312G	0	77	83
Prcz&Mess+AG 07046+AG 02013	0.178+2.5%+0.0312G	0	72	80
Prcz&Mess+Destiny	0.178+24	0	86	85
Prcz&Mess+AG 05006	0.178+0.094G	0	83	85
Prcz&Mess+AG 05006+AG 07046	0.178+0.094+1.25%	0	83	85
Prcz&Mess+AG 05006+AG 02013	0.178+0.094G+0.0312G	0	77	82
Prcz&Mess+AG05006+AG07046+AG02013	0.178+0.094G+1.25%+0.0312G	0	75	82
Prcz&Mess+AG 05055	0.178+1.5%	0	83	85
CV		0	4	2
LSD		0	5	3

Treatments did not cause injury to wheat. All adjuvant systems improved the efficacy of propoxycarbazone and mesosulfuron except AG07046, AG07046 plus AG02013, or AG07046 with AG05006 and AG02013 on 7/3. Destiny improved the control of yellow foxtail the most, 86% control with adjuvant compared with 72% without adjuvant. Destiny and several other adjuvants improved control to 85% on 7/18 compared with 73% control with the herbicide alone. At this evaluation, all adjuvant treatments improved control of yellow foxtail but AG07046 only resulted in 77% control with propoxycarbazone and mesosulfuron, the least of all adjuvant treatments. And AG07046 plus AG02013 only allowed 80% control with the herbicide.

Improving foxtail control through deposition aid. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 12. Treatments were applied to three-leaf wheat and one- to two-leaf yellow foxtail (15 to 30 plants/yd^2) on June 18 with 85°F, 20% RH, 5% cloud cover, 2 mph wind at 180°, and wet soil at 75°F. A backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	7/03 Wheat	7/03 Yeft	7/18 Yeft
	oz/A		%	
Fenoxaprop+Brox&MCPA5	0.8+8	0	90	96
Fenoxaprop+Brox&MCPA5	0.66+8	0	83	96
Fenoxaprop+Brox&MCPA5+InPlace	0.8+8+4.8	0	90	96
Fenoxaprop+Brox&MCPA5+InPlace	0.66+8+4.5	0	81	96
Pinoxaden+Brox&MCPA5	0.64+8	0	88	95
Pinoxaden+Brox&MCPA5	0.52+8	0	87	94
Pinoxaden+Brox&MCPA5+InPlace	0.64+8+6	0	90	94
Pinoxaden+Brox&MCPA5+InPlace	0.52+8+5.8	0	86	93
Flucarbazone+Brox&MCPA5	0.42+8	0	82	93
Flucarbazone+Brox&MCPA5	0.34+8	0	82	93
Flucarbazone+Brox&MCPA5+InPlace	0.42+8+3.3	0	83	93
Flucarbazone+Brox&MCPA5+InPlace	0.34+8+3.3	0	80	93
GF-1848[a]	1.68	0	78	93
GF-1848	1.34	0	78	93
GF-1848+InPlace	1.68+4	0	83	93
GF-1848+InPlace	1.34+3.2	0	82	93
CV		0	3	1
LSD		NS	4	1

[a] GF-1848 was the premix of pyroxsulam, florasulam, and fluroxypyr, which will be sold as Goldsky from Dow Agrosciences.

Treatments did not cause injury to wheat. Fenoxaprop, pinoxaden, and flucarbazone did not benefit from inclusion of In Place at either evaluation. There was a slight improvement of yellow foxtail control by GF-1848 with the inclusion of In Place on 7/3. But on 7/18, all four treatments provided 93% control.

Wheat response to 2,4-D formulations. Howatt, Roach, and Harrington. Hi Dep is a mixed formulation of 2,4-D that has been known to cause crop injury. The 2,4-D diethyl amine component of Hi Dep has been formulated as Broadrange 55 and was evaluated for crop response. 'Alsen' hard red spring wheat was seeded May 8. Treatments were applied to four-leaf wheat on June 19 with 68°F, 50% RH, 0 % cloud cover, 4 to 7 mph wind at 315°, and moist soil at 69°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. Harvest for yield was on August 19.

		7/2/08	7/18/08	8/19
Treatment	Rate	Wheat	Wheat	Wheat
	oz/A	%		bu/A
2,4-D (Broadrange)	15	8	3	39
2,4-D (Broadrange)	30	7	2	42
2,4-D (Hi Dep)	15	8	4	42
2,4-D (Hi Dep)	30	10	3	48
2,4-D (Amine 4)	15	9	3	45
2,4-D (Amine 4)	30	9	2	58
Untreated	0	0	0	36
CV		19	64	22
LSD		2	3	18

Treatments did not cause substantial injury, but even Amine 4, which was included as a standard with minimal injury potential, caused nearly 10% injury. Symptoms included slight stunting and stiffened leaf blades which remained more upright than the nontreated wheat. Doubling the rate of 2,4-D did not substantially increase the injury rating for any 2,4-D formulation, although Hi Dep caused slightly more injury at the high rate compared with the low rate and compared with Broadrange on 7/2. Injury was still evident on 7/18 but only 2 to 4%. Lodging was sporadic in the study area and, while not correlated with specific treatments, occurred in some treatments more often than others leading to a large LSD.

Wheat response to 2,4-D formulation and application timing. Howatt, Roach, and Harrington. An experiment was established to compare wheat response to a novel single 2,4-D formulation to a standard amine which has been safe to wheat. 'Alsen' hard red spring wheat was seeded May 12. Two-leaf (2L) treatments were applied to two-to three-leaf wheat on June 18 with 72°F, 38% RH, 0% cloud cover, 1.5 mph wind at 180°, and wet soil at 70°F. Four-leaf (4L) treatments were applied to four- to six-leaf wheat on June 26 with 78°F, 36% RH, 20% cloud cover, 1 mph wind at 165°, and dry soil at 70°F. Late-boot (L-Boot) treatments were applied to late-boot stage wheat on July 9 with 68°F, 63% RH, 5% cloud cover, 2 mph wind at 240°, and moist soil at 61°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. The study area did not have weed pressure. The experiment was a randomized complete block design with three replicates. Test weight and yield were taken August 26.

			7/3	7/10	7/22	8/26	8/26
Treatment[a]	Rate	Growth stg.	Wht	Wht	Wht	TW	Yield
	oz/A			% injury		lb/bu	bu/A
2,4-D-dea	15	2L	0	0	0	62.1	52
2,4-D-dea	30	2L	0	0	0	62.0	52
2,4-D-amine	15	2L	4	4	1	62.5	54
2,4-D-amine	30	2L	4	4	1	62.1	52
2,4-D-dea	15	4L	4	4	0	62.7	57
2,4-D-dea	30	4L	5	4	0	63.2	58
2,4-D-amine	15	4L	7	6	4	62.8	55
2,4-D-amine	30	4L	9	6	3	63.0	53
2,4-D-dea	15	L-Boot	0	3	0	62.9	49
2,4-D-dea	30	L-Boot	0	8	3	62.5	45
2,4-D-amine	15	L-Boot	0	4	0	62.5	48
2,4-D-amine	30	L-Boot	0	13	7	61.9	40
Untreated	0		0	0	0	62.6	58
CV			52	32	92	0.7	6
LSD			2	2	2	0.8	5

[a] 2,4-D-dea was a diethyl amine formulation as Broadrange and 2,4-D-amine was WECO Amine 4 from Wilbur Ellis Company.

Application timings were established such that the first and third timing would be likely to cause wheat injury. 2,4-D Applied to seedling wheat and wheat that is close to anthesis has a higher potential to cause injury than when applied to three- to five-leaf wheat.

2,4-D-amine injury to wheat on 7/3 was evident for wheat treated at 2L, 4%, but injury was not observed in the –dea plots. Both formulations caused visible injury when applied at the 4L stage, but –dea caused less injury than the –amine. There was minimal effect from doubling the rate of 2,4-D. The L-Boot stage had not yet been applied. Injury on 7/10 was consistent with 7/3, but injury diminished by 7/22 and only remained in the –amine wheat that was treated at 4L.

Injury with the low rate of either formulation applied at L-Boot was similar to other timings. However, doubling the rate of 2,4-D more than doubled wheat injury ratings. Again, the –amine formulation caused more injury, 13% compared with 8%.

Test weight was generally similar among treatments, ranging from 62 to 63 lb/bu. Grain yield was substantially reduced by 2,4-D applied with wheat in late boot. At the high rate of 2,4-D, the –amine was the most injurious, resulting in 40 bu/A compared with 58 bu/A for the nontreated control. All treatments applied at 2L and the high rate of –amine at 4L also slightly reduced wheat yield compared with the control or –dea treatments at 4L.

Broadleaf Response to 2,4-D. Howatt, Roach, and Harrington. An experiment was established near Fargo to evaluate formulations of 2,4-D for broadleaf efficacy. 'Omega' flax, 'Chenopodium quinoa' quinoa, 'Plainsman' amaranth, tame buckwheat, 'Marksman Roundup-Ready' canola, and 'Pioneer 63M80' sunflower were seeded May 14. Treatments were applied to 15 to 18 inch tall crops and 12 to 15 inch tall wild mustard (3 plants/ft^2) and Venice mallow (5 plants/ft^2) on July 3 with 76 F, 20% RH, partly cloudy sky, 2 mph wind at 225, and dry soil at 78 F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 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.

		7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/22	7/22	7/22	7/22	7/22	7/22	7/22	7/22	7/30	7/30	7/30	7/30	7/30	7/30
Treatment	Rate	Flax	Quinoa	Amaranth	Tame buckwheat	Canola	Sunflower	Wild mustard	Venice mallow	Flax	Quinoa	Amaranth	Tame buckwheat	Canola	Sunflower	Wild mustard	Venice mallow	Flax	Quinoa	Amaranth	Tame buckwheat	Canola	Sunflower
	pr floz/A	%																					
Broadrange55	13	18	60	60	50	25	45	50	20	25	86	83	43	70	64	89	55	16	93	80	66	80	67
Broadrange55	12	13	45	45	38	28	45	38	15	20	70	63	30	61	66	70	43	13	71	65	54	65	69
WECO Amine4	16	30	60	60	50	45	60	50	20	40	92	86	60	81	94	97	71	24	96	91	71	91	97
Weedar64	16	30	60	60	50	43	60	50	20	40	94	88	60	87	90	96	78	26	96	91	79	93	98
Saber	16	30	60	60	50	50	60	50	20	40	94	86	53	83	89	98	70	24	97	88	75	93	98
HiDep	16	30	60	60	50	40	60	50	20	40	94	88	53	84	91	96	70	30	97	92	81	92	96
Unison	32	30	60	60	50	58	60	50	20	53	99	94	68	88	91	99	86	29	99	96	83	97	98
BR55+InPlace	9+2.3	43	60	60	50	48	60	50	20	58	93	86	48	88	91	98	79	26	98	91	78	94	98
WECOA4+InPlace	12+3	45	60	60	50	60	60	50	20	48	96	90	63	90	91	97	83	30	98	93	80	96	95
Untreated	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0
CV		14	18	18	18	17	26	18	18	15	18	18	18	17	26	18	16	19	18	18	19	17	25
LSD		6	13	13	11	9	20	11	4	8	21	19	12	18	29	21	15	6	22	21	18	20	30

Broadrange 55 at 13 fl oz/A had a similar amount of 2,4-D acid equivalent to other products included at 16 or 32 fl oz/A. In general, Broadrange control was less numerically, although it did not provide less control than other formulations because of large LSD values. Broadrange at 9 fl oz/A plus In Place provided similar to slightly better control of broadleaf species to the standard 2,4-D formulations.

Broadleaf weed control in wheat at Fargo. Howatt, Roach, and Harrington. Comparison of commercial standard herbicide programs will provide a consistent environment for evaluation of the treatments. 'Alsen' hard red spring wheat was seeded May 14. Treatments were applied to three- to four-leaf wheat, two- to four-leaf wild mustard (8 plants/yd^2), two- to four-leaf Pennsylvania smartweed (10 plants/yd^2), cotyledon to two-leaf lanceleaf sage (5 plants/yd^2), and one- to three-leaf wild buckwheat (3 to 5 plants/yd^2) on June 23 with 84°F, 37% RH, 20% cloud cover, 25 mph wind at 210°, and dry soil at 77°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		7/8	7/8	7/8	7/8	7/22	7/22	7/22	7/22	8/19	8/26
Treatment	Rate	Wimu	Smwd	Llsa	Wibw	Wimu	Smwd	Llsa	Wibw	All	Yield
	oz/A					%					bu/A
Flox&MCPA	8	89	94	95	84	96	93	99	93	99	53
Clopyralid&Flox	3	90	95	94	89	98	99	99	97	99	50
Clpy&Flox+Thif-sg+ Trib-sg	2+0.16+ 0.04	89	93	95	81	99	99	99	99	99	52
Thif-sg+Trib-sg+ Sword+NIS	0.16+0.04+ 4+0.25%	95	94	88	84	99	99	99	98	99	52
Thif-sg+Trib-sg+ Salvo+NIS	0.1+0.1+ 4+0.25%	92	93	89	87	98	99	99	99	99	51
Carfentrazone&2,4-D+ NIS	4.06+ 0.25%	88	88	81	86	99	98	99	99	99	47
Pyraflufen+Salvo+ NIS	0.013+4+ 0.25%	88	92	79	83	96	95	98	92	99	47
Brox&MCPA5	8	95	95	94	94	99	99	99	99	99	53
Brox&2,4-D	9	92	95	88	94	99	98	99	99	99	50
Brox&Pyrasulfotol	2.5	95	94	92	81	98	99	98	99	99	55
Brox&Pyrasulfotol+ AMS	2.5+ 8	95	95	95	95	98	99	99	99	99	53
Brox&Flox	5	92	95	92	91	98	99	99	99	99	51
Florasulam&MCPA	5.07	90	93	91	89	99	99	98	98	99	51
Untreated	0	0	0	0	0	0	0	0	0	0	45
		2	2	2	3	1	1	1	1	0	6
		2	3	3	3	1	1	1	2	NS	4

Herbicide injury to wheat was not detected in this study. Bromoxynil and pyrasulfotol provided rapid and effective control of the weed spectrum, resulting in the greatest improvement in wheat yield. Several treatments provided control near 90% or greater across all weed species on 7/8. Carfentrazone and pyraflufen were slow to control weeds compared with other treatments. Weed competition with wheat likely caused less yield compared to other herbicide treatments because injury was not observed.

Broadleaf weed control in durum wheat, Williston 20087. Neil Riveland.

'Alkabo' durum wheat was planted on recrop (land cropped to lentil in 2007) in 7 inch rows at 90 lbs/a on April 25. All treatments were applied on May 30 with anair temperature of 56 F., 95% relative humidity, soil temp 58 F, 80% clear sky and wind at 1-3 mph from 176 degrees to 3.5-4 leaf wheat, 1-2 inch Russian thistle (Ruth) and kochia (Kocz) and 2-4 leaf wild mustard (Wimu). We used a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor to apply the treatments, delivering 8.5 gals/a at 30 psi through 8001vs flat fan nozzles to a 6.67 ft wide area the length of 10 by 24 ft plots. First rain received after application was 0.05 inches on June 3. Experimental design was a randomized complete block design with four replications. Weeds densities were 6-8 plts/sq ft for Russian thistle,1 plt/sq ft for kochia and 5-6 plts/sq ft for wild mustard. Plots were evaluated for crop injury on June 23 and July 26 and for weed control on June 23 and August 17. Wheat was machine harvested for yield on August 18.

Treatmenta	Rate	Crop Injury 6-23	Injury 7-26	Test Weight	Yield	Ruth 6/23	Ruth 8/17	Kocz 6/23	Kocz 8/17	Wimu 6/23
		---- % ----		lbs/bu	bus/a	--------% Control-------				
Flox&MCPA	8	1	1	56.1	5.05	76	75	82	91	98
Clopyralid&Flox	3	2	2	56.2	4.78	65	96	85	95	98
Clpy&Flox+Thif-sg+Trib-sg	2+0.16+0.04	2	1	55.7	4.19	83	92	93	95	98
Thif-sg+Trib-sg+Sword+NIS	0.16+0.04+4+0.25%	1	1	55.3	4.42	74	71	80	55	99
Thif-sg+Trib-sg+Salvo+NIS	0.1+0.1+4+0.25%	3	1	56.9	6.20	90	96	92	60	99
Carfentrazone&2,4-D+NIS	4.06+0.25%	3	2	56.6	4.94	94	95	88	92	99
Pyraflufen+Salvo+NIS	0.013+4+0.25%	1	1	55.5	3.55	87	88	65	41	99
Brox&MCPA%	8	1	1	55.4	4.07	97	97	97	96	99
Brox&2,4-D	9	1	1	55.7	4.21	96	99	95	97	99
Brox&Pyrasulfotol	2.5	1	1	56.0	4.89	96	98	97	92	98
Brox&Pyrasulfotol+AMS	2.5+8	2	0	55.6	3.93	99	98	99	99	99
Brox&Flox	5	0	0	56.7	5.94	90	93	93	95	99
Florasulam&MCPA	5.07	0	1	54.9	4.99	48	43	83	34	73
Untreated	0	0	0	55.7	3.59	0	0	0	0	0
TRIAL MEAN		1	1	55.9	4.62	78	81	82	74	90
C.V. %		117	183	1.9	36.35	17	12	18	18	15
LSD 5%		2	NS	NS	NS	19	15	25	19	19

a - Thif = Thifensulfuron. Clopy - Clopyralid Brom = Bromoxynil
Carf = Carfentrazone Flox = Fluroxypry
NIS = R-11 from Wilbur-Ellis. AMS = Ammonium Sulfate

Summary: Early injury ratings showed significant crop injury by several treatments. Droughty growing season conditions masked the effect of the treatments.

Broadleaf weed control in HRS wheat, Carrington, 2008. (Greg Endres). The experiment was conducted at the NDSU Carrington Research Extension Center on a conventionally-tilled Heimdahl loam soil with 6.8 pH and 2.8% organic matter. The experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was seeded April 30. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 35 psi through 8001 flat fan nozzles to the center 6.7 ft of 10 by 25 ft plots. POST treatments were applied on June 7 with 64 F, 68% RH, clear sky, and 15 mph wind to 4-leaf wheat, 0.5- to 2-inch tall common lambsquarters, and 1- to 4-inch tall wild buckwheat. Average plant density in untreated plots during early June: wheat, 41 plants/ft^2, common lambsquarters, 5 plants/ft^2 , and wild buckwheat, 1 plant/ft^2. Axial XL at 16.4 fl oz was applied across the trial on June 14 for foxtail control.

Minor wheat chlorosis was noted three days after application (DAA) with treatments 2-5 (Table). Wheat height reduction, ranging from 2-10%, was noted 16 DAA with all treatments, but was not present on August 7. Common lambsquarters control was excellent with treatments 2-7. Wild buckwheat control ranged from 87-91% with treatments 2-7 when visually evaluated June 23. Wild buckwheat was excellent, ranging from 93-99%, with treatments 4-6 when visually evaluated July 7 and August 7.

Table.

Herbicide			Wheat response[1]		Weed control (%)[2]					
Treatment[3]		Rate	6/10	6/23	6/23		7/7		8/7	
No.		product/A	chlorosis	injury (%)	colq	wibw	colq	wibw	colq	wibw
1	Untreated check	0	0	0	0	0	0	0	0	0
2	ARY-0546-101/Baseline A	0.3 oz	1	10	93	87	99	84	96	75
	ARY-0547-101/Baseline B	0.1 oz								
	Starane	7.7 fl oz								
3	ARY-0546-101/Baseline A	03 oz	1	7	96	89	99	79	96	70
	ARY-0547-101/Baseline B	0.1 oz								
	ARY-0548-003/Sahara	3.6 oz								
	NIS	0.25% v/v								
4	ARY-0546-101/Baseline A	0.3 oz	2	7	95	91	99	96	96	93
	ARY-0547-101/Baseline B	0.1 oz								
	Widematch	8 fl oz								
5	ARY-0546-101/Baseline A	0.1 oz	2	5	94	90	97	96	94	93
	ARY-0547-101/Baseline B	0.033 oz								
	Widematch	16 fl oz								
6	Widematch	16 fl oz	0	2	90	90	99	99	95	95
	MCPA	8 fl oz								
7	Huskie	11 fl oz	0	4	99	88	99	76	93	63
8	ARY-0548-003/Sahara	3.75 oz	0	6	0	0	13	40	0	40
	NIS	0.25% v/v								
9	Starane	8 fl oz	0	2	27	65	27	63	13	63
C.V. (%)			49.3	75.1	11.7	5.5	14.9	4.0	12.6	9.2
LSD (0.05)			1	NS	13	6	18	5	14	11

[1]chlorosis:0=none and 9=yellow; injury=heig
[2]colq=common lambsquarters; wibw=wild buckwheat.
[3]NIS=Preference (WinField).

Broadleaf Weed Control with Florasulam. Howatt, Roach, and Harrington. "Alsen" hard red spring wheat was seeded May 6. Treatments were applied to four- to five-leaf wheat, 4 to 12 inch Canada thistle (2 to 30 plants/yd^2), one- to six-leaf wild buckwheat (7 plants/yd^2), two- to eight-leaf wild mustard (5 plants/yd^2), and one- to five-leaf common mallow (10 plants/yd^2) on June 17 with 73°F, 52% RH, 0% cloud cover, 2 to 3 mph wind at 270°, and wet soil at 58°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 3 ft plots. The experiment was a randomized complete block design with three replicates. Harvest for yield was on August 20.

		7/02	7/2	7/2	7/2	7/14	7/14	7/14	7/14	8/18	8/18	8/18	8/20
Treatment	Rate	Cath	Wibw	Wimu	Coma	Cath	Wibw	Wimu	Coma	Cath	Wibw	Coma	Yield
	oz/A	%											bu/A
A15351A+Adigor	0.93+9.6	48	77	83	92	85	87	94	88	78	63	83	58
Florasulam&MCPA	5.1	72	83	92	93	90	90	99	93	88	85	94	58
Florasulam&MCPA+Fluroxypyr	5.1+1	67	85	92	92	86	92	99	90	72	91	92	50
Florasulam&MCPA+Bromoxynil	5.1+4	88	93	97	96	91	96	99	95	85	93	91	52
Florasulam&MCPA+Clopyralid	5.1+2	92	93	95	95	95	92	88	88	96	97	96	52
Florasulam&MCPA+Pinoxaden	5.1+0.86	80	85	93	90	92	89	99	91	92	82	83	54
Bromoxynil&MCPA5	8	80	83	94	93	90	92	99	90	91	94	95	57
Bromoxynil&Pyrasulfotol	2.9	82	93	95	95	73	87	99	86	87	92	92	54
Clpy&Flox+MCPA	3+4	89	90	91	93	95	95	97	93	94	97	97	51
Thif-sg+Trib-sg+MCPA	0.24+0.06+4	53	73	90	93	33	30	95	63	83	23	85	58
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	55
CV		29	6	5	4	7	3	2	4	9	6	5	9
LSD		34	9	8	6	9	4	3	6	13	8	7	9

Treatments did not cause injury to wheat. A15351A generally was slower to cause symptoms in weeds and by the end of the season more weed regrowth was occurring than with other herbicide treatments. Florasulam and MCPA gave 85 to 95% control of most weeds during the study. Florasulam and MCPA gave 72% control of Canada thistle on 7/2 but provided near 90% control later in the season. Bromoxynil or clopyralid tended to give the best improvement in control with florasulam and MCPA. Thifensulfuron and tribenuron plus MCPA had difficulty controlling Canada thistle until late in the season on 8/18, 83%. Control of wild buckwheat with this treatment was 73% on 7/2 and control declined throughout the season as plants recovered. Thifensulfuron and tribenuron gave only 23% control of wild buckwheat on 8/18 compared with 91 to 97% control with several other treatments. Other than a few patches of dense Canada thistle, vigorous wheat competed well with weed pressure. Four plots were removed from yield analysis because intense competition from Canada thistle severely thinned the wheat stand prior to herbicide application. With this concession,even nontreated wheat produced 55 bu/A. Herbicide treatments did not affect wheat yield.

Broadleaf weed control with Orion and tank mix partners in HRSW. Jenks, Willoughby, and Mazurek. 'Howard' spring wheat was seeded May 15 at 90 lb/A in 7.5-inch rows into barley stubble. Herbicides treatments were applied postemergence on June 17 at the 4- to 4.5-leaf stage. Kochia (Kocz) ranged from 1-6 inches with 5-35 plants/ft^2. Common lambsquarters (Colq) was 1-6 inches tall with 5-40 plants/ft^2. Wild buckwheat (Wibw) was 1-4 inches with 8-40 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

Orion is a new herbicide that is a combination of florasulam + MCPA ester. Florasulam is a Group 2 herbicide, which like other Group 2 herbicides is not expected to control ALS-resistant kochia. Orion alone provided poor kochia control, but provided good or excellent control of wild buckwheat and common lambsquarters. Tank mixing Orion with Starane or Buctril significantly improved kochia control. Tank mixing Orion with Starane, Buctril, or Stinger slightly improved wild buckwheat control. Huskie and WideMatch+MCPA provided excellent control of all weeds. No crop injury was observed with any treatment. There were no significant differences in yield or test weight between treatments.

			HRSW			Kocz[a]			Colq[a]			Wibw[a]			HRSW	
Treatment	Rate	Timing	Jun 27	Jul 5	Jul 15	Jul 5	Jul 15	Jul 26	Jul 5	Jul 15	Jul 26	Jul 5	Jul 15	Jul 26	Yield	TW
			----- % injury -----			---------- % control ----------								bu/A	lb/bu
Florasulam + Adigor	8.85 fl oz + 0.6 pt	4-leaf	0	0	0	40	30	30	47	20	20	53	83	82	44.9	59.4
Orion[b]	17 oz	4-leaf	0	0	0	47	47	35	93	99	100	73	88	85	45.9	60.2
Orion + Starane	17 oz + 0.33 pt	4-leaf	0	0	0	94	96	97	95	100	100	85	97	97	52.7	60.5
Orion + Buctril 2EC	17 oz + 1 pt	4-leaf	0	0	0	92	98	98	95	100	100	89	97	97	48.7	60.6
Orion + Stinger	17 oz + 0.33 pt	4-leaf	0	0	0	63	67	67	95	100	100	95	99	99	52.8	60.6
Orion + Axial XL	17 oz + 16.4 oz	4-leaf	0	0	0	63	67	67	95	100	100	78	92	93	51.3	59.8
Bronate Adv	0.8 pt	4-leaf	0	0	0	93	96	98	95	100	100	78	88	89	52.4	60.8
Huskie	11 oz	4-leaf	0	0	0	94	99	99	96	100	100	83	99	97	53.9	59.9
WideMatch + MCPA Ester	1 pt + 8 oz	4-leaf	0	0	0	95	98	98	95	100	100	95	99	99	52.2	60.6
Affinity TM + MCPA ester	0.60 oz + 8 oz	4-leaf	0	0	0	47	50	50	95	99	100	88	98	96	53.8	60.2
Untreated			0	0	0	0	0	0	0	0	0	0	0	0	45.4	59.5
LSD (0.05)			NS	NS	NS	19.2	21.3	20.7	3.4	8.9	8.9	11.8	8.7	8.8	NS	NS
CV			0	0	0	17	18	18	2	6	6	9	6	6	12	1

[a] *Kocz=Kochia; Colq=Common lambsquarters; Wibw=Wild buckwheat*

[b] *Orion is a premix containing florasulam + MCPA ester*

Tank Mixes with Orion Herbicide in Wheat at Hettinger, ND

Eric Eriksmoen

'Howard' HRSW was seeded on April 30. Treatments were applied on May 31 to 4 leaf wheat and to 2" kochia (kocz) and 2" Russian thistle (ruth) with 65° F, 55% RH, clear sky and west wind at 2 mph. 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 trial was a randomized complete block design with three replications. HRSW, kochia and Russian thistle populations were 8, 17 and 3 plants per square foot, respectively. The trial was sprayed with 16 oz/A Axial XL on June 16 to control wild oats. Plots were evaluated for crop injury on June 18 and for weed control on August 1. The trial was harvested on August 8.

	Treatment	Product Rate	6/18	-- Aug. 1--		Test Weight	Grain Yield
			inj	kocz	ruth		
		oz/A	---- % Control -----			lbs/bu	bu/A
1	A15351A + Adigor	8.85 + 9.6	0	60	99	52.6	12.3
2	Orion	17	0	73	99	53.0	18.5
3	Orion + Starane	17 + 5.33	0	99	98	55.9	16.9
4	Orion + Buctril	17 + 16	0	90	99	51.7	15.9
5	Orion + Stinger	17 + 5.33	0	73	99	54.3	17.2
6	Orion + Axial XL	17 + 16.4	0	72	99	54.1	16.7
7	Bronate Adv.	12.8	0	73	94	53.3	15.3
8	Huskie	11	0	88	96	52.6	18.6
9	WideMatch + MCPA	16 + 8	0	99	99	58.3	17.0
10	Affinity TM + MCPA	0.6 + 8	0	72	99	54.9	18.5
11	Untreated	--	0	0	0	52.0	15.0
	C.V.%		0	19	3	4.9	11.6
	LSD .05		NS	24	20	NS	3.3

Summary

Crop injury was not observed. A15351A, Orion alone, Orion + Stinger, Orion + Axial XL, Bronate Advance and Affinity treatments only provided partial control of kochia. Orion + Starane, Orion + Buctril and WideMatch treatments provided excellent season long kochia control. All herbicide treatments provided excellent Russian thistle control. The trial sustained late season heat and moisture stress which significantly impacted test weights and grain yields. Orion alone, Huskie and Affinity treatments had significantly higher yields than the untreated check.

Broadleaf weed control in spring wheat with Orion, Carrington, 2008. (Greg Endres). The experiment was conducted at the NDSU Carrington Research Extension Center on a conventionally-tilled Heimdahl loam soil with 6.8 pH and 2.8% organic matter. The experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was seeded April 30. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 35 psi through 8001 flat fan nozzles to the center 6.7 ft of 10 by 25 ft plots. POST treatments were applied on June 9 with 57 F, 85% RH, 95% cloudy sky, and 14 mph wind to 4-leaf wheat, 0.5- to 3-inch tall common lambsquarters, and 1- to 2-inch tall wild buckwheat. Average plant density in untreated plots during early June: wheat, 36 plants/ft^2, common lambsquarters, 11 plants/ft^2 , and wild buckwheat, 1 plant/ft^2. Axial XL was applied at 16.4 fl oz on June 14 for foxtail control to treatments 2-5 and 7-10. The trial was harvested by a plot combine on August 19.

Minor wheat height reduction was noted 12 days after application with several treatments (Table). Grain yield tended to be lowest with the untreated check and highest with Orion plus Buctril and Affinity TM plus MCPA. Common lambsquarters control generally was excellent with all herbicide treatments. Wild buckwheat control was 90% or greater on July 11 and August 14 with Orion plus Stinger and WideMatch plus MCPA.

Table.

Herbicide			Wheat response[1]			Weed control (%)[2]			
Treatment		Rate	6/26	Yield	TW	7/11		8/14	
No.		fl oz product/A	injury (%)	bu/A	lb/bu	colq	wibw	colq	wibw
1	Untreated check	0	0	36.7	62.4	0	0	0	0
2	A13551A	8.85	0	40.3	62.5	0	0	0	0
	Adigor	9.6							
3	Orion	17	0	42.1	62.5	99	73	96	44
4	Orion	17	2	41.8	62.6	97	76	99	54
	Starane	5.3							
5	Orion	17	2	46.9	63.2	98	83	90	62
	Buctril	16							
6	Orion	17	2	45.4	63.2	99	90	99	98
	Stinger	5.3							
7	Orion	17	0	43.4	62.7	98	62	95	62
	Axial XL	16.4							
8	Bronate Advanced	12.8	3	40.2	62.1	99	66	90	57
9	Huskie	11	2	41.1	62.3	96	73	82	48
10	WideMatch	12.8	0	43.3	62.5	99	97	99	91
	MCPAe	8							
11	Affinity TM	0.6 oz	2	48.8	63.5	99	88	98	62
	MCPAe	8							
C.V. (%)			206.7	9.7	1.1	2.3	21.6	7.0	23.8
LSD (0.05)			NS	NS	NS	3	25	9	22

[1]injury=height reduction.
[2]colq=common lambsquarters; wibw=wild buckwheat.

Orion for broadleaf weed control in HRSW, Langdon 2008. John Lukach. 'Glenn' hrsw was seeded May 6 on conventional tillage. Post treatments were applied June 2, on 3.5 - 4 leaf wheat, at 8pm, 9F, 28RH, 11mph NE wind, cloudy with dry foliage. A tractor mounted CO2 sprayer with hood on was used with DG8001.5 tips and four 20" spaced nozzles delivering 10 gal/a at 35psi. An application of Axial XL, 16.4 oz/a, was made June 13 at 9pm, to all plots not having received Axial on June 2. Wild mustard was 4lf 5/ft2, wild buckwheat 1 lf 1/ft2, lambsquarter 1-1.5" tall1/ft2, common mallow 2 lf 1/ft2, heavy small chickweed emerging to 2 leaf. Wild oats was 1-4 leaf 10/ft2 on June 2. Plot length was 25 feet and in a RCBD design.

Treatment	Rate	10-Jun	1-Jul	1-Jul	1-Jul	1-Jul	1-Jul	1-Jul	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug			
	oz/A	Injury	Wimu	Wibu	Colq	Coma	Kocz	Chick	Wimu	Wibu	Colq	Coma	Kocz	Chick	Height	Yield	T. Wt.
					%						%				cm	bu/a	lb/bu
A15351A+Adigor	8.85+9.6	0.0	98	83	45	100	100	87	100	97	61	100	100	100	104	65	63.1
Orion+Axial XL	17+16.4	0.0	100	94	99	95	88	75	100	94	100	100	99	100	102	64	63.0
Orion+Buctril	17+16	0.0	100	97	100	97	100	100	100	92	100	100	99	100	100	61	63.1
Huskie	11	0.0	99	93	100	94	60	88	100	88	100	95	75	100	104	60	62.6
WideMatch+MCPA ester	16+8	0.0	98	98	100	86	75	85	100	100	100	85	92	100	103	60	62.8
Orion+Starane	17+5.3	0.0	100	95	100	98	100	88	100	97	100	99	99	100	100	58	62.6
Orion+Stinger	17+5.3	0.0	100	99	100	96	99	80	100	98	100	98	99	99	100	58	62.5
Bronate Advanced	12.8	0.0	100	85	100	67	35	75	100	97	100	83	45	98	102	57	62.5
Orion	17	0.0	100	98	99	88	99	87	100	98	100	100	98	99	100	57	62.3
Affinity TM+MCPA ester	0.6+8	0.0	100	79	100	75	95	100	100	84	100	99	95	100	100	55	62.6
Untreated	---	0.0	0	0	0	0	0	0	0	0	0	0	0	0	104	47	61.7
	C.V. %	0.0	1	12	4	18	25	25	0	11	8	12	19	2	2	6	0.9
	LSD 5%	NS	2	14	5	22	28	28	NS	14	10	15	22	2	NS	5	NS

Chick = Chickweed

Broad spectrum weed control with A15351A tank-mixes. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 14. Treatments were applied to four-leaf wheat; one- to three-leaf wild buckwheat (8 plants/yd^2); two- to eight-leaf wild mustard (5 plants/yd^2); and cotyledon to two-leaf Venice mallow (20 plants/yd^2), common mallow (10 plants/yd^2), and lanceleaf sage (25 plants/yd^2) on June 23 with 84°F, 32% RH, 25% cloud cover, 0 to 2 mph wind at 170°, and dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 40 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	6/30 Wheat	7/8 Wheat	7/8 Wild buckwheat	7/8 Wild mustard	7/8 Venice mallow	7/8 Common mallow	7/8 Lanceleaf sage	7/8 Yellow foxtail	7/14 Wheat	7/22 Wheat	7/22 Wild buckwheat	7/22 Wild mustard	7/22 Venice mallow	7/22 Common mallow	7/22 Lanceleaf sage	7/22 Yellow foxtail	8/19 Venice mallow	8/19 Lanceleaf sage	8/19 Yellow foxtail	8/26 Yield
	oz/A	%																			bu/A
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36
A15351A+Adigor	0.93+0.075G	0	0	90	90	93	89	73	83	0	0	99	99	99	99	81	90	70	40	58	35
A15351A+Brox&MCPA5+Adigor	0.93+8+0.075G	0	0	92	96	95	92	95	80	0	0	99	99	98	99	98	91	92	96	91	42
A15351A+Fluroxypyr+Adigor	0.93+1+0.075G	0	0	89	93	94	91	82	79	0	0	98	99	97	99	98	92	93	95	89	44
A15351A+Broxl&Flox+Adigor	0.93+5.1+0.075G	0	0	92	96	94	90	92	83	0	0	99	99	99	99	99	92	95	95	90	44
A15351A+Flox&MCPA+Adigor	0.93+5.3+0.075G	0	0	85	90	88	85	83	79	0	0	98	98	99	98	98	93	73	81	76	42
A15351A+MCPA+Adigor	0.93+5+0.075G	0	0	92	96	92	91	92	78	0	0	98	99	99	99	98	92	83	92	75	36
A15351A+Clpy&Flox+Adigor	0.93+2+0.075G	0	0	92	93	94	91	92	78	0	0	98	98	98	98	99	92	97	98	80	35
A15351A+Brox&Pyst+Adigor+AMS	0.93+2.9+0.075G+8	0	0	95	97	96	91	94	89	0	0	99	99	99	99	99	92	98	99	88	41
Pinoxaden+Clpy&Flox+MCPA	0.86+3+5.6	0	0	96	96	95	96	95	92	0	0	98	98	97	96	98	96	96	99	92	45
Fenx+Brox&Pyst+AMS	0.8+2.9+8	0	0	92	96	88	87	90	73	0	0	99	99	98	98	98	89	97	99	86	39
CV		0	0	2	1	2	3	5	7	0	0	1	1	1	1	1	1	5	8	5	17
LSD		0	0	4	3	4	5	8	7	0	0	2	2	2	2	2	2	7	10	6	10

Herbicides did not cause wheat injury. A15351A alone provided about 90% control of wild buckwheat, wild mustard, Venice mallow, and common mallow on 7/8, which increased to complete weed removal by 7/22. By 8/19, a new flush of Venice mallow had come into the plots resulting in only 70% control with A15351A. Also, control of lanceleaf sage and yellow foxtail declined to 40% and 58%, respectively. Addition of broadleaf herbicides improved control of the whole spectrum and also increased activity on yellow foxtail. Fluroxypyr and MCPA or MCPA were not as effective in improving weed control with A15351A. Tank-mix treatments that included bromoxynil tended to provide the best control of the entire weed spectrum.

Broadleaf weed control with pyroxsulam. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded in Fargo on May 6. Treatments were applied to four- to five-leaf wheat, one- to six-leaf wild buckwheat (7 plants/yd^2), two- to eight-leaf wild mustard (5 plants/yd^2), and one- to five-leaf common mallow (10 plants/yd^2) on June 17 with 73°F, 52% RH, 2 to 3 mph wind at 270°, and wet soil at 58°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	6/20 wht	7/2 Wibw	7/2 Wimu	7/2 Coma	7/14 Wibw	7/14 Wimu	7/14 Coma
	oz/A				%			
GF-1848+Agral 90+AMS	1.26+0.5%+24	4	86	88	57	90	96	62
GF-1848+Agral 90	1.68+0.5%	3	90	93	58	93	95	63
GF-1848+Agral 90+AMS	1.68+0.5%+24	3	88	95	62	91	98	63
GF-1848+Assist	1.68+0.8%	3	88	90	60	90	92	60
GF-1848+MSO	1.68+0.8%	3	87	90	53	93	93	62
GF-1848+2,4-D+AMS	1.68+4+24	4	88	90	63	92	95	63
GF-1848+MCPA+AMS	1.68+6+24	3	89	93	60	91	96	62
GF-1848	1.68	3	91	94	63	92	99	65
GF-1847+Agral 90	0.21+0.5%	3	75	82	54	82	93	60
GF-1847+Agral 90+AMS	0.21+0.5%+24	3	82	87	58	83	90	62
GF-1847+Clpy&Flox+MCPA+AMS	0.21+3+4+24	4	93	96	63	96	98	65
GF-1847+Flox+2,4-D+AMS	0.21+1.5+4+24	3	90	95	63	87	96	62
GF-1847+GF-2257+Agral 90+AMS	0.21+1.5+0.5%+24	3	90	94	62	88	96	59
GF-1847	0.21	3	78	88	55	82	85	60
Pinoxaden+Clpy&Flox+MCPA	0.86+3+6	4	84	85	57	90	89	62
Fenx+Brox&Pyrst+AMS	1.32+2.9+24	3	95	95	61	94	98	58
Clfp-ng+Thif-sg+Trib-sg	0.8+0.16+0.04	3	85	90	57	82	95	58
Flucarbazone+2,4-D	0.28+6	3	84	88	59	88	99	62
Prcz&Mess+Brox&MCPA5+ Agral 90+AMS	0.178+8+ 0.25%+24	3	96	96	63	96	99	60
Untreated	0	0	0	0	0	0	0	0
CV		17	4	4	22	3	3	21
LSD		1	6	6	20	4	4	20

All herbicides caused 3 to 4% injury to wheat on 6/20. This injury was temporary and was not apparent on 7/2. GF-1847 gave less control of wild buckwheat than GF-1848. This deficit was eliminated with the addition of another broadleaf herbicide to GF-1847. GF-1848 provided similar control of wild buckwheat to commercial standards. Similar trends were detected for wild mustard. Herbicides did not give more than 65% control of common mallow. This may be because the mallow plants were shielded from herbicide by other plant tissue.

Broadleaf weed control with GoldSky in spring wheat. Jenks, Willoughby, and Mazurek. 'Glenn' spring wheat was seeded April 30 at 90 lb/A into 7.5-inch rows into barley stubble. Herbicide treatments were applied postemergence (POST) on June 10 at the 4- to 5-leaf stage. Kochia was 4-8 inches tall with 4-10 plants/ft^2. Common lambsquarters ranged from 4-8 inches tall with 0-2 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

GoldSky is a new grass and broadleaf herbicide for wheat. The objective of this study was to evaluate broadleaf weed control and crop safety. Several treatments caused early chlorosis, but the symptoms quickly disappeared within two weeks after treatment. GoldSky provided good to excellent kochia and lambsquarters control. Weed control was enhanced by the addition of adjuvants such as NIS and AMS. Pyroxsulam is one of three active ingredients in GoldSky. Pyroxsulam alone did not control kochia. The addition of AMS enhanced pyroxsulam activity, especially on lambsquarters.

		HRSW		Kocz[c]		Colq[c]		HRSW	
Treatment[ab]	Rate	Jun 19	Jun 28	Jun 28	Jul 21	Jun 28	Jul 21	Yield	TW
		%chlorosis		-------- % control --------				bu/A	lb/bu
GoldSky+NIS+AMS	0.75 pt + 0.5% + 1.5 lb	0	0	85	89	83	89	56.8	63.5
GoldSky + NIS	1 pt + 0.5%	0	0	89	91	83	88	56.0	64.2
GoldSky+NIS+AMS	1 pt + 0.5% + 1.5 lb	0	0	90	95	85	96	56.6	63.5
GoldSky + Assist	1 pt + 0.8%	0	0	88	89	78	80	59.5	63.8
GoldSky + MSO	1 pt + 0.8%	0	0	90	93	84	91	59.9	63.5
GoldSky + 2,4-De + AMS	1 pt + 0.5 pt + 1.5 lb	0	0	93	96	95	100	50.6	63.6
GoldSky + MCPe+ AMS	1 pt + 0.75 pt + 1.5 lb	2	0	91	92	93	97	59.5	63.3
GoldSky	1 pt	0	0	79	82	71	74	56.7	63.8
Pyrox + NIS	0.21 oz + 0.5%	0	0	25	38	62	60	55.9	63.9
Pyrox + NIS + AMS	0.21 oz + 0.5% + 1.5 lb	0	0	30	43	82	89	53.5	63.6
Pyrox + WideMatch + MCPe + AMS	0.21 oz + 1 pt + 0.5 pt + 1.5 lb	2	0	93	95	94	100	57.7	63.8
Pyrox + Starane + 2,4-De + AMS	0.21 oz + 0.5 pt + 0.5 pt + 1.5 lb	2	0	93	92	94	100	63.6	63.9
Pyrox + Exp + NIS + AMS	0.21 oz + 1.5 oz + 0.5% + 1.5 lb	2	0	84	84	78	75	66.4	64.0
Pyrox	0.21 oz	0	0	20	32	68	63	54.5	63.1
Axial XL + WideMatch + MCPe	16.4 fl oz + 1 pt + 0.75 pt	6	0	92	92	93	100	61.4	63.7
Puma + Huskie + AMS	0.67 pt + 11 fl oz + 0.5 lb	0	0	97	99	99	100	65.5	63.8
Discover NG + Affinity TM	12.8 fl oz + 0.6 oz	0	0	28	48	85	100	65.6	64.2
Everest + 2,4-De	0.4 oz + 0.75 pt	0	0	57	65	95	100	57.2	64.0
Rimfire + Bro Adv + NIS + AMS	1.75 oz + 0.8 pt + 0.25% + 1.5lb	1	0	96	95	98	99	63.5	63.2
Untreated		0	0	0	0	0	0	61.1	63.3
LSD (0.05)		1.5	NS	6	12.1	9.6	12.7	NS	NS
CV		112	0	5	10	7	9	20	1.4

[a] *Treatments were applied at the 4- to 5-leaf stage*

[b] *Pyrox = Pyroxsulam (expressed in oz ai/A); NIS=Agral 90; Assist=Mineral oil*

[c] *Kocz=Kochia; Colq=Common lambsquarters*

Wild buckwheat control with clopyralid or bromoxynil combinations. Howatt, Roach, and Harrington. ' Alsen' hard red spring wheat was seeded May 6. Treatments were applied to four- to five-leaf wheat, 4 to 12 inch tall Canada thistle (2 to 30 plants/yd^2), one- to six-leaf wild buckwheat (10 plants/yd^2), and two- to eight-leaf wild mustard (15 plants/yd^2) on June 17 with 87°F, 42% RH, 0% cloud cover, 2 mph wind at 270°, and wet soil at 64°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	6/20 Wht	7/02 Cath	7/02 Wibw	7/02 Wimu	7/14 Wht	7/14 Cath	7/14 Wibw	7/14 Wimu	8/18 Cath	8/18 Wibw
	oz/A	%									
Clpy&Flox	3	0	31	89	82	0	30	90	67	27	98
Clpy&Flox+MCPA	3+6	0	31	92	94	0	32	95	90	32	99
Clpy&Flox+2,4-D	3+4	0	60	92	94	0	63	95	96	64	99
Clpy&Flox+Thif-sg+NIS	3+0.08+0.25%	0	28	89	92	0	30	93	87	32	99
Clpy&Flox+Thif-sg+ Trib-sg+NIS	3+0.1+ 0.03+0.25%	0	30	90	94	0	32	95	96	32	99
Brox&Pyst+AMS	2.9+8	0	88	87	95	0	92	96	99	88	97
Brox&Pyst+AMS	3.5+8	0	59	91	96	0	58	96	99	58	98
Brox&Pyst+GF-1748+ AMS	2.9+1.1+ 8	0	55	94	96	0	57	96	99	58	96
Brox&MCPA5	8	0	87	89	94	0	92	90	98	89	96
Brox&Flox+MCPA	5+6	0	75	88	91	0	83	93	96	69	98
Brox&2,4-D	9	0	63	93	96	0	61	85	98	59	94
Carf&2,4-D+NIS	6.1+0.25%	13	62	93	96	9	63	95	98	65	96
Ampy&Flox+2,4-D	2.1+4	0	47	91	90	0	63	92	91	58	99
GF-1748+2,4-D	1.67+6	0	0	91	83	0	0	87	60	0	93
Untreated	0	0	0	0	0	0	0	0	0	0	0
CV		83	79	3	2	47	80	2	3	81	3
LSD		1	63	5	3	1	68	4	5	67	5

Carfentrazone caused small necrotic lesions on leaf tissue resulting in a 13% injury rating. This leaf tissue did not recover by 7/14, but these leaves were senesced by August. The injury did not appear to affect health or development of wheat. Canada thistle control varied widely depending on the size and density of the patch. GF-1848 plus 2,4-D did not result in Canada thistle damage and only gave 60% control of wild mustard on 7/14, but this treatment provided about 90% control of wild buckwheat. Clopyralid and fluroxypyr gave 67% control of wild mustard, but the addition of MCPA or 2,4-D brought the control to 90% or more.

Wild buckwheat control in wheat. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded in Fargo, ND, on May 12. Treatments were applied to three-leaf wheat, four-leaf wild buckwheat (15 plants/yd^2), 4 to 14 inch tall wild mustard (10 plants/yd^2), cotyledon to three-leaf common mallow (5 plants/yd^2), cotyledon Venice mallow (30 plants/yd^2), and oneleaf common ragweed (20 plants/yd^2 only in the first replicate) on June 17 with 79°F, 34% RH, 2% cloud cover, 4 mph wind at 315°, and damp soil at 64°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide at the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

		6/24	6/24	6/24	6/24	7/8	7/8	7/8	7/8	7/8	8/20	8/20	8/20	8/20
Treatment	Rate	Wild buckwheat	Wild mustard	Common mallow	Venice mallow	Wild buckwheat	Wild mustard	Common mallow	Venice mallow	Common ragweed	Wild buckwheat	Common mallow	Venice mallow	Common ragweed
	oz/A	%												
Brox&Pystl+AMS	2.9+8	57	95	60	60	91	97	96	95	99	93	96	93	97
Brox&Pyst+AMS	2.4+8	53	90	60	60	89	97	96	95	99	89	96	93	99
Brox&Pyst+Thif-sg+Trib-sg+AMS	2.4+0.2+0.05+8	57	95	57	57	92	96	92	83	99	92	97	92	99
Clpy&Fluroxypyr+MCPA	2+4	60	78	57	60	96	89	85	90	90	98	96	96	90
Clpy&Flox+Thif-sg+Trib-sg	2+0.2+0.05	67	92	57	57	90	95	89	87	85	98	95	90	93
Thif-sg+Trib-sg+Flox+NIS	0.24+0.06+1+0.25%	43	90	57	57	92	96	92	88	80	98	99	96	95
Florasulam&MCPA	4.1	60	92	53	53	77	96	88	84	85	43	91	83	90
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CV		9	2	8	8	4	1	5	6	.	5	2	3	.
LSD		8	3	7	7	6	2	7	8	.	7	3	5	.

Herbicides did not cause visible injury to wheat. Seven days after treatment, on 6/24, herbicides generally gave 50 to 60% control of wild buckwheat, common mallow, and Venice mallow. Wild mustard was controlled 90% or better except with clopyralid and fluroxypyr plus MCPA, which gave only 78% control. Wild buckwheat control was near 90% by 7/8 for all herbicides except florasulam and MCPA. Control of mallow species tended to be better when bromoxynil and pyrasulfotol were applied alone compared with the addition of thifensulfuron and tribenuron, and bromoxynil and pyrasulfotol seemed to be very effective in controlling common ragweed. By 8/20, lack of wild buckwheat control with florasulam and MCPA was very pronounced, and this treatment gave less control of mallow species as well.

Broadleaf weed control in wheat with ARY-0546 and ARY-0547. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded May 6. Treatments were applied to four- to five-leaf wheat, one- to six-leaf wild buckwheat (5 plants/yd^2), and two- to eight-leaf wild mustard (10 plants/yd^2) on June 17 with 83°F, 43% RH, 0% cloud cover, 2 mph wind at 270°, and wet soil at 60°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	7/2 Wibw	7/2 Wimu	7/14 Wht	7/14 Wibw	7/14 Wimu
	oz/A			%		
ARY-0546+ARY-0547+Flox	0.22+0.07+1.5	93	96	0	92	96
ARY-0546+ARY-0547+ARY-0548+NIS	0.22+0.07+1.5+0.25%	82	89	0	85	92
ARY-0546+ARY-0547+Clpy&Flox	0.22+0.07+1.5	90	94	0	93	97
ARY-0546+ARY-0547+Clpy&Flox	0.07+0.02+3	88	93	0	93	91
Clpy&Flox+MCPA	3+4	95	97	0	95	98
Brox&Pyst+AMS	2.9+8	93	96	2	92	98
ARY-0548+NIS	1.5+0.25%	89	83	0	89	78
Flox	1.5	87	83	0	90	78
Carf&2,4-D	4.06	88	93	1	88	96
Thif-sg+Trib-sg+Dicamba	0.15+0.15+1.5	86	93	13	92	95
Untreated	0	0	0	0	0	0
CV		4	3	97	3	4
LSD		6	4	2	5	6

Herbicide injury to wheat was not observed on 7/2, but 13% injury was recorded on 7/14 with dicamba. Bromoxynil and pyrasulfotol also caused minor injury of 2%. ARY-0548 was not as good of a tank-mix partner with ARY-0546 and -0547 as other herbicides for wild buckwheat or wild mustard control. ARY-0548 or fluroxypyr only gave 78%control of wild mustard. Other herbicides provided more than 90% control of wild mustard.

Broadleaf weed control with GWN-3124. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 14. Treatments were applied to four-leaf wheat, two- to eight-leaf wild mustard (15 plants/yd^2), cotyledon to two-leaf common mallow (8 plants/yd^2) and Venice mallow (15 plants/yd^2), four- to six-leaf wild buckwheat (10 plants/yd^2), and cotyledon to two-leaf lanceleaf sage (8 plants/yd^2) on June 23 with 84°F, 32% RH, 25% cloud cover, 0 to 2 mph wind at 170°, and dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		6/30	7/8					7/22					8/19
Treatment	Rate	Wheat	Wild buckwheat	Wild mustard	Venice mallow	Common mallow	Lanceleaf sage	Wild buckwheat	Wild mustard	Venice mallow	Common mallow	Lanceleaf sage	All
	oz/A	%											
Unity+NIS+UAN	0.25+0.25%+2%	0	90	96	95	91	92	91	95	93	93	93	99
Unity+Fluroxypyr+NIS+UAN	0.25+1+0.25%+2%	0	93	97	96	94	91	93	96	96	96	97	99
Unity+Fluroxypyr+NIS+UAN	0.25+2+0.25%+2%	0	90	93	94	93	92	90	99	96	95	97	99
GWN-3124+GWN-3125+NIS+UAN	0.25+0.127+0.25%+2%	0	93	96	96	92	93	92	96	93	93	93	99
GWN-3124+GWN-3125+Flox+NIS+UAN	0.25+0.127+1+0.25%+2%	0	93	94	94	90	93	95	96	95	96	96	99
GWN-3124+GWN-3125+Flox+NIS+UAN	0.165+0.082+1+0.25%+2%	0	91	93	95	88	92	96	96	95	94	96	99
GWN-3124+GWN-3125+Flox+NIS+UAN	0.165+0.082+2+0.25%+2%	0	97	97	97	93	96	97	99	96	98	98	99
Brox&MCPA5+NISUAN	8+0.25%+2%	0	95	96	96	93	97	96	99	95	97	99	99
Brox&Pyst+NIS+UAN	2.9+0.25%+2%	0	96	97	97	95	96	99	98	98	98	99	99
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0
CV		0	3	2	1	2	2	2	1	2	2	1	1
LSD		0	3	2	2	3	2	3	1	2	3	2	0

Herbicides did not cause wheat injury. Vigorous wheat growth aided weed control by providing competition with weeds. Essentially all control ratings were at least 90% on 7/8. Weed control tended to be better with treatments than included bromoxynil or treatments with the GWN compounds when 2 oz/A fluroxypyr was included. This trend continued through the evaluation on 7/22, but all herbicide treatments provided complete weed control by 8/19.

Broadleaf weed control in wheat with F7121. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 14. Treatments were applied to four- to five-leaf wheat, one- to six-leaf wild buckwheat (7 plants/yd^2), and two- to eight-leaf wild mustard (5 plants/yd^2) on June 17 with 83°F, 43% RH, 0% cloud cover, 2 mph wind at 270°, and wet soil at 60°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete bock design with three replicates.

		6/20	7/2	7/2	7/14	7/14	7/14
Treatment	Rate	Wht	Wibw	Wimu	Wht	Wibw	Wimu
	oz/A			%			
F7121+NIS	0.068+0.25%	3	0	0	1	0	0
F7121+NIS	0.1+0.25%	3	0	0	2	0	0
F7121+MCPA+NIS	0.068+4+0.25%	4	82	95	3	53	92
F7121+MCPA+NIS	0.068+8+0.25%	3	93	96	1	63	93
Carfentrazone&2,4-D+NIS	4.06+0.25%	9	83	95	3	77	98
Bromoxynil&Pyrasulfotol	2.9	3	92	96	0	96	99
Untreated	0	0	0	0	0	0	0
		18	5	2	115	12	4
		1	4	2	3	9	4

Each herbicide treatment caused injury to wheatCarfentrazone caused the most injury, 9% on 6/20, while the other treatments were similar at 3 to 4%. Injury generally diminished through the season. New tissue was not effected so when older leaves senesced, visible injury was not present. Wheat tissue injured by bromoxynil and pyrasulfotol quickly regained natural color and injury was not present on 7/14.

The best control was achieved with F7121 plus 8 oz/A MCPA or with bromoxynil and pyrasulfotol on 7/2. These two treatments gave greater than 90% control of wild buckwheat and wild mustard. Activity of F7121 alone was not discernible from the untreated plots. For full season control of wild buckwheat, bromoxynil and pyrasulfotol provided 96% control. Carfentrazone and 2,4-D gave only 77% control, and combinations of F7121 and MCPA gave less than 65% control. Carfentrazone and 2,4-D and bromoxynil and pyrasulfotol provided better control than combinations of F7121 and MCPA, but these four treatments provided 92% or better control of wild mustard.

Kochia control in wheat. Howatt, Roach, and Harrington. An experiment was established near Prosper, ND, to evaluate weed control including kochia. 'Alsen' hard red spring wheat was seeded May 8. Treatments were applied to four-leaf wheat; two- to four-leaf common cocklebur (8 plants/yd^2), common mallow (4 plants/yd^2), common ragweed (8 plants/yd^2), and redroot pigweed (15 plants/yd^2); 3 to 4 inch tall kochia (5 plants/yd^2) and common lambsquarters (20 plants/yd^2); two- to five-leaf wild buckwheat (5 plants/yd^2); and six- to eight-leaf wild mustard (12 plants/yd^2) on June 19 with 66°F, 56% RH, 0% cloud cover, 1.5 mph wind at 360°, and moist soil at 68°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates. Harvest for yield was on August 19.

		7/1	7/2	7/2	7/2	7/2	7/2	7/2	7/2	7/2	7/11	7/11	7/11	7/11	7/11	7/11	7/11	7/11	7/22	8/19
Treatment	Rate	Wheat	Cocb	Coma	Corw	Rrpw	Kocz	Wibw	Colq	Wimu	Cocb	Coma	Corw	Rrpw	Kocz	Wibw	Colq	Wimu	All	Yield
	oz/A	%																		bu/A
Brox&Pyst+AMS	2.9+8	0	97	96	97	97	97	97	97	97	99	99	99	99	99	99	99	99	99	58
Brox&Pyst+AMS	2.4+8	0	96	96	97	97	97	97	97	97	99	99	99	99	99	99	99	99	99	53
Brox&Pyst+Thif[a]+Trib+AMS	2.4+0.2+0.05+8	0	96	96	97	97	97	97	97	97	99	99	99	99	99	99	99	99	99	57
Clpy&Flox+MCPA	2+4	0	97	97	97	97	97	97	97	97	99	99	99	99	99	99	99	99	99	52
Clpy&Flox+Thif+Trib	2+0.2+0.05	0	96	90	97	97	97	97	88	97	99	99	99	99	99	99	99	99	99	53
Thif+Trib+Flox+NIS	0.24+0.06+1+0.25%	0	95	97	97	97	97	97	97	97	99	99	99	99	99	99	99	99	99	54
Florasulam&MCPA	4.1	0	95	97	97	97	93	97	93	97	99	99	99	99	99	99	99	99	99	60
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
CV		0	2	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	9
LSD		0	3	3	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	9

[a] Thifensulfuron and tribenuron were soluble granule formulations from DuPont.

Herbicide treatments did not cause visible injury to wheat. All treatments provided exceptional weed control above 90% by 7/2. Control with florasulam and MCPA was slower for kochia and common lambsquarters than with other herbicides, but this did not affect yield. Vigorous wheat growth suppressed much of the weed growth but yield was only 40 bu/A compared with 60 bu/A with florasulam and MCPA. Other treatments resulted in wheat yield similar to yield with florasulam and MCPA but tended to be less than florasulam and MCPA.

Broadleaf weed control and crop tolerance with Wolverine in HRSW. Jenks, Willoughby, and Mazurek. 'Glenn' spring wheat was seeded April 30 at 90 lb/A into 7.5-inch rows into barley stubble. Herbicides treatments were applied postemergence (POST) on June 10 at the 4- to 5-leaf stage. Kochia was 4-8 inches tall with 4-10 plants/ft^2. Common lambsquarters ranged from 4-8 inches tall with 0-2 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

This study evaluated broadleaf weed control with Wolverine tank mixes compared to Puma + Huskie and a new Puma formulation + Huskie. There was no crop injury observed with any treatment. All Wolverine and Huskie treatments provided excellent kochia (Kocz) and common lambsquarters (Colq) control. Wolverine applied without an adjuvant provided slightly less lambsquarters control compared treatments with an adjuvant. There were no differences in wheat yield or test weight between treatments.

			HRSW			Kocz[a]			Colq[a]			HRSW	
Treatment	Rate	Timing	Jun 19	Jun 26	Jul 9	Jun 26	Jul 9	Jul 22	Jun 26	Jul 9	Jul 22	Yield	TW
			---% injury ---			---------- % control ----------						bu/A	lb/bu
Untreated			0	0	0	0	0	0	0	0	0	64.3	63.8
Wolverine + AMS	27.4 oz + 0.5 lb	4-5 leaf	0	0	0	91	99	99	94	100	100	64.6	63.9
New Puma / Huskie + AMS	14 oz / 11oz + 0.5lb	4-5 leaf / + 9 day	0	0	0	27	90	94	53	100	100	63.8	64.2
Puma 1 EC + Huskie + AMS	0.66 pt + 11oz + 0.5lb	4-5 leaf	0	0	0	91	97	97	95	100	100	65.6	64.2
Wolverine + UAN 28%	27.4 oz + 1 qt	4-5 leaf	0	0	0	85	95	95	90	100	100	66.8	64.5
Wolverine + NIS	27.4 oz + 0.25 %	4-5 leaf	0	0	0	86	95	96	91	99	99	61.8	64.1
Wolverine	27.4 oz	4-5 leaf	0	0	0	86	94	95	90	95	92	68.8	64.3
LSD (0.05)			NS	NS	NS	8.6	5.5	5.6	7.6	5.4	6.1	NS	NS
CV			0	0	0	7	4	4	6	4	4	8	8

[a] *Kocz=Kochia; Colq=Common lambsquarters*

Agility efficacy and crop safety in wheat. Jenks, Willoughby, and Mazurek. 'Glenn' spring wheat was seeded April 30 at 90 lb/A into 7.5-inch rows into barley stubble. Herbicide treatments were applied postemergence (POST) on June 10 at the 4- to 5-leaf stage. Kochia was 4-8 inches tall with 4-10 plants/ft^2. Common lambsquarters ranged from 4-8 inches tall with 0-2 plants/ft^2. Individual plots were 10 x 30 ft and replicated three times.

Agility is a new herbicide from DuPont that includes the active ingredients of Affinity, dicamba, and Ally for controlling broadleaf weeds. This study evaluated broadleaf weed control with Agility tank mixes. Some early crop injury was observed in most treatments in the form of slight chlorosis and lodging; however, this injury was not visible 2 weeks after treatment (WAT). Agility treatments provided 79-89% kochia control and 100% lambsquarters control on July 19. There was no significant difference in wheat yield and test weight between treatments.

		HRSW		Kocz[b]		Colq[b]		HRSW	
		Jun	Jul	Jul	Jul	Jul	Jul		
Treatment[a]	Rate	19	19	4	19	4	19	Yield	TW
		% injury		---------- % control ---------				bu/A	lb/bu
Agility + NIS	1.74 oz + 0.25%	1	0	81	79	91	100	51.3	63.7
Agility + NIS	3.47 oz + 0.25%	2	0	81	82	92	100	58.6	63.9
Agility + 2,4-De + NIS	1.74 oz + 0.5 pt + 0.25%	4	0	88	89	98	100	58.4	64.4
Agility + 2,4-De + NIS	3.47 oz + 0.5 pt + 0.25%	6	0	87	88	98	100	51.6	63.7
Agility + MCPAa + NIS	1.74 oz + 0.5 pt + 0.25%	5	0	86	87	98	100	60.1	64.6
Agility + MCPAa + NIS	3.47 oz + 0.5 pt + 0.25%	6	0	88	89	98	100	51.5	64.1
Untreated		0	0	0	0	0	0	51.8	63.5
LSD (0.05)		2.4	NS	6.6	7.3	0.9	NS	NS	NS
CV		40	0	5	5	1	0	19	1

[a] *Treatments were applied at the 4- to 5-leaf stage.*
[b] *Kocz=Kochia; Colq=Common lambsquarters*

Huskie on durum wheat, Williston - 2008. Neil Riveland. WREC.

'Alkabo' durum wheat was planted on recrop (land cropped to peas in 2007) in 7 inch rows at 90 lbs/a on April 25. All treatments were applied on May 29 with 66 F temperature, 64% Relative humidity, 90% clear sky and wind at 4-6mph from 201 degrees to 3.5-4 leaf wheat and 1-2 inch Russian thistle (Ruth) 2-4 inch wild mustard (WiMu). 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 30 ft plots. First rain received after application was 0.05 inches on June 3. Experimental design was a randomized complete block design with three replications. Wild Mustard and Russian thistle densities averaged 2-3 and 5-6 plants/ft2, respectively. Droughty conditions occurred during July and August, limiting crop growth and yields. Plots were evaluated for crop injury on June 22, June 29 and August 17. Weed control ratings were taken on June 22 and on August 17. Durum was machine harvested for yield on August 18.

							-- Control ---		
	Product	-Crop Injury--			Test		Ruth	WiMu	Ruth
Treatment a	Rate	6/22	6/29	7/26	Weight	Yield	6/22	6/22	8/17
	oz/a	-----	%	------	lbs/bu	bus/a	-----	%	-----
Untreated	0	0	0	0	57.3	6.1	0	0	0
Huskie+Dry AMS	11+8	0	0	0	57.1	8.5	98	99	97
Huskie+Dry AMS+NIS	11+8+0.5%v/v	0	0	0	58.1	10.3	98	99	98
Huskie+Dry AMS	13.5+8	0	0	1	58.5	7.7	97	99	98
Widematch+MCPA	12+8	2	3	3	59.2	10.1	68	99	83
AffinityTM+Starane+NIS	0.6+5.28+0.25%	1	2	1	58.8	9.4	80	98	65
Orion	17	3	2	1	57.2	6.0	47	98	45
EXP MEAN		1	1	1	58.0	8.3	70	85	69
C.V. %		201	59	157	1.5	18.0	12	1	9
LSD 5%		NS	1	NS	NS	2.7	15	2	12

NIS = Activator 90 from Loveland

Orion did cause slight crop stunting early in the growing season. Harvested 100 sq ft.

Broadleaf weed control in HRSW, Langdon 2008. John Lukach. 'Glenn' hrsw was seeded May 6 on conventional tillage. Post treatments were applied June 5, on 4 leaf wheat, at 10am, 49F, 80RH, 11mph E wind, cloudy with damp foliage. A tractor mounted CO2 sprayer with hood on was used with DG8001.5 tips and four 20" spaced nozzles delivering 10 gal/a at 35psi. A general application of Axial XL, 16.4 oz/a, was made for grass control on June 13 at 9pm. Wild mustard was 4lf 5/ft2, wild buckwheat 1 lf 1/ft2, common lambsquarter 1" tall 3/ft2, common mallow 1-2 lf 2/ft2, redroot pigweed 1" tall 3/ft2, and quarter sized kochia 2/yd2. Plot length was 25 feet and in a RCBD design.

Treatment	Rate	1-Jul	1-Jul	1-Jul	1-Jul	1-Jul	1-Jul	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug	7-Aug			
	oz ai/A	Wimu	Wibu	Colq	Coma	Rrpw	Kocz	Wimu	Wibu	Colq	Coma	Rrpw	Kocz	Height	Yield	T. Wt.
					%					%				cm	bu/a	lb/bu
Brox&MCPA5	8	100	96	98	95	100	100	99	93	99	87	100	93	92	51	62.3
Carfentrazone&2,4-D+NIS	4.06+0.25%	100	38	100	100	100	98	100	20	100	98	98	100	100	50	61.9
Thif-sg+Trib-sg+Salvo+NIS	0.1+0.1+4+0.25%	95	50	100	80	100	18	100	45	100	87	100	0	95	49	61.9
Thif-sg+Trib-sg+Sword+NIS	0.16+0.04+4+0.25%	97	84	100	90	100	20	100	61	100	89	100	0	92	48	61.6
Brox&Pyrasulfotol	2.5	98	96	100	98	100	100	100	88	98	100	100	100	97	48	62.0
Brox&Flox	5	82	99	97	100	100	88	93	90	100	97	100	88	93	47	62.0
Florasulam&MCPA	5.07	98	97	98	96	100	84	100	93	98	99	99	21	86	47	62.1
Brox&Pyrasulfotol+AMS	2.5+8	76	98	100	97	100	100	81	99	95	100	100	100	89	46	62.3
Clpy&Flox+Thif-sg+Trib-sg	2+0.16+0.04	68	96	100	92	100	100	81	86	100	94	100	98	92	46	62.4
Brox&2,4-D	9	89	98	100	97	95	100	93	97	98	79	100	100	85	44	62.8
Flox&MCPA	8	100	55	100	53	100	100	100	23	93	35	100	100	91	44	62.4
Pyraflufen+Salvo+NIS	0.013+4+0.25%	99	61	100	71	100	78	88	8	95	60	98	38	83	39	61.4
Clopyralid&Flox	3	35	98	70	85	100	100	38	98	60	83	100	100	93	36	62.5
Untreated	0	0	0	0	0	0	0	0	0	0	0	0	0	91	26	62.2
	C.V. %	13	20	8	18	3	18	18	24	10	27	2	19	9	10	1.5
	LSD 5%	15	22	11	21	4	20	21	22	12	30	3	18	NS	6	NS

False Chamomile control in HRSW, Langdon 2008. John Lukach. 'Glenn' hrsw was seeded May 1, no-till into flax stubble at 90 lb/a. The area had received Glyphosate, 0.75 lb/a, Sept. 15, 2007 so chamomile was small to one inch rosettes at seeding. Post treatments were applied June 5, on 4 leaf wheat, at 7pm, 63F, 56RH, 13mph E wind, cloudy with dry foliage. A tractor mounted CO2 sprayer with hood on was used with DG8001.5 tips and four 20" spaced nozzles delivering 10 gal/a at 35psi. A general application of Axial XL, 16.4 oz/a, was made for grass control on June 13 at 9pm. False Chamomile was small up to 3" tall with 5/ft2 when treatments were applied. Other broadleaf weeds were present but were quickly eliminated by competition from the chamomile and wheat. Plots were 25 feet long and in a RCBD design with four replications.

		30-Jun	30-Jun	7-Aug			
	Rate	False Chamomile					
Treatment	oz/a	Control	Maturity	Control	Height	Yield	T.Wt.
		%	1-5	%	cm	bu/a	lb/bu
Orion	17	85.0	1.8	83.5	71.0	29.2	62.6
Affinity TM +24D+NIS	0.4+8+0.125%	70.0	1.0	77.0	75.3	27.7	62.4
Affinity BS +24D+NIS	0.6+8+0.125%	85.0	1.0	97.8	72.3	26.0	62.5
Huskie+AMS	13.5 +0.5lb/a	31.8	2.5	40.0	77.5	24.0	62.2
WideMatch+MCPA	12 + 8	55.0	3.3	60.0	74.3	23.9	62.6
Huskie+AMS	15 +0.5 lb/a	50.0	3.0	40.0	69.5	23.7	62.4
Huskie+AMS	11+0.5lb/a	47.5	2.3	32.5	76.0	23.7	62.5
Bronate Advanced	16	55.0	2.5	32.5	73.3	20.3	62.4
Aim +24D+NIS	0.5+8+0.125%	25.0	4.3	20.0	74.5	16.8	62.2
MCPA ester	16	17.5	4.0	7.5	76.0	16.8	62.4
Starane	10.7	2.5	4.0	0.0	78.8	15.3	62.3
2,4-D ester	16	10.0	4.0	5.0	68.5	9.3	61.1
Check	---	0.0	4.0	0.0	67.8	10.4	61.4
C.V. %		31.1	21.9	27.9	7.5	30.1	1.1
LSD 5%		18.3	0.9	15.3	NS	8.9	NS

Chamomile Maturity - 1= leaf, 2= early bud, 3= late bud, 4= first flower, 5= 10% flower

Broadleaf Weed Control with Tribenuron. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Prosper on May 19. Treatment were applied to four-leaf wheat and common ragweed (30 plants/yd^2), 4 inch tall common lambsquarters (15 plants/yd^2), two- to four-leaf redroot pigweed (10 plants/yd^2), and four- to eight-leaf wild mustard (8 plants/yd^2) on June 19 with 68°F, 50% RH, 4 to 7 mph wind at 315°, and moist soil at 69°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments 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.

		7/2	7/2	7/2	7/2	7/2	7/18	7/18	7/18	7/18
Treatment	Rate	Wheat	Corw	Colq	Rrpw	Wimu	Wheat	Corw	Colq	Rrpw
	oz/A									
Tribenuron-HA[a]+NIS	0.25+0.25%	0	82	95	97	95	3	98	99	99
Tribenuron-sg+NIS	0.25+0.25%	0	83	96	97	95	3	89	99	99
Fluroxypyr-HA	1.5	0	91	92	96	91	0	99	99	99
Fluroxypyr	1.5	0	90	90	96	91	2	99	99	99
Fluroxypyr-HA	2.2	0	91	93	97	94	3	99	99	99
Fluroxypyr	2.2	0	92	95	97	94	3	96	99	99
Trib-HA+Flox-HA+NIS	0.25+1.5+0.25%	0	97	97	97	97	6	99	99	99
Thif-sg+Trib-sg+NIS	0.2+0.2+0.25%	0	91	94	97	92	5	89	99	99
Dicamba	2	0	97	95	96	94	18	99	99	99
Clpy&Flox	3	0	97	97	94	95	2	99	99	99
Brox&Pyst+AMS	2.9+8	0	94	97	97	97	0	99	99	99
Clpy&Flox+Trib-sg+NIS	2+0.15+0.25%	0	97	97	97	93	8	99	99	99
Untreated	0	0	0	0	0	0	0	0	0	0
		0	1	1	1	1	69	2	0	0
		0	3	2	1	2	5	3	1	1

[a] HA indicated products supplied by Helm Agro.

Herbicide injury to wheat was not visible on 7/2; however, wheat in several plots appeared shorter than wheat in nontreated areas on 7/18, 2 to 6% injury. Clopyralid and fluroxypyr plus tribenuron and dicamba caused stiff leaves and slightly deformed heads as well as stunting, 8 and 18% injury respectively.

Tribenuron plus fluroxypyr, dicamba, or treatments that contained clopyralid provided 97% control of common ragweed and common lambsquarters on 7/2. Tribenuron alone gave the least control of common ragweed at 82 to 83%. Other herbicide treatments provided at least 90% control of common ragweed and other weeds. Only common ragweed remained on 7/18. Treatments that included the soluble granule (-sg) formulation of sulfonylureas without a growth regulator gave only 89% control of common ragweed. Other herbicides provided very good weed control.

Broadleaf weed control in cereals. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 14. Treatments were applied to four-leaf wheat, two- to four-leaf wild mustard (8 plants/yd^2), two- to four-leaf Pennsylvania smartweed (15 plants/yd^2), and cotyledon to two-leaf Venice mallow (25 plants/yd^2) on June 23 with 84°F, 32% RH, 25% cloud cover, 0 to 2 mph wind at 170°, and dry soil at 70°F. A backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles was used to apply treatments to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/30 Wht	7/8 Vema	7/8 Smwe	7/8 Wimu	7/22 Vema	7/22 Smwe	7/22 Wimu	8/19 Brlf	8/19 Yeft
	oz/A					%				
Accurate+NIS	0.06+0.25%	0	87	86	92	94	95	97	99	10
Accurate Extra+NIS	0.28+0.25%	0	90	92	95	93	96	97	99	10
Nuance+NIS	0.25+0.25%	0	83	85	88	95	95	98	99	10
Nimble+NIS	0.45+0.25%	0	86	86	92	96	95	96	99	10
Harass+NIS	0.45+0.25%	0	89	91	91	95	94	97	99	10
Report+NIS	0.25+0.25%	0	89	92	95	94	93	96	99	95
Report Extra+NIS	0.3+0.25%	0	95	94	95	96	95	98	99	92
INC115+Clfp-ng+ MCPA+NIS	0.4+0.8+ 4+0.25%	0	88	93	95	96	95	98	99	10
INC116+NIS	0.5+0.25%	0	89	91	93	92	95	96	99	10
Thif-sg+Trib-sg+ MCPA+NIS	0.24+0.06+ 4+0.25%	0	87	91	95	96	97	99	99	10
Bromoxynil&Pyrasulfotol+ AMS	2.9+ 8	0	94	95	96	97	99	98	99	8
Untreated	0	0	0	0	0	0	0	0	0	0
CV		0	3	1	1	1	1	1	0	11
LSD		0	4	2	2	2	2	2	1	4

Treatments did not cause injury to wheat. Bromoxynil and pyrasulfotol or Report Extra provided the best weed control on 7/8, although Accurate Extra also gave at least 90% control of broadleaf weeds present. Other herbicides gave 80 to 90% control of Venice Mallow and 85 to 95% control of Pennsylvania smartweed. All herbicides provided greater than 90% control of wild mustard except Nuance at 88%. While there were small differences among treatments on 7/22, herbicides essentially provided similar weed control from 92 to 99% across the three weed species.

None of the treatments included a grass herbicide per se; however, Report and Report Extra activity on Yellow foxtail was very pronounced late in the season. Since treatments were not targeted to grass control, foxtail size and population were not recorded during application. Slight foxtail stunting and discoloration was noticed generally throughout the study herbicide treatments, but the population on 8/19 was still unchanged in most plots at about 50 plants/ft^2. Yellow foxtail was present in Report and Report Extra treatments, but the population was only 2 to 4 plants/ft^2. And the surviving plants were not as large and developed physiologically as plants in other plots. This effect has been observed with sulfonylurea treatments in previous years, but not so specifically to certain products within a study.

Broadleaf weed control in wheat with NUP compounds. Howatt, Roach, and Harrington. 'Alsen' hard red spring wheat was seeded near Fargo on May 14. Treatments were applied to four-leaf wheat, two- to four-leaf wild mustard (8 plants/yd^2), two- to four-leaf Pennsylvania smartweed (10 plants/yd^2), cotyledon to two-leaf lanceleaf sage (5 plants/yd^2), and cotyledon to one-leaf Venice mallow (3 to 5 plants/yd^2) on June 23 with 84°F, 32% RH, 25% cloud cover, 0 to 2 mph wind at 170°, and dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 38 psi through 11001 TT nozzles to an area 7 ft wide the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		7/8	7/8	7/8	7/8	7/22	7/22	7/22	7/22	8/19
Treatment	Rate	vema	smwd	llsa	wimu	vema	smwd	llsa	wimu	all
	oz/A					%				
NUP-08002+NIS	8+0.25%	91	87	86	95	98	99	93	99	99
NUP-08004+NIS	8.5+0.25%	88	88	86	95	99	99	93	98	99
NUP-08035+NIS	5.8+0.25%	85	92	87	95	99	99	95	99	99
NUP-06107+NIS	4+0.25%	92	93	92	92	99	99	93	99	99
NUP-08006+NIS	2+0.25%	85	88	87	92	99	99	92	99	99
NUP-08057+NIS	4+0.25%	88	90	89	85	98	98	94	98	99
Treaty+NIS	0.3+0.25%	91	92	91	95	99	99	93	98	99
Treaty Extra+NIS	0.3+0.25%	89	92	91	95	99	99	92	99	99
Victory+NIS	0.2+0.25%	83	89	91	95	99	98	93	99	99
Rapport BS+NIS	0.3+0.25%	92	95	92	94	99	99	93	99	99
Rapport TM+NIS	0.3+0.25%	91	93	94	95	99	99	93	99	99
Untreated	0	0	0	0	0	0	0	0	0	0
		3	3	3	1	1	1	2	1	1
		4	4	4	2	1	1	3	1	1

Herbicide injury to wheat was not observed. All treatments provided good to excellent control of the weeds present. NUP-06107, Treaty, and Rapport each provided greater than 90% control. Control of lanceleaf sage was better than expected given past performance of sulfonylureas on this weed, Treaty, Victory, and the two Rapport entries are sulfonylurea products. The high activity may have been due to the small growth stage or competition from other plants. Even though lanceleaf sage control was high, complete control was not achieved until crop competition helped eliminate it. Control was similar across herbicides on 7/22, ranging from 92 to 95%, but lanceleaf sage was not present in herbicide plots on 8/19.

ET on durum wheat, Williston 2008. Neil Riveland. WREC.

'Alkabo' durum wheat was planted on recrop (land cropped to peas in 2007) in 7 inch rows at 90 lbs/a on April 25. All treatments were applied on June 3rd with 67 F, 57% RH, 90% clear sky and wind at 2-3 mph from 185 degrees to 5.2 to 5.7 leaf wheat and 4-6 inch wild mustard (Wimu), 1-3 inch Russian thistle (Ruth), common lambsquarters (Colq), and kochia (Kocz). We used a small plot sprayer with wind cones, mounted on a G-Allis Chalmers tractor to apply the treatments, delivering 20 gals/a at 40 psi through 8001vs flat fan nozzles at 1.5 mph to a 6.67 ft wide area the length of 10 by 30 ft plots. First rain received after application was 0.34 inches on June 8. Experimental design was a randomized complete block design with four replications. Weed densities in plants/ft2 were 8-12 for Ruth, 1 for Wimu, 5 for Colq, and 1/yd2 for KOCZ. Plots were evaluated for crop injury on June 20, June 29 and July 26. Weed control ratings were taken on June 29 and on August 17. Durum was machine harvested for yield on August 18.

Table 1.

Treatment a	Product Rate oz/a	Leaf Chlorosis 0-10 b	Crop injury 6/20 %	Crop injury 6/29 %	Crop injury 7/26 %	Test Weight lbs/b	Grain Yield bus/a
ET+MCPA-Ester+NIS	0.75+16+0.25%vv	7.5	2.5	1.8	1.8	56.7	7.93
ET+Bucktril+NIS	0.75+24+0.25%vv	4.8	1.0	.5	.0	53.4	5.13
ET+2,4-D Ester+NIS	0.75+16+0.25%vv	5.3	.0	.0	.0	54.9	6.12
ET+Ally Extra+NIS	0.75+0.1+0.25%vv	1.0	2.0	1.3	1.8	57.8	6.67
ET+Ally Extra+NIS	0.75+0.2+0.25%vv	.0	.5	2.0	.0	56.6	8.42
Control-Bucktril	24	1.3	.0	1.3	1.3	53.2	4.86
Control-Bronate	24	1.3	.5	.5	.0	55.2	5.93
Untreated Check	0	.0	.0	.0	.0	51.5	3.64
EXP MEAN		2.6	.8	.9	.6	54.9	6.09
C.V. %		31.4	183.9	164.9	301.2	2.6	30.47
LSD 5%		1.2	NS	NS	NS	3.4	2.73

a - NIS = Activator 90.
b - visual rating 0-10 where 0 = none to 10 = severe chlorosis.

Summary: Leaf chlorosis or "speckling" rated on the first five leaves. There was no chlorosis of newer growth. No significant crop injury was observed, although Ally Extra with ET tended to cause slight stunting to the crop. Very dry weather conditions (drought) caused very low yield levels. Test weights of the crop were increased by most treatments.

Table 2.

Treatment a	Product Rate oz/a	Ruth Control 6/29	Ruth Control 8/17	KOCZ Control 6/29	KOCZ Control 8/17	Colq Control 6/29	Colq Control 8/17	Wimu Control	Yield
		----- % ----		----- % ----		----- % ----		%	bus/a
ET+MCPA-Ester+NIS	0.75+16+0.25%vv	88.8	77.5	81.0	63.5	96.0	95.8	99.0	7.93
ET+Bucktril+NIS	0.75+24+0.25%vv	98.0	97.3	93.3	92.5	99.0	99.0	99.0	5.13
ET+2,4-D Ester+NIS	0.75+16+0.25%vv	99.0	97.5	89.8	75.0	98.8	99.0	99.0	6.12
ET+Ally Extra+NIS	0.75+0.1+0.25%vv	82.3	79.8	69.8	62.3	90.8	97.0	99.0	6.67
ET+Ally Extra+NIS	0.75+0.2+0.25%vv	83.8	65.0	50.0	28.8	93.8	96.0	99.0	8.42
Control-Bucktril	24	97.5	98.0	94.8	98.5	99.0	99.0	98.0	4.86
Control-Bronate	24	96.8	94.3	94.3	81.8	96.8	98.0	99.0	5.93
Untreated Check	0	.0	.0	.0	.0	.0	.0	.0	3.64
HIGH MEAN		99.0	98.0	94.8	98.5	99.0	99.0	99.0	8.42
LOW MEAN		.0	.0	.0	.0	.0	.0	.0	3.64
EXP MEAN		80.8	76.2	71.6	62.8	84.3	85.5	86.5	6.09
C.V. %		9.2	17.8	19.8	42.3	5.5	2.3	.8	0.47
LSD 5%		10.9	20.0	20.9	39.1	6.8	2.9	1.0	2.73
LSD 1%		14.8	27.2	28.4	53.2	9.2	4.0	1.4	NS
# OF REPS		4	4	4	4	4	4	4	4
F-TRT		81.1	23.7	6.3	221.4	23.7	1202.9	9773.7	2.92

Summary: Very dry (droughty) conditions resulted in very low yield levels that were variable and not indicative of the corresponding weed control pressure. For example, Ally Extra and MCPA with ET do not appear to give adequate control of Russian thistle; yet those treatments have the highest yields.

ET Herbicide for In-Crop Applications in Wheat at Hettinger, ND

Eric Eriksmoen

'Howard' HRSW was seeded on April 30. Treatments were applied on June 1 to 4 ½ leaf wheat and to 2" kochia (kocz), 2" Russian thistle (ruth) and to 2 leaf wild buckwheat (wibw) with 69° F, 58% RH, clear sky and NW wind at 3 mph. 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 trial was a randomized complete block design with three replications. HRSW, kochia, Russian thistle and wild buckwheat populations were 8, 29, 3 and 0.7 plants per square foot, respectively. Plots were evaluated for crop injury on June 10 and June 18 and for weed control on June 10, June 18 and on August 1. The trial was harvested on August 8.

			June 10				June 18				8/1	Test	Crop
	Treatment*	Rate	inj	kocz	ruth	wibw	inj	kocz	ruth	wibw	kocz	Weight	Yield
		oz/A	% Control									lbs/bu	bu/a
1	ET + MCPA ester	0.75 + 16	13	87	98	95	0	91	93	95	93	46.2	31.8
2	ET + Buctril	0.75 + 24	10	93	96	95	0	92	96	96	98	47.9	29.7
3	ET + 2,4-D ester	0.75 + 16	17	90	92	55	0	90	95	96	90	47.7	20.3
4	ET + Ally Extra	0.75 + 0.1	3	80	98	90	0	76	96	99	91	45.6	24.3
5	ET + Ally Extra	0.75 + 0.2	2	60	93	92	0	80	96	85	82	49.1	26.7
6	MCPA ester	16	0	30	37	0	0	91	90	7	77	45.3	26.3
7	Untreated	--	0	0	0	0	0	0	0	0	0	43.3	22.5
	C.V.%		49	17	15	24	337	14	8	9	13	7.4	19.8
	LSD .05		6	19	20	26	NS	19	11	11	18	NS	NS

Summary

Crop injury (leaf spotting) was quite evident initially but diminished quickly. All herbicide treatments except for ET + 0.2 oz/A Ally Extra (trt 5) and MCPA alone (trt 6) provided excellent season long kochia control. MCPA alone (trt 6) was not effective on wild buckwheat but when combined with ET herbicide (trt 1), control was excellent. All herbicide treatments provided excellent Russian thistle control. Test weights were very light due to late season heat and moisture stress. Although there were no statistical differences for grain yield between treatments, all herbicide treatments with the exception on ET + 2,4-D (trt 3) had higher yields than the untreated check.

Field Bindweed Control at Hettinger, ND

Eric Eriksmoen

Herbicide treatments were applied on September 11, 2007 to fully mature field bindweed (fibw) which had been cut to a 4 to 6 inch height during small grain harvest (post harvest) with 54° F, 56% RH, partly cloudy sky and east wind at 6 mph. 'Howard' HRSW was seeded on April 30. Treatments were applied with a tractor mounted CO_2 propelled plot sprayer delivering 10 gpa at 30 psi through PK-01E80 nozzles to a 10 foot wide area the length of 15 by 28 foot plots. The trial was a randomized complete block design with three replications. Plots were evaluated for crop injury and weed control on May 27 and on June 18. The trial was harvested on August 8.

	Treatment	Product Rate	Approx. trt cost	- May 27 - inj	- May 27 - fibw	- June 18 - inj	- June 18 - fibw	Test Weight	Grain Yield
		oz/A	$/A	-------- % control --------				lbs/bu	bu/A
1	Untreated	--	0	0	0	0	0	52.2	13.8
2	Roundup (RT3)	96	21.00	0	98	0	99	53.4	22.1
3	Roundup + AMS	44 + 1%	13.12	0	99	0	99	52.8	18.3
4	R'up + 2,4-D ester + AMS	11 + 24 + 1%	8.72	0	99	0	99	54.4	22.5
5	2,4-D amine (4 lb/gal)	48	4.50	0	96	0	99	53.4	16.1
6	2,4-D ester (4 lb/gal)	48	5.62	0	96	0	98	55.9	21.1
7	Banvel + NIS	32 + 0.5%	23.50	0	99	2	99	54.9	16.5
8	Paramount + MSO + UAN	5.28 + 32 + 128	25.40	0	99	0	99	56.8	19.2
	C.V.%			0	3.1	490	0.9	4.0	7.8
	LSD .05			NS	5	NS	1	NS	2.5

Summary

Crop injury was very minor when observed. The trial sustained severe late season heat and moisture stress causing light test weights and lower yields. All herbicide treatments provided excellent season long control of field bindweed. All herbicide treatments except for 2,4-D amine alone (trt 5) had significantly higher grain yields than the untreated check.