Green section: **Weed Control in Small Grains** Page

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Evaluation of barley variety sensitivity to Beyond carryover (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate barley variety sensitivity to Beyond carryover from the previous year. In 2010, Beyond was applied postemergence to Clearfield lentil at 2, 3, 4, 6, and 8 fl oz. Tradition, Celebration, Pinnacle, and Conlon were planted in 2011 into the treated blocks. Each variety was evaluated for visual injury, height, yield, test weight, and percent plump and thin. All Beyond rates were compared to an untreated. No visual injury was observed with any treatment. There were no differences between treatments for height, yield, test weight, or percent plump and thin. Excessive rainfall flooded out the Conlon block, so no data is presented for Conlon. This study was also conducted by Vision Research (Berthold) with similar results.

Table 1. Evaluation of barley variety sensitivity to Beyond carryover. (1111)

		Barley								
		Visual injury						Height		
		Tradition		Celebration		Pinnacle		Tradition	Celebration	Pinnacle
Treatment[a]	Rate	14-Jul	4-Aug	14-Jul	4-Aug	14-Jul	4-Aug	5-Aug		
		----------%----------						----------cm----------		
Untreated		0	0	0	0	0	0	92.2	101.6	91.7
Beyond	2 fl oz	0	0	0	0	0	0	88.8	102.5	91.7
Beyond	3 fl oz	0	0	0	0	0	0	89.3	99.3	91.8
Beyond	4 fl oz	0	0	0	0	0	0	92.6	102.8	93.5
Beyond	6 fl oz	0	0	0	0	0	0	89.9	102.8	93.3
Beyond	8 fl oz	0	0	0	0	0	0	91.6	100.4	90.5
LSD (0.05)		NS	NS	NS	NS	NS	NS	NS	NS	NS
CV		0	0	0	0	0	0	4	2	3

[a]*All treatments applied postemergence to Clearfield lentil in 2010 with NIS (0.25%) + 28% N (2.5%)*

Table 2. Evaluation of barley variety sensitivity to Beyond carryover. (1111)

		Barley											
		Tradition		Celebration		Pinnacle		Tradition		Celebration		Pinnacle	
Treatment[a]	Rate	Plump	Thin	Plump	Thin	Plump	Thin	Yield	TW	Yield	TW	Yield	TW
		----------%----------						bu/A	lb/bu	bu/A	lb/bu	bu/A	lb/bu
Untreated		87.5	3.6	93.3	6.6	94.8	2.7	79.7	44.8	78.8	42.0	72.8	43.1
Beyond	2 fl oz	88.1	3.7	93.6	6.3	94.3	2.6	73.0	44.2	83.1	42.8	79.0	43.9
Beyond	3 fl oz	84.3	5.1	89.3	6.5	96.7	2.1	70.5	43.6	77.6	42.1	75.8	43.9
Beyond	4 fl oz	81.6	5.8	94.7	5.2	96.4	2.4	85.2	44.3	81.4	42.8	80.3	43.9
Beyond	6 fl oz	82.5	5.2	94.6	5.4	94.5	2.5	79.2	44.0	87.7	42.3	78.6	43.6
Beyond	8 fl oz	84.3	5.5	95.7	4.2	93.5	2.8	78.8	43.4	82.5	42.7	76.8	44.4
LSD (0.05)		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV		5	34	3	34	2	23	8	2	7	2	6	2

[a]*All treatments applied postemergence to Clearfield lentil in 2010 with NIS (0.25%) + 28% N (2.5%)*

Table 3. Evaluation of barley variety sensitivity to Beyond carryover (1111)

		Barley								
		Tradition	Celebration	Pinnacle	Tradition	Celebration	Pinnacle	Tradition	Celebration	Pinnacle
Treatment[a]	Rate	Yield			Test Weight			Protein		
		----------bu/A----------			----------lb/bu----------			----------%----------		
Untreated		80	79	73	45	42	43	13.2	11.5	15.3
Beyond	2 fl oz	73	83	79	44	43	44	13.1	11.3	15.1
Beyond	3 fl oz	71	78	76	44	42	44	13.1	11.5	14.7
Beyond	4 fl oz	85	81	80	44	43	44	13.1	11.6	15
Beyond	6 fl oz	79	88	79	44	42	44	13.3	11.3	14.7
Beyond	8 fl oz	79	83	77	44	43	44	13.2	11.5	14.7
LSD (0.05)		NS	NS	NS	NS	NS	NS	NS	NS	NS
CV		8	7	6	8	2	2	2	3	2

[a]*All treatments applied with NIS (0.25%) + 28% N(2.5%)*

Dandelion control before cereals. Howatt, Roach, and Harrington. Preplant treatments were applied and 'Faller' hard red spring wheat was seeded near Fargo on May 19. Conditions at application were 55°F, 40% relative humidity, cloud covered sky, 2 mph wind at 315°, and dry soil at 55°F. Weeds present at application were full blooming dandelion approximately 12 inches in diameter and tillering foxtail barley and downy brome. Application was with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 flat fan nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Jun-2 Dali	Jun-17 Dali	Jul-18 Dali	Jul-18 Foba	Jul-18 Dobr
Trib-sg+mets+NIS	0.125+0.02+0.25%	20	45	45	0	0
Trib-sg+mets+Glyt+NIS +AMS	0.125+0.02+12+0.25% +13.6	20	43	71	84	99
Thif-sg+trib-sg+NIS	0.125+0.125+0.25%	20	45	65	0	0
Thif-sg+trib-sg+glyt+NIS +AMS	0.125+0.125+12+0.25% +13.6	20	38	69	91	99
Glyt+AMS	12+13.6	20	35	43	90	99
Glyt+saflufenacil+MSO +AMS	12+0.36+0.13G +13.6	69	43	18	0	48
Glyt-dma+florasulam+AMS	6.75+0.07+13.6	20	43	48	86	98
Glufosinate+AMS	6.4+48	38	28	23	13	71
Untreated	0	0	0	0	0	0
CV		11	18	22	13	13
LSD 5%		4	9	14	8	10

Large dandelion were resilient to all treatments. Saflufenacil promoted initial leaf necrosis of dandelion in combination with glyphosate, but plants recovered and control was less than with glyphosate alone by July 18. Addition of tribenuron to glyphosate provided better control of dandelion than glyphosate alone, but metsulfuron was a less effective partner than thifensulfuron. Dandelion control did not exceed 71% with any herbicide treatment. Saflufenacil with glyphosate also resulted in less control of foxtail barley and downy brome than glyphosate alone or glyphosate with ALS-inhibiting herbicides.

Soil applied herbicides in spring wheat. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on June 6. Treatments were applied to tilled soil on June 5 with 91°F, 39% relative humidity, 10% cloud-cover, 0 to 2 mph wind at 0°, and damp soil at 77°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	6/24 Wht	7/18 Wht	7/18 Rrpw	7/18 Llsa	7/18 Vema	7/18 Yeft	8/10 Rrpw	8/10 Llsa	8/10 Vema	8/10 Yeft
		%	%	%	%	%	%	%	%	%	%
Untreated		0	0	0	0	0	0	0	0	0	0
Flum+2,4-D +AMS	1.53+15.2 +40	0	0	90	94	93	70	83	82	91	57
Flum&pxsf+2,4-D +AMS	3.42+15.2 +40	0	4	96	97	97	95	94	98	88	92
Flcz+NIS+AMS	0.21+0.25%+40	0	0	40	0	23	38	82	27	40	27
Trib+NIS+AMS	0.125+0.25%+40	0	0	35	18	28	43	27	7	47	43
Saff+MSO+AMS	0.72+0.18G+40	0	0	75	90	86	65	33	67	73	23
Suen+NIS+AMS	3+0.25%+40	0	0	87	71	74	80	88	30	40	47
CV		0	76	10	12	11	13	14	21	14	27
LSD 5%		0	1	9	9	9	10	15	17	14	20

Wheat was not evident until July 18. At this evaluation, only flumioxazin and Pyroxasulfone caused noticeable injury. The injury was minor stunting and rated at 4% for height reduction. This injury was not observed on August 10. While some injury was detected, this treatment gave the best season-long weed control. Averaged across weeds, flumioxazin and pyroxasulfone provided 97% control on June 17 and 93% control on August 10. Flumioxazin alone gave 92% control of broadleaf weeds in July but late-emerging weeds resulted in 85% broadleaf control in August, and foxtail control was 57% with the exceptional soil moisture for maximum root uptake. Other herbicides gave varying levels of suppression, but would have benefitted from postemergence herbicide application. Saflufenacil and sulfentrazone gave reasonably good control through July 18, but by August 10, two of the four weeds species were controlled at 40% or less.

Weed control with new premixes for cereals. Howatt, Roach, and Harrington. Preemergence treatments were applied to tilled soil near Fargo on June 5 with 91°F, 39% relative humidity, 10% cloud cover, 0 to 2 mph wind at 0°, and wet soil at 77°. 'Faller' hard red spring wheat was seeded on June 6. Two-leaf treatments were applied to two-leaf wheat, four to six-leaf wild buckwheat, four-leaf Venice mallow, and two-leaf yellow foxtail on June 20 with 67°F, 79% relative humidity, 95% cloud cover, 8.8 mph wind at 90°, and dry soil at 68°F. Three-inch broadleaf treatments were applied to three-leaf to tillering wheat, six-leaf to vining wild buckwheat, six-leaf Venice mallow, and four-leaf yellow foxtail on July 7 with 82°F, 50% relative humidity, 0% cloud cover, 3.5 mph wind at 135°, and dry soil at 70°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Timing	6/24 inj	7/18 inj	7/18 wibw	7/18 vema	7/18 yeft	8/10 vema	8/10 yeft
	oz/A		%	%	%	%	%	%	%
F9312	1.16	Pre	0	0	69	76	79	20	58
F9312	1.5	Pre	0	0	79	81	84	55	69
F9312	2.29	Pre	0	0	86	81	90	75	83
F9310	1.1	Pre	0	0	88	85	83	43	63
F9310	1.47	Pre	0	0	88	85	85	83	70
F9310+MCPA+NIS	1.1+5.7+0.25%	2L Wht	0	0	90	89	89	88	71
F9310+MCPA+NIS	1.47+5.7+0.25%	2L Wht	12	0	94	97	93	91	90
F9312+MCPA+NIS	2.16+5.7+0.25%	2L Wht	25	0	93	95	94	96	86
F9007+pxdn+NIS	0.14+0.86+0.25%	3" BL	0	0	98	95	90	94	91
Mets+pxdn+NIS	0.06+0.86+0.25%	3" BL	0	0	35	30	94	8	98
F9007+MCPA+pxdn+NIS	0.14+5.7+0.86+0.25%	3" BL	0	0	96	97	91	99	88
F9071+MCPA+pxdn+NIS	0.08+5.7+0.86+0.25%	3" BL	0	0	93	88	96	49	99
Mets+MCPA+pxdn+NIS	0.06+5.7+0.86+0.25%	3" BL	0	0	89	85	0	5	0
MCPA+pxdn+NIS	5.7+0.86+0.25%	3" BL	0	0	58	50	93	13	96
Pxdn+clpy&flox +MCPA+NIS	0.86+2.2 +5.7+0.25%	3" BL	0	0	95	94	0	98	0
Flcz/Pxdn+clpy&flox +MCPA+NIS	0.21/0.86+2.2 +5.7+0.25%	Pre /3" BL	0	0	97	95	97	97	94
Untreated	0		0	0	0	0	0	0	0
CV			53	0	6	6	7	15	9
LSD (0.05)			2	0	8	7	7	13	8

Wheat injury was observed with postemergence application of F9310 at the higher rate or F9312. Injury manifested as stunting and chlorosis with minor necrosis of leaf margins. Wheat injury was not present with any treatment on July 18.

Moisture for incorporation was not limited this season. Preemergence treatment with F9310 or F9312 provided good control of grass and broadleaf weeds of generally 80 to 90% on July 18. F9312 at 1.16 oz ai/A only gave 70 to 80% control during this period so a minimum of 1.5 oz/A of this product was needed to provide the best control. In august the rate response of these herbicides was more evident. Early postemergence timing of F9007 plus pinoxaden provided excellent weed control, greater than 90%, without eliciting response from wheat.

2011 Valent Winter Wheat Herbicide Trial

Eric Eriksmoen, Hettinger, ND

Pre-plant (PP) treatments were applied on September 21, 2010 with 59° F, 64% RH, partly cloudy sky and east wind at 6 mph. 'AP503CL2' HRWW was seeded no-till on September 28. Fall post-emergence (FPOST) treatments were applied on October 13, 2010 with 55° F, 30% RH, cloudy sky and southwest 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 soil is classified as a silt-loam with a pH of 6.2, OM of 3.2% and 85% hrsw residual ground cover. The trial was a randomized complete block design with four replications. The trial had a pre-plant burndown application of 24 oz/A Roundup WeatherMax on September 12, 2010 and an application of 12 oz/A Huskie herbicide + 8 oz/A Headline fungicide on June 4, 2011 to control broadleaf weeds and foliar diseases. Plots were evaluated for crop injury on October 22, 2010 and on May 19, 2011, and the trial was harvested on August 5, 2011.

	Treatment	Product rate	App. Timing	10/22 inj	5/19 inj	Test weight	Grain yield
		oz/A		%*	%**	lbs/bu	bu/A
1	Untreated			0	0	--	11.2
2	Valor SX	2.0	PP	0	12	--	7.9
3	Fierce	3.0	PP	0	35	52.2	26.7
4	PrePare + NIS	0.3 + 0.25%	PP	0	5	52.6	22.7
5	Valor SX	2.0	FPOST	2	0	57.0	20.6
6	Valor SX + Harm Ext + NIS	2.0 + 0.6 + 0.25%	FPOST	10	0	54.1	17.5
7	Everest + NIS	0.6 + 0.25%	FPOST	3	18	57.3	30.0
8	PowerFlex + Basic Blend	3.5 + 1%	FPOST	4	50	53.7	27.8
9	Valor SX fb PowerFlex + Basic Blend	2.0 3.5 + 1%	PP FPOST	1	22	53.8	27.4
10	Fierce fb PowerFlex + Basic Blend	3.0 3.5 + 1%	PP FPOST	3	28	55.0	35.5
	C.V. %			133	168	4.1	31.5
	LSD .05			4	NS	NS	10.4

NS = no statistical difference between treatments
*Crop injury on October 22, 2010 = % leaf speckling
*Crop injury on May 19, 2011 = % crop stunting

Summary

Fall crop injury symptoms were leaf speckling and observations were generally minor with the exception Valor SX + Harmony Extra which was quite obvious. Crop stunting was observed in the spring and was generally quite evident but inconsistent with most treatments. Grain yields did not correspond to injury symptoms but were more related to weed control (data not collected).

2011 Bayer Winter Wheat Herbicide Trial

Eric Eriksmoen, Hettinger, ND

Pre-plant (PP) treatments were applied on October 6, 2010 to 3 leaf downy brome (dobr) with 54° F, 55% RH, sunny sky and southwest wind at 5 mph. 'AP503CL2' HRWW was seeded no-till on October 11. Spring treatments (SPOST) were applied on May 19, 2011 to tillering wheat, tillering downy brome and 2 leaf Japanese brome (jabr) with 46° F, 80% RH, cloudy sky and northeast wind at 3 mph. Wild oats (wiot) had not yet emerged. 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 soil is classified as a silt-loam with a pH of 6.2, OM of 3.2% and 85% hrsw residue ground cover. The trial was a randomized complete block design with four replications. The trial had an application of 12 oz/A Huskie herbicide + 8 oz/A Headline fungicide on June 4, 2011 to control broadleaf weeds and foliar diseases. Weed populations for downy brome, Japanese brome and wild oats were 20, 2 and 0.25 plants /ft^2 respectively. Plots were evaluated for crop injury on May 19, June 1, June 22 and July 18, and were evaluated for weed control on May 19, June 22 and July 18. The trial was harvested on August 5.

				------ May 19 ------			6/22	---------- July 18 ----------				Test	Grain
	Treatment	Product rate	Timing	inj	stand	dobr	dobr	inj	dobr	jabr	wiot	weight	yield
		oz/A		%	%	---------- Percent Control ----------						lbs/bu	bu/A
1	R'up Weather Max + AMS	16 + 17lbs	PP	0	54	92	84	0	82	20	0	51.6	25.2
2	R'up W. Max + Olympus + AMS	16 + 0.6 + 17lbs	PP	0	58	94	91	0	95	79	0	52.9	30.2
3	R'up W. Max + Olympus + AMS	16 + 0.9 + 17lbs	PP	0	60	91	89	0	91	94	0	53.1	33.2
4	R'up W. Max + PrePare + AMS	16 + 0.3 + 17lbs	PP	0	50	96	84	0	88	38	0	52.6	31.7
5	R'up W. Max + Olympus + AMS fb Olympus + NIS	16 + 0.6 + 17lbs 0.6 + 0.5%	PP SPOST	0	70	95	99	0	99	99	55	52.4	31.7
6	R'up W. Max + Olympus + AMS fb Rimfire Max + MSO	16 + 0.6 + 17lbs 3 + 20	PP SPOST	0	69	95	97	0	98	96	58	52.4	33.2
7	R'up W. Max + PrePare + AMS fb Everest + NIS	16 + 0.3 + 17lbs 0.3 + 0.5%	PP SPOST	0	78	90	91	0	94	97	70	53.0	36.8
	C.V. %			0	28	4	5	0	5	21	34	2.2	20.1
	LSD .05			NS	NS	NS	6	NS	7	24	13	NS	NS

NS = no statistical difference between treatments

Summary

Crop injury was not observed. All herbicide treatments with the exception of Roundup alone (trt1) provided good season long control of downy brome. Pre-plant treatments 1, 2 and 3 provided marginal activity on Japanese brome and no activity on wild oats. Sequential treatments (trts 5, 6 & 7) provided excellent season long control of both downy brome and Japanese brome and provided some activity on wild oats.

Station grass control in small grains, Fargo. Howatt, Roach, Harrington. This study was established on a wild oat infestation that was not seeded with crop. Treatments were applied to two- to three-leaf wild oat on June 5 with 89°F, 45% relative humidity, 5% cloud-cover, 0 to 1 mph wind at 0°, and wet soil at 76°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	June 30 Wioa	July 13 Wioa	July 29 Wioa
	oz/A	%	%	%
Flucarbazone 2.0+brox&MCPA5+BB	0.32+8+1%	80	86	81
Prcz+brox&MCPA5+BB	0.42+9+1%	70	70	63
Prcz&Mess+brox&MCPA5+BB	0.2+8+1%	75	74	78
Pxlm+brox&MCPA5+Basic Blend	0.26+8+1%	75	74	73
Pxlm&flas&flox+Basic Blend	1.68+1%	76	85	85
Fenoxaprop+brox&MCPA5	0.8+8	45	48	40
Fenoxaprop+brox&MCPA5	1.32+8	68	83	74
Clodinafop-ng+brox&MCPA5	0.8+8	66	83	65
Pinoxaden+brox&MCPA5	0.86+8	92	98	99
Untreated	0	0	0	0
CV		8	3	4
LSD 5%		8	3	3

The best treatment in this study was easy to see from a distance. Since this study was not seeded to wheat, brown rectangles of dead wild oat, 92% control, could be seen from across the field by June 30. Lingering plants continued to die, and by July 13, the solid carpet of wild oat plants was dead. This has been the case in several studies but the destruction was very obvious without a lush green crop to hide the carnage.

Clodinafop or fenoxaprop were not able to match this activity, each providing a maximum of 83% control mid-season that declined to below 75% control by the end of July. The lack of crop competition and cool, wet weather may have inhibited the typical control level with these herbicides. Conditions also exacerbated the antagonism of the fenoxaprop low rate with bromoxynil and MCPA. This treatment has been used by wheat producers who primarily target foxtails but have some wild oat. This result indicates the risk of such a practice for increasing wild oat in the seedbank and may promote resistance in the field.

Flucarbazone or pyroxsulam gave good wild oat control, 80 to 85%, throughout the season, but other ALS herbicides generally gave 75% control or less. The ALS-inhibiting herbicide treatments produced initial symptoms similar to expected level of chlorosis and stunting, but affected wild oat plants didn't die as they often have. Whether this was because of the weather and environment or lack of crop competition could not be determined.

Station grass control in small grains, Langdon. Chaput, Lukach and Howatt. 'Glenn' hard red spring wheat was seeded May 20. Treatments were applied to 3.5 leaf wheat and 2 inch wild oat on June 16 with 72° F, 57% relative humidity, southeast wind at 9 mph, partly cloudy sky, and dry foliage. Treatments were applied with a tractor mounted sprayer delivering 10 gpa at 40 psi through 8001.5 DG nozzles to plots the length of 6.7 by 25 feet. The experiment was a randomized complete block design with four replicates. Harvest for yield was on September 12 including three replicates.

Treatment	Rate	6/23 Wht	7/21 Wht	7/21 Wioa	9/12 Yield	9/12 Test	9/12 Height
		%	%	%	bu/A	lb/bu	cm
Flcz 2.0+brox&MCPA5+BB	0.32+8+1%	0	0	97	42	56	84
Prcz+brox&MCPA5+BB	0.42+8+1%	0	0	85	46	55	88
Prcz&mess+brox&MCPA5+BB	0.2+8+1%	0	0	87	46	56	87
Pyroxsulam+brox&MCPA5+BB	0.26+8+1%	0	0	93	48	55	83
Pxlm&flas&flox+BB	1.68+1%	0	0	94	51	55	82
Fenoxaprop+brox&MCPA5	0.8+8	0	0	43	43	55	89
Fenoxaprop+brox&MCPA5	1.32+8	0	0	76	44	53	86
Clodinafop-ng+brox&MCPA5	0.8+8	0	0	73	41	55	88
Pinoxaden+brox&MCPA5	0.86+8	0	0	93	44	55	85
Untreated	0	0	0	0	32	55	90
CV		0	0	6	9	2	6
LSD 5%		0	0	6	7	2	8

This location has wild oat with resistance to fenoxaprop and clodinafop confirmed in greenhouse experiments. This biotype did not express obvious resistance to pinoxaden although a few plants were present at evaluation. This wild oat was susceptible to ALS-inhibiting herbicides. Control with ALS herbicides was similar to that obtained at locations with susceptible wild oat this season. Greatest control was achieved with flucarbazone, 97%, but pyroxsulam gave similar control at 93 to 94%.

Wild oat resistance characterization. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Nielsville, MN, on May 18. Treatments were applied to one-leaf wheat and two- to three-leaf wild oat on June 10 with 62°F, 40% relative humidity, cloud covered sky, 3 mph wind at 45°, and dry soil at 60°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	June 29 Wht	June 29 Wioa	Aug 11 Wioa
	oz/A	%	%	%
Fenx+clpy&flox+thif-sg	1.32+2.2+0.1	0	20	33
Clfp-ng+clpy&flox+thif-sg	0.8+2.2+0.1	0	57	53
Pxdn+clpy&flox+thif-sg	0.86+2.2+0.1	0	47	62
Flcz 2.0+clpy&flox+BB	0.35+2.2+1%	0	63	85
Pxlm&flas&flox+clpy+BB	1.68+1.1+1%	0	70	37
Prcz&mess+clpy&flox+MSO	0.2+2.2+0.18G	0	70	78
Flcz 2.0+pxdn+clpy&flox+BB	0.35+0.86+2.2+1%	0	70	91
Flcz 2.0+fenx+clpy&flox+BB	0.35+1.32+2.2+1%	0	67	88
Fenx+pxdn+clpy&flox+thif-sg+BB	1.32+0.86+2.2+0.1+1%	0	20	30
CV		0	20	12
LSD 5%		0	18	13

Herbicide treatments did not cause injury to wheat. Wild oat in this field, according to the owner and consultant, had not been adequately controlled by fenoxaprop in previous years and control with some ALS herbicides also was in question. Plants did not develop symptoms of herbicide exposure very quickly. None of the treatments gave better than 70% control on June 29, nearly 3 weeks after application. Large LSDs, caused by the random nature of resistant plant location, limited the ability to separate treatments. However, fenoxaprop or fenoxaprop plus pinoxaden gave only 20% control. Wild oat in these treatments was slightly shorter and only mildly chlorotic compared with untreated plants.

Flucarbazone gave the highest control of all single ingredient wild oat treatments at 85% on August 11. Propoxycarbazone and mesosulfuron gave 78% control, but other single single ingredient products gave 62% control or less. Adding pinoxaden or fenoxaprop to flucarbazone, all at labeled field rates, tended to increase control resulting in 91 and 88% control, respectively. But pinoxaden plus fenoxaprop gave only 30% control.

Resistant wild oat control. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Nielsville, MN, on May 18. Preemergence treatments were applied to one-leaf wild oat on June 3 with 79°F, 67% relative humidity, 40% cloud cover, 7 mph wind at 315°, and damp soil at 66°F. Postemergence treatments were applied to one-leaf wheat and two- to three-leaf wild oat on June 10 with 62°F, 40% relative humidity, 100% cloud cover, 2 mph wind at 45°, and dry soil at 60°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 flat fan nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	Timing	June 29 Wht	June 29 Wioa	Aug 11 Wioa
	oz/A		%	%	%
Flcz	0.21	Pre	0	70	63
Flcz/flcz 2.0+BB	0.21+0.15+1%	Pre/2L	0	70	62
Flcz/flcz 2.0+BB	0.21+0.22+1%	Pre/2L	0	70	88
Flcz/pxdn	0.21+0.86	Pre/2L	0	70	80
Flcz/clfp-ng	0.21+0.8	Pre/2L	0	63	60
Flcz 2.0+BB	0.21+1%	2L	0	70	75
Flcz 2.0+BB	0.32+1%	2L	0	70	87
Flcz 2.0+BB	0.42+1%	2L	0	70	89
Pxdn	0.86	2L	0	70	65
Clfp-ng	0.8	2L	0	70	63
Prcz&mess+Basic Blend	0.2+1%	2L	0	70	73
AMS+pxlm&flas&flox+NIS	24+1.68+0.25%	2L	0	70	60
Untreated	0		0	0	0
CV			0	5	13
LSD 5%			0	5	15

Herbicide treatments did not cause injury to wheat. Wild oat in this field, according to the owner and consultant, had not been adequately controlled by fenoxaprop in previous years and control with some ALS herbicides also was in question. Plants did not develop symptoms of herbicide exposure very quickly. None of the treatments gave better than 70% control on June 29, nearly 4 weeks after preemergence application. Visible distinction among treatments was more definite in August, but a large LSD, caused by the random nature of resistant plant location, limited the ability to separate treatments.

Flucarbazone was the most effective herbicide for control of this wild oat biotype, but applying at least 0.32 oz ai/A was critical to achieve better than 85% control. Even then, timing was important. If 0.32 oz/A flucarbazone was split between pre- and postemergence, control dropped to 62%. Flucarbazone at 0.42 oz/A provided the same control whether split or applied all postemergence. Pinoxaden, clodinafop, or pyroxsulam at labeled field rates gave less than 65% control of this wild oat biotype.

Management of ACCase resistant wild oat in wheat with Pre-Pare/Sierra (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate ACCase-resistant wild oat control with PRE and POST herbicides including Pre-Pare and Sierra compared to standard wild oat herbicides. Pre-Pare was applied preemergence (PRE) on May 19 while all other herbicides were applied postemergence (POST) on June 6 to 2- to 3-leaf wheat and 3-leaf wild oat. Sierra is a new formulation of flucarbazone plus a safener marketed by Syngenta. Pre-Pare applied preemergence caused slight to moderate crop injury that was visible through about six weeks after seeding. All Group 2 herbicides (Sierra, Rimfire, GoldSky) also caused slight crop injury mostly in the form of chlorosis. All injury ratings were less than 10% by about three weeks after the POST treatments. Pre-Pare alone provided about 50% wild oat control and increased yield by about 7 bushels over the untreated check. Discover, a Group 1 herbicide, provided poor wild oat control resulting in lower wheat yields. Axial XL and all Group 2 herbicides applied POST provided excellent wild oat control. Wheat yields more than doubled where wild oat was controlled effectively.

Table. Management of ACCase-resistant wild oat in wheat with Pre-Pare/Sierra. (1120)

			HRSW			Weed Control		Yield	TW
			Injury			Wild Oat		HRSW	
Treatment[a]	Rate	Timing	15-Jun	29-Jun	15-Jul	29-Jun	15-Jul	22-Aug	
			----------%----------			-------%-------		bu/A	lb/bu
Untreated			0	0	0	0	0	15.9	58.5
Pre-Pare		PRE	14	5	0	52	49	23.4	58.7
Pre-Pare/Sierra	0.3 oz / 0.35 fl oz	PRE / 2-3 lf	16	8	0	95	99	32.8	59.3
Pre-Pare/ Sierra	0.3 oz / 0.5 oz	PRE / 2-3 lf	15	7	0	96	99	31.9	59.7
Pre-Pare/Axial XL	0.3 oz / 16.4 fl oz	PRE / 2-3 lf	15	7	0	94	98	31.3	59.4
Pre-Pare / Discover NG	0.3 oz / 12.8 fl oz	PRE / 2-3 lf	13	6	0	64	55	26.1	59.2
Sierra	0.5 fl oz	2-3 lf	5	5	0	88	98	33.0	59.6
Sierra	0.75 fl oz	2-3 lf	5	5	0	90	98	33.9	59.8
Sierra	1 fl oz	2-3 lf	5	6	0	95	99	32.7	59.9
Axial XL	16.4 fl oz	2-3 lf	4	0	0	94	98	35.4	59.7
Discover NG	12.8 fl oz	2-3 lf	3	0	0	27	23	17.6	57.7
Rimfire Max	3 oz	2-3 lf	11	6	0	94	99	32.8	59.4
Goldsky + NIS + AMS	16 fl oz + 0.25% + 4.4%	2-3 lf	12	9	0	94	98	31.9	59.5
LSD (0.05)			2	3	NS	8	10	4.2	0.96
CV			11	32	0	6	7	9	1

[a] *Pre-Pare applied preemergence; Sierra and Rimfire Max applied with Quad 7 (1%)*

Wild oat control with Everest 2.0 tank mixes (Jenks, Willoughby and Hoefing) The objective of the study was to evaluate wild oat control with Everest 2.0 alone, as a premix, or tank mixed with broadleaf herbicides. Two treatments were applied June 6 to 2- to 3-leaf wheat, while the remaining treatments were applied June 16 to 4-leaf wheat. Wild oat were about the same stage as the wheat with an average of 10 plants per ft^2. The wild oat population in this field is known to be resistant to Puma, but not to Axial. All treatments provided good to excellent wild oat control with the exception of Wolverine (Puma + Huskie). Raze (Everest 2.0 + fluroxypyr) tank mixed with Bronate resulted in slightly lower wild oat control. All other treatments containing Everest 2.0 alone or in a mix provided excellent wild oat control. The early application did not show a yield advantage from removing weed competition early. In a similar study in 2010, a yield advantage was observed when treatments applied to 5-leaf wheat yielded more than treatments applied to 6.5 leaf-jointing. Wild oat density in the 2010 study was higher at 25 plants/ft^2.

Table. Wild oat control with Everest 2.0 tank mixes. (1104)

			HRSW		Weed Control		HRSW	
			Injury		Wild Oat		Yield	TW
Treatment	Rate/ha	Timing	28-Jun	7-Jul	28-Jun	16-Jul	22-Aug	
			----% injury----		----% control----		bu/A	lb/bu
Untreated			0	0	0	0	16.0	55.9
Everest 2.0[a]	23g	2-3 leaf	1	0	90	99	30.6	58.5
ARY-0454-107[c]	139g + 1%	2-3 leaf	4	0	90	99	30.8	59.0
Everest 2.0 + WM[e] + MCPe[d]	23g + 210g + 280g	4-leaf	0	0	85	95	30.2	58.8
Everest 2.0[a]	23g	4-leaf	0	0	83	98	29.7	59.0
ARY-0454-107[c]	139g + 1%	4-leaf	0	0	87	99	29.6	58.9
Everest 2.0[a]	30.6g	4-leaf	2	0	87	99	30.2	58.3
Raze[b]	123g	4-leaf	0	0	85	99	31.7	58.7
Raze[b]	158g	4-leaf	0	0	84	99	30.6	58.1
Raze + 2,4-De[d]	123g + 420g	4-leaf	0	0	80	94	32.0	58.7
Raze + Bronate[d]	123g + 560g	4-leaf	0	0	81	87	32.9	59.2
Axial XL + Supremacy	60g + 109g	4-leaf	0	0	94	99	31.3	58.7
GoldSky[c]	117g	4-leaf	7	0	85	99	30.0	58.7
Wolverine	329g	4-leaf	0	0	33	28	25.1	58.5
LSD (0.05)			2	NS	8	5	4.5	NS
CV			110	0	6	3	9	2

[a] *Applied with Supremacy (109g) + Basic Blend (1%)*

[b] *Applied with ARY-0546-001 (15.8g) + ARY-0547-001 (5.25g) + Basic Blend (1%)*

[c] *Applied with Basic Blend (1%)*

[d] *Applied with Basic Blend (0.5%)*

[e] *WM = WideMatch*

Weedy grass control with Starane Flex plus graminicides in spring wheat (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate control of weedy grasses with Starane Flex tank mixed with standard grass herbicides such as Axial XL, Puma, and Discover. Weedy grasses evaluated included wild oat, barnyardgrass, green foxtail, and yellow foxtail. Treatments were applied June 23 to 5-leaf wheat, 3-leaf wild oat, 2-4 inch barnyardgrass, and 1-inch foxtail. None of the treatments caused significant crop injury. In this study, good grass control or the lack thereof is likely due to a combination of factors. It is possible that some wild oat and green foxtail at this location may be resistant to Group 1 herbicides, as we have seen in other fields. Axial XL, Puma, and Discover are all Group 1 herbicides; however, this does not mean that a weed will be resistant to all three herbicides. There also appears to be some level of antagonism between the Starane Flex and the grass herbicides.

Table. Wild oat, barnyardgrass, and foxtail control with Starane Flex plus graminicides. (1152)

		HRSW				Weed Control[b]						
		Chlorosis		Growth reduction		Wioa		Bygr		Grft		Yeft
Treatment[a]	Rate	29-Jun	15-Jul	29-Jun	15-Jul	15-Jul	3-Aug	15-Jul	3-Aug	15-Jul	3-Aug	3-Aug
		----------%----------				----------% control----------						
Axial XL	16.4 oz	2	0	0	0	99	99	99	99	77	70	95
Axial XL + Starane Flex	16.4 oz + 13.5 oz	5	0	0	0	99	99	53	75	40	35	95
Axial XL + Starane Flex + MCPe	16.4 oz + 13.5 oz + 8.63 oz	5	0	0	0	99	99	30	23	33	33	95
Puma	6.4 oz	0	0	0	0	81	53	95	99	30	17	99
Puma + Starane Flex	6.4 oz + 13.5 oz	1	0	0	0	57	33	93	99	27	38	38
Puma + Starane Flex + MCPe	6.4 oz + 13.5 oz + 8.63 oz	0	0	0	0	42	20	95	99	27	32	32
Discover NG	12.8 oz	0	0	0	0	90	90	95	98	28	18	96
Discover NG + Starane Flex	12.8 oz + 13.5 oz	0	0	0	0	68	37	58	45	23	33	27
Discover NG + Starane + MCPe	12.8 oz + 13.5 oz + 8.63 oz	0	0	0	0	57	28	53	38	23	28	25
Untreated		0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)		1	NS	NS	NS	10	15	15	11	4	14	8
CV		29	0	0	0	8	16	13	9	8	26	7

[a] *All treatments applied at 5-leaf wheat; Starane=Starane Flex*

[b] *Wioa=Wild Oat; Bygr=Barnyardgrass; Grft=Green foxtail; Yeft=Yellow foxtail*

ACCase-resistant wild oat control with Pyroxsulam. Chaput, Lukach and Howatt. 'Glenn' hard red spring wheat was seeded in Langdon, North Dakota on May 20. Treatments were applied to 3.5 leaf wheat and 1 leaf wild oat on June 16 with 71°F, 61% relative humidity, south east wind at 7 mph, partly cloudy sky and dry foliage. Treatments were applied with a tractor mounted sprayer delivering 10 gpa at 40 psi through 8001.5 DG nozzles at a length of 6.7 by 25 foot plots. The experiment was a randomized complete block design with four replicates. Harvest was on September 12 of the first three replicates.

Treatment	Rate	6/23 Wht	7/21 Wht	7/21 Wioa	9/12 Yield	9/12 Test	9/12 Height
	oz/A	%	%	%	bu/A	lb/bu	cm
Pxlm&flas&flox	1.68	0	0	74	42	57	86
Pxlm&flas&flox+NIS	1.68+0.5%	0	0	76	46	59	85
Pxlm&flas&flox+NIS+AMS	1.68+0.5%+24	0	0	81	45	57	87
Pxlm&flas&flox+NIS+UAN	1.68+0.5%+0.5G	0	0	93	45	58	83
Pxlm&flas&flox+MSO	1.68+0.13G	0	0	95	44	58	80
Pxlm&flas&flox+MSO+UAN	1.68+0.13G+0.5G	0	0	97	45	57	82
Pinoxaden+clpy&flox+MCPA	0.86+3+6	0	0	69	44	57	86
Flcz 2.0+Salvo	0.32+6	0	0	95	40	55	84
Fenx&brox&pyst	4.7	0	0	65	50	56	88
Untreated	0	0	0	0	38	56	87
CV		0	0	7	10	3	3
LSD 5%		0	0	8	7	3	5

This location has wild oat with resistance to fenoxaprop and clodinafop confirmed in greenhouse experiments. This biotype did not express obvious resistance to pinoxaden in another study when wheat was slightly younger. In this study, pinoxaden applied to one true leaf wild oat gave less than 70% control. Flucarbazone or pyroxsulam provided good to excellent control of this wild oat biotype; however, adjuvant was important for pyroxsulam activity. MSO provided better enhancement of pyroxsulam than NIS. UAN made up for the deficiency of NIS as an adjuvant for pyroxsulam to a greater extent than AMS.

ACCase-resistant wild oat control with pyroxsulam, Nielsville. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Nielsville, MN, on May 18. Treatments were applied to three-leaf wheat and two- to four-leaf wild oat on June 10 with 62°, 40% relative humidity, dry soil at 60° and 100% cloud cover with 2 mph winds at 45°. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	June 29 Wht	June 29 Wioa	Aug 11 Wht	Aug 11 Wioa
	oz/A	%	%	%	%
Pxlm&flas&flox	1.68	0	70	0	60
Pxlm&flas&flox+NIS	1.68+0.5%	0	70	0	60
Pxlm&flas&flox+NIS+AMS	1.68+0.5%+24	0	70	0	47
Pxlm&flas&flox+NIS+UAN	1.68+0.5%+0.5G	0	70	0	60
Pxlm&flas&flox+MSO	1.68+0.13G	0	60	0	78
Pxlm&flas&flox+MSO+UAN	1.68+0.13G+0.5G	0	70	0	77
Pinoxaden+clpy&flox+MCPA	0.86+3+6	0	70	0	70
Flcz 2.0+2,4-D	0.32+6	0	70	0	85
Fenx&brox&pyst	4.7	0	67	0	70
Untreated	0	0	0	0	0
CV		0	9	0	9
LSD 5%		0	10	0	10

Herbicide treatments did not cause injury to wheat. Plants of shorter stature or displaying chlorosis or necrosis were not present in June. Plants of shorter stature, plants with cholorosis, or plants with small, damaged, or deformed heads were not present in August.

Wild oat in this field, according to the owner and consultant, had not been adequately controlled by fenoxaprop in previous years and control with some ALS herbicides also was in question. Control on June 29, 3 weeks after application, was not greater than 70% for any herbicide treatment. In August, flucarbazone had the highest numerical control value, 85%. The pyroxsulam premix was similar to this value when MSO was included as the adjuvant, 77 to 78% control compared to 60% control with the pyroxsulam premix alone. Adding NIS as the adjuvant did not change the control of wild oat compared with pyroxsulam alone. Adding UAN as a nitrogen source did not alter the control of wild oat with pyroxsulam and NIS or MSO, but AMS with NIS resulted in less control than only adding NIS or adding nothing at all to the pyroxsulam premix.

Wild oat control with Pyroxsulam premixes. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Hillsboro, ND, on May 19. Treatments were applied to wheat and four- to five-leaf wild oat on June 14 with 69°F, 26% relative humidity, 80% cloud cover, damp soil at 62°F, and 8.5 mph wind at 135°. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with two reps for wheat injury and three reps for wild oat evaluations.

Treatment	Rate	July 6 Wht	July 6 Wioa	July 26 Wioa
Pxlm&flas&flox+NIS+AMS	1.68+0.5%+24	0	67	99
Pxlm&flas&flox+NIS+UAN	1.68+0.5%+0.5G	0	85	99
Pxlm&flas&flox+MCPA+AMS	1.68+4+24	0	83	98
Pxlm&clpy&flox+NIS+AMS	2.4+0.5%+24	0	87	98
Pxlm&clpy&flox+NIS+AMS	3.2+0.5%+24	0	75	96
Pxlm&clpy&flox+NIS+UAN	3.2+0.5%+0.5	0	96	99
Pxlm&clpy&flox+NIS	3.2+0.5%	0	92	99
Pxlm-L+clpy&flox+NIS+AMS	0.21+3+0.5%+24	0	93	99
Pinoxaden+clpy&flox+MCPA	0.86+3+6	0	85	99
Fenx&brox&pyst	4.7	0	82	94
Flcz 2.0+2,4-D	0.32+6	0	85	98
Prcz&mess+brox&MCPA5+NIS+AMS	0.2+8+0.25%+24	0	60	88
Untreated	0	0	0	0
CV		0	8	3
LSD 5%		0	10	5

Herbicide treatments did not cause wheat injury, but persistent precipitation and field topography were factors in substantial crop stress that limited the ability to evaluate wheat response to herbicides.

The only treatments to provide greater than 90% control of wild oat on July 6 included pyroxsulam; however, the pyroxsulam premix Goldsky was not included in this group and gave at most 85% control at this evaluation. A pyroxsulam premix with clopyralid and fluroxypyr provided 92 to 96% control, but AMS limited the activity of this product to 75%. The standalone liquid formulation of pyroxsulam also gave 93% control. Pinoxaden or fenoxaprop gave 85% control or less.

All herbicide treatments, except propoxycarbazone and mesosulfuron, eventually provided 94% control or greater of wild oat. Control with propoxycarbazone and mesosulfuron did not reach 90%.

Wild oat control in spring wheat with GoldSky (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate wild oat control with GoldSky in spring wheat. All treatments were applied June 9 to 3-leaf wheat and 3-leaf wild oat. GoldSky treatments caused as much as 8% chlorosis and 17% growth reduction one week after application, but the injury symptoms subsided by early July. All treatments provided excellent wild oat control with the exception of Wolverine, which provided almost no wild oat control. Wild oat at this location has been documented previously to be resistant to Puma.

Table. Wild oat control in HRSW with GoldSky. (1135)

		HRSW						Weed Control	
		Chlorosis			Growth Reduction			Wild Oat	
Treatment[a]	Rate	15-Jun	29-Jun	8-Jul	18-Jun	8-Jul	3-Aug	29-Jun	3-Aug
		%							
Untreated		0	0	0	0	0	0	0	0
Goldsky[bc]	16 fl oz	8	2	0	17	6	0	93	99
Goldsky + 28% N[b]	16 fl oz + 64 fl oz	8	2	0	14	4	0	93	99
Goldsky + MCPe[c]	16 fl oz + 8.63 fl oz	8	2	0	14	5	0	94	99
Axial XL + WM + MCPe	16.4 oz + 16 oz + 13 oz	5	0	0	1	0	0	95	97
Everest 2.0 + 2,4-De	1 fl oz + 12.6 fl oz	3	2	0	2	0	0	81	98
Wolverine	27.3 fl oz	0	1	0	0	0	0	10	12
LSD (0.05)		NS	1	NS	3	2	NS	2	3
CV		0	33	0	24	41	0	2	2

[a] *WM=WideMatch; All treatments applied to 3-leaf wheat*

[b] *Applied with NIS (0.5%)*

[c] *Applied with AMS (4.44%)*

Wild oat control with 20211 in cereals. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded at Crookston, MN, on May 16. Treatments were applied to three-leaf wheat and two- to four-leaf smartweed on June 10 with 61°F, 48% relative humidity, 80% cloud cover, and damp soil at 62°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	June 29 Wht	June 29 Wioa	June 29 Smwd	Aug 11 Wioa	Aug 11 Smwd	Aug 18 Yield
	oz/A	%	%	%	%	%	bu/A
Prcz&mess +brox&pyst+MSO	0.2 +2.9+0.19G	0	97	99	99	99	44
Prcz&mess +brox&pyst+BB	0.2 +2.9+1%	0	93	98	99	99	45
Prcz&mess +brox&pyst+HSOC	0.2 +2.9+0.09G	0	93	98	98	99	48
Prcz&mess+thif-sg +trib-sg+flox+BB	0.2+0.24 +0.06+1+1%	0	94	98	99	99	51
20211	3.45	0	95	98	99	99	44
Fenx&brox&byst	4.7	0	94	98	97	99	47
Untreated	0	0	0	0	0	0	22
CV		0	3	2	1	0	11
LSD 5%		0	3	2	1	0	7

Herbicides did not visibly injure wheat. While all herbicide treatments provided exceptionally high control of wild oat and smartweed, MSO adjuvant enabled slightly more rapid control of wild oat with propoxycarbazone and mesosulfuron than other adjuvants, 97% versus 93% control, respectively, on June 29. Herbicide 20211, 95%, provided similar control to the MSO combination. The fenoxaprop premix, while statistically different from the best treatments, gave essentially similar control on a practical basis, 94 to 97%. All treatments were very efficient in eliminating smartweed.

POST foxtail control in spring wheat, Carrington, 2011. Kirk Howatt, Greg Endres, and Janet Harrington. The experiment was conducted at the NDSU Carrington Research Extension Center on a conventionally-tilled Heimdal-Emrick loam soil. The experimental design was a randomized complete block with three replicates. 'Tioga' durum wheat was seeded May 17. 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. Treatments were applied on June 9 with 64 F, 34% RH, 40% clear sky, and 2 mph wind to three-leaf wheat and one- to three-leaf yellow foxtail. Average plant density in untreated plots on May 28: wheat = 26 plants/ft^2 and foxtail = 60 plants/ft^2. The trial was not harvested for seed yield due to significant hail damage on July 24.

Table.

Treatment	Rate	June 16	June 23		July 19
		Wht	Wht	Yeft	Yeft
	oz/A	%	%	%	%
Flcz 2.0+brox&MCPA5+BB	0.32+8+1%	0	0	87	89
Prcz+brox&MCPA5+BB	0.42+8+1%	0	0	63	23
Prcz&Mess+brox&MCPA5+BB	0.2+8+1%	0	0	60	17
Pxlm+brox&MCPA5+BB	0.26+8+1%	0	0	87	65
Pxlm&flas&flox+BB	1.68+1%	0	0	88	85
Fenoxaprop+brox&MCPA5	0.8+8	0	0	68	80
Fenoxaprop+brox&MCPA5	1.32+8	0	0	73	77
Clfp-ng+brox&MCPA5	0.8+8	0	0	83	83
Pxdn+brox&MCPA5	0.86+8	0	0	85	85
Untreated	0	0	0	0	0
CV		0	0	6	12
LSD 5%		0	0	6	12

Wheat chlorosis or other visible injury was not observed with any herbicide treatment. The area where this study was placed had a history of foxtail survival that indicated the presence of ACCase-resistant foxtail biotypes. In fact, replicate data for some of the treatments had more variance than typically expected and produced the larger LSD for the July evaluation. This possibly indicated response differences of the biotypes on a micro scale. However, the overall average control values for ACCase herbicides were not catastrophic, mimicking the slow buildup of resistance in the field population. Yellow foxtail control on July 19 ranged from 77 to 85% control with ACCase herbicides.

Flucarbazone or the pyroxsulam premix gave yellow foxtail control of 85 to 90%. The adjuvant load or florasulam, an ALS broadleaf herbicide, in the premix may be improving control of grasses with pyroxsulam compared with the dry solo formulation. This tendency has been observed in other studies this year, but this is the only case where a significant difference was recorded. Tribenuron, another ALS broadleaf herbicide, has been implicated in several studies as increasing foxtail control with ALS grass herbicides.

Foxtail control with an ACCase combination. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on June 7. Treatments were applied to three-leaf wheat, one-leaf Venice mallow, and two-leaf yellow foxtail on July 7 with 77°F, 60% relative humidity, clear sky, 3.5 mph wind at 135°, and dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	Jul-22 Yeft	Jul-22 Vema	Aug-8 Yeft	Aug-19 Yeft
	oz/A	%	%	%	%
A17713	0.86	94	0	98	98
Prcz&mess+Basic Blend	0.2+1%	53	80	68	70
Fenx&brox&pyst	4.7	89	91	92	93
Fenoxaprop	0.8	96	0	99	98
Pxlm&flas&flox+NIS	1.68+0.5%	83	93	85	87
Flcz 2.0+Basic Blend	0.32+1%	78	83	78	80
Pinoxaden	0.86	93	0	99	99
Untreated	0	0	0	0	0
CV		8	7	5	6
LSD 5%		10	5	7	8

A17713 provided control similar to fenoxaprop or pinoxaden at each evaluation timing. Treatments with these herbicides alone always gave greater than 90% control of yellow foxtail, and by August, control with these three treatments was 98 to 99%. On August 8, the fenoxaprop premix with bromoxynil and pyrasulfotole gave 92% control of foxtail, less than fenoxaprop alone, which indicates antagonism of the broadleaf herbicides towards fenoxaprop activity in foxtail. However, the fenoxaprop premix provided the best control of the combined weed spectrum.

Does Express or Affinity increase green foxtail control in wheat? (Jenks, Willoughby, and Hoefing) The objective of the study was to determine if green foxtail control with Everest 2.0, GoldSky, and Rimfire Max will increase when tank mixed with Express or Affinity. Everest 2.0, GoldSky, and Rimfire Max were applied alone or tank mixed with Express or Affinity. At the pre-harvest evaluation on August 9, foxtail control increased 6-14% when the grass herbicides were tank mixed with Express or Affinity compared to the grass herbicide alone.

Table. Green foxtail control with SU's (1113)

		Weed Control			HRSW	
		Green Foxtail			Yield	TW
Treatment[abc]	Rate	9-Jul	22-Jul	9-Aug	29-Aug	
		----------%----------			bu/A	lb/bu
Untreated		0	0	0	15.9	54.0
Everest 2.0	0.5 fl oz	72	75	71	27.5	57.4
Everest 2.0 + Express	0.5 fl oz + 0.4 oz	83	82	83	31.5	58.5
Everest 2.0 + Affinity BS	0.5 fl oz + 0.6 oz	87	89	84	29.2	57.9
GoldSky	1 pt	86	78	80	25.5	56.7
GoldSky + Express	1 pt + 0.4 oz	85	81	86	29.2	57.1
GoldSky + Affinity BS	1 pt + 0.6 oz	85	87	88	29.1	57.8
Rimfire Max	3 oz	59	39	37	23.6	56.9
Rimfire Max + Express	3 oz + 0.4 oz	70	60	51	24.3	57.1
Rimfire Max + Affinity BS	3 oz + 0.6 oz	73	50	48	26.2	57.2
Express	0.4 oz	23	23	23	26.7	56.1
Affinity BS	0.6 oz	27	22	13	23.5	56.5
Affinity TM	0.5 oz	28	20	15	27.0	57.7
Affinity TM + Everest 2.0	0.5 oz + 0.5 fl oz	85	87	85	29.5	56.4
LSD (0.05)		9	17	15	4.0	1.8
CV		9	18	17	9	2

[a] *All treatments applied at 4-leaf wheat*

[b] *Rimfire Max applied with MSO (1.5 pt)*

[c] *Everest, Affinity, Goldsky, and Express applied with NIS (0.25%)*

Foxtail control with Tankmixes including AGH09035. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Prosper, ND, on June 6. Treatments were applied to two-leaf wheat, 6- to 18-inch tall Canada thistle, and two-leaf yellow foxtail and wild oat on July 5 with 84°F, 40% relative humidity, 10% cloud cover, 6 mph wind at 45°, dry soil at 83°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	7/23 yeft	8/11 yeft	8/11 wioa
	oz/A	%	%	%
Fenx+AGH09035	0.8+5.8	80	92	81
Fenx+AGH09035+AG02013	0.8+5.8+0.03G	80	92	83
Fenx+AGH09035	0.8+7.7	80	89	76
Fenx+AGH09035+AG02013	0.8+7.7+0.03G	80	94	79
Fenx+AGH09035	0.8+8.7	80	92	78
Flcz 2.0+AGH09035+BB	0.32+5.8+1%	60	53	96
Flcz 2.0+AGH09035+BB+AG02013	0.32+5.8+1%+0.03G	60	50	96
Flcz 2.0+AGH09035+BB	0.32+7.7+1%	60	60	94
Flcz 2.0+AGH09035+BB+AG02013	0.32+7.7+1%+0.03G	60	50	96
Flcz 2.0+AGH09035+BB	0.32+8.7+1%	60	60	94
Flcz 2.0+AGH09035+Trib-sg+BB	0.32+5.8+0.13+1%	60	56	93
CV		0	9	5
LSD 5%		0	9	7

Herbicides did not cause wheat injury. All treatments included the auxinic premix AGH09035, which provided excellent control of Canada thistle, about 95%, and other incidental broadleaf weeds, 99%, in the study area. AGH09035 did not affect the control of yellow foxtail or wild oat with fenoxaprop or flucarbazone. Control was not improved improved by the droplet retention adjuvant AG02013.

Weed control with GoldSky and GF-2705 in spring wheat, Carrington, 2011. Greg Endres. The experiment was conducted at the NDSU Carrington Research Extension Center in cooperation with Dow AgroSciences. Experimental design was a randomized complete block with four replicates. The conventional-till trial was seeded to 'Glenn' HRS wheat on May 17. 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 16 with 68 F, 82% RH and 9 mph wind to 4-leaf wheat, 2- to 4-leaf yellow and green foxtail, 1- to 4-inch tall volunteer flax, and 1- to 3-inch wide redroot and prostrate pigweed. The trial was extensively damaged by hail on July 24 and was not harvested for seed yield.

Foxtail species was primarily yellow foxtail. Foxtail control on July 2 was 70-76% with Axial XL, Everest 2.0, and Rimfire Max, while other grass herbicides provided good control (80 to 85%) (table). Grass herbicides provided 76 to 83% control on July 15 except Everest 2.0 and Rimfire Max. Herbicides provided excellent control (93 to 99%) of volunteer flax on July 15 except Axial XL + Affinity Tankmix + MCPA ester, Wolverine, Everest 2.0 + 2,4-D ester, and Rimfire Max + Bronate Advanced. All herbicides provided excellent control of pigweed. Significant wheat chlorosis was observed on June 20 and 24 with Rimfire Max + Bronate Advanced.

Table.

Treatment				Weed control[1]						Wheat chlorosis	
				2-Jul			15-Jul				
No.	Name	Rate	Unit	Fota	Vofl	Pigw	Fota	Vofl	Pigw	20-Jun	24-Jun
		product		%						0-9[2]	
1	Untreated Check	x	x	0	0	0	0	0	0	0	0
2	GOLDSKY	16	fl oz/A	80	94	98	80	99	97	1	1
	NONIONIC SURFACTANT	0.5	% v/v								
	AMMONIUM SULFATE	1.5	lb/A								
3	GOLDSKY	16	fl oz/A	80	91	96	78	94	95	0	0
	NONIONIC SURFACTANT	0.5	% v/v								
	UAN 28%N	64	fl oz/A								
4	GOLDSKY	16	fl oz/A	84	95	96	82	93	99	0	0
	MCPA ESTER	8.6	fl oz/A								
	AMMONIUM SULFATE	1.5	lb/A								
5	GF-2705	16	fl oz/A	85	94	98	79	96	99	1	2
	NONIONIC SURFACTANT	0.5	% v/v								
	AMMONIUM SULFATE	1.5	lb/A								
6	GF-2705	16	fl oz/A	83	93	98	80	96	99	1	2
	NONIONIC SURFACTANT	0.5	% v/v								
	UAN 28%N	64	fl oz/A								
7	GF-2705	16	fl oz/A	84	90	97	76	95	99	1	1
	NONIONIC SURFACTANT	0.5	% v/v								
8	WIDEMATCH	16	fl oz/A	85	98	98	81	98	99	0	2
	PYROXSULAM	6.8	fl oz/A								
	NONIONIC SURFACTANT	0.5	% v/v								
	AMMONIUM SULFATE	1.5	lb/A								
9	WIDEMATCH	16	fl oz/A	0	99	99	0	97	91	0	0
10	AXIAL XL	16.4	fl oz/A	76	85	99	76	69	99	0	0
	AFFINITY TANK MIX	0.6	oz wt/A								
	MCPA ESTER	13	fl oz/A								
11	WOLVERINE	27.3	fl oz/A	86	20	99	83	36	99	0	0
12	EVEREST 2.0	0.75	fl oz/A	70	79	90	62	80	99	1	1
	2,4-D ESTER LV	8.6	fl oz/A								
13	RIMFIRE MAX	3	oz wt/A	70	79	98	64	78	98	3	4
	NONIONIC SURFACTANT	0.25	% v/v								
	AMMONIUM SULFATE	1.5	lb/A								
	BRONATE ADVANCED	12.8	fl oz/A								
CV (%)				10.7	9.9	5.7	15.6	12.5	3.8	133.3	98.6
LSD (0.05)				10	11	7	14	14	5	1	1

[1]Fota=yellow and green foxtail; Vofl=volunteer flax; Pigw=redroot and prostrate pigweed.

[2]0=green and 9=yellow.

Pyroxsulam with adjuvants for foxtail control. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on June 7. Treatments were applied to two-leaf wheat and two- to three-leaf yellow foxtail on July 8 with 75°F, 57% relative humidity, 2 mph wind at 135°, and dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	July 22 Yeft	Aug 8 Yeft
	oz/A	%	%
Pxlm&flsm&flox	1.68	50	33
Pxlm&flsm&flox+NPak	1.68+0.44G	70	67
Pxlm&flsm&flox+Class Act	1.68+2.5%	70	53
Pxlm&flsm&flox+Class Act+AG02013	1.68+2.5%+0.03G	70	62
Pxlm&flsm&flox+AG8034	1.68+2%	70	60
Pxlm&flsm&flox+AG8034+AG02013	1.68+2%+0.03G	70	65
Pxlm&flsm&flox+AG06011	1.68+0.047G	70	60
Pxlm&flsm&flox+PrimeOil	1.68+0.8%	70	72
Pxlm&flsm&flox+Superb HC	1.68+0.13G	70	70
Pxlm&flsm&flox+Destiny	1.68+0.8%	70	75
Pxlm&flsm&flox+Destiny HC	1.68+0.094G	70	70
Pxlm&flsm&flox+Destiny HC	1.68+0.13G	70	70
Pxlm&flsm&flox+AG07043	1.68+1%	70	82
Pxlm&flsm&flox+AG09012	1.68+1%	70	57
Pxlm&flsm&flox+AG09053	1.68+1.5%	70	60
Pxlm&flsm&flox+AG10021	1.68+1%	70	62
Pxlm&flsm&flox+Trib-sg+Class Act	1.68+0.13+2.5%	70	60
CV		0	11
LSD 5%		1	12

Herbicide treatments did not cause injury to wheat. The pyroxsulam premix benefitted from each of the adjuvants included in the study. Oil adjuvants such as PrimeOil, Superb, and Destiny provided the greatest lasting improvement in pyroxsulam efficacy to yellow foxtail. The greatest control value of 82% was achieved with pyroxsulam plus AG07043 adjuvant. This is consistent with previous NDSU research; however, the potential for wheat response in the form of temporary chlorosis has increased with oil adjuvants, especially methylated seed oils.

Yellow foxtail control with soil applied flucarbazone. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded at Prosper, ND, on June 6. Preemergence treatments were applied June 9 with 71°F, 41% relative humidity, 4 mph wind at 135°F, 75% cloud cover, and dry soil at 69°F. Postemergence treatments were applied to two- to four-leaf yellow foxtail on June 20 with 69°F, 78% relative humidity, 90% cloud cover, 8 mph wind at 90°, and wet soil at 68°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Timing	Jul-8 Yeft	Jul-26 Yeft
	oz/A		%	%
Flcz	0.21	Pre	55	50
Flcz/flcz 2.0+Basic Blend	0.21/0.15+1%	Pre/2L	86	78
Flcz/flcz 2.0+Basic Blend	0.21/0.22+1%	Pre/2L	97	86
Flcz/pinoxaden	0.21/0.86	Pre/2L	99	92
Flcz/clfp-ng	0.21/0.8	Pre/2L	98	95
Flcz 2.0+Basic Blend	0.21+1%	2L	90	83
Flcz 2.0+Basic Blend	0.32+1%	2L	95	81
Flcz 2.0+Basic Blend	0.42+1%	2L	94	76
Pinoxaden	0.86	2L	98	96
Clodinafop-ng	0.8	2L	97	88
Prcz&mess+BB	0.2+1%	2L	90	79
Pxlm&flas&flox+AMS+NIS	1.68+24+0.25%	2L	98	88
Untreated	0		0	0
CV			3	3
LSD 5%			4	3

Preemergence (PRE) flucarbazone gave about 50% control of yellow foxtail. Additional flucarbazone applied postemergence (POST) improved control with increasing rate to 86% control with the maximum seasonal allowance. Flucarbazone applied POST only resulted in 76 to 83% control. A better POST followup to flucarbazone PRE would be pinoxaden or clodinafop, resulting in 92 to 95% control, respectively. Pinoxaden only also controlled foxtail at 96%, 8 to 20 percentage points better than other herbicides applied POST.

Flucarbazone plus adjuvants for foxtail control. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on June 7. Treatments were applied to two-leaf wheat and yellow foxtail on July 8 with 74°F, 41% relative humidity, 0% cloud cover, 1.5 mph wind at 135°, dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	July 22 Yeft	Aug 8 Yeft
	oz/A	%	%
Flcz&flox+carf	2.27+0.13	33	30
Flcz&flox+carf+Class Act	2.27+0.13+2.5%	53	40
Flcz&flox+carf+Class Act+AG02013	2.27+0.13+2.5%+0.03G	53	40
Flcz&flox+carf+AG8034	2.27+0.13+2%	63	43
Flcz&flox+carf+AG8034+AG02013	2.27+0.13+2%+0.13G	40	40
Flcz&flox+carf+Superb HC	2.27+0.13+0.13G	43	40
Flcz&flox+carf+Destiny HC	2.27+0.13+0.13G	58	40
Flcz&flox+carf+AG10021	2.27+0.13+1%	43	37
Flcz&flox+carf+AG09012	2.27+0.13+1%	63	43
Flcz&flox+carf+AG09053	2.27+0.13+1.5%	60	43
Flcz&flox+carf+AG07043	2.27+0.13+1%	62	40
Flcz&flox+trib-sg+Class Act	2.27+0.13+2.5%	57	37
CV		11	12
LSD 5%		10	8

Herbicide treatments did not cause wheat injury. Flucarbazone control of yellow foxtail was enhanced by each of the adjuvants included in the study. Flucarbazone control was enhanced the most by AG8034 or Ag09012 on July 22, resulting in 63% control compared with 33% control without them. Adjuvant effect seemed to be inconsistent within adjuvant class; however, consistent control ratings are difficult when general control is so poor. Control with flucarbazone appeared to decline between evaluation dates as none of the treatments gave more than 43% control of yellow foxtail.

Evaluation of application timing for flucarbazone SC formulation. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded at Prosper, ND, on June 6.Early treatments (two-leaf stage) were applied to one-leaf wheat and one- to two-leaf yellow foxtail on June 13 with 60°F, 83% relative humidity, 100% cloud cover, moist soil at 60°F, and 13.8 mph wind at 180°. The remaining treatments (four-leaf stage) were applied to three-leaf wheat and yellow foxtail on July 5 with 80°F, 52% relative humidity, clear sky, dry soil at 81°, and 8.5 mph wind at 45°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Timing	Jul-8 inj	Jul-8 yeft	Jul-26 yeft	Aug-11 yeft
	oz/A	no. leaf				
Untreated	0		0	0	0	0
Flcz 2.0+Flox&Thif&Trib+BB	0.328+1.55+1%	2	0	85	60	43
ARY0454+BB	1.98+1%	2	0	83	60	45
Pinoxaden+Brox&MCPA	0.86+8	2	0	81	60	43
Flcz 2.0+Clpy&Flox+MCPAe+BB	0.328+3+4+0.5%	4	0	0	60	64
Flcz 2.0+Flox&Thif&Trib+BB	0.328+1.55+1%	4	0	0	60	66
ARY0454+BB	1.98+1%	4	0	0	60	74
Flcz 2.0+Flox&Thif&Trib+BB	0.437+1.55+1%	4	0	0	76	64
Flcz&Flox+thif+trib+BB	1.75+0.226+0.075+1%	4	0	0	60	55
Flcz&Flox+thif+trib+BB	2.25+0.226+0.075+1%	4	0	0	60	64
Flcz&Flox+2,4-D ester+BB	1.75+6+0.5%	4	0	0	60	63
Flcz&Flox+Brox&MCPA+BB	1.75+8+0.5%	4	0	0	60	55
Pinoxaden+Flox&Thif&Trib	0.86+1.55	4	0	0	76	80
Pxlm&Flas&Flox+BB	1.68+1%	4	0	0	60	64
Fenx&Brox&Pyst	4.7	4	0	0	78	84
CV			0	11	3	8
LSD 5%			0	3	3	6

Herbicides did not cause injury that could be discerned from the untreated. Early application timing allowed for 85% control of yellow foxtail with flucarbazone. Another formulation of flucarbazone, ARY0454 gave similar control, but control with pinoxaden was slightly less. Since wheat did not grow well in this study area and the seedbank is very heavy with yellow foxtail, subsequent flush of foxtail and recovery of some of the treated plants resulted in ratings of 45% control or less by August 11. Later application of several treatments that contained flucarbazone did not provide better than 76% control. Most treatments with flucarbazone formulations and tank-mixes gave 55 to 65% control at mid- and late-season evaluations, but ARY0454 provided 74% control on August 11. Only pinoxaden or fenoxaprop gave better control, but even these treatments only provided 80 and 84% control respectively.

Weed control with Raze herbicide in spring wheat, Carrington, 2011. Greg Endres. The experiment was conducted at the NDSU Carrington Research Extension Center in cooperation with Arysta LifeScience. Experimental design was a randomized complete block with three replicates. The conventional-till trial was seeded to 'Glenn' HRS wheat on May 31. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 13 gal/A at 35 psi through 8001 flat fan nozzles to the center 6.7 ft of 10- by 20-ft plots on June 24 with 67 F, 77% RH and 7 mph wind to 4-leaf wheat, 1- to 5-leaf yellow and green foxtail, 1- to 4-inch tall redroot and prostrate pigweed, and 2- to 6-inch tall volunteer flax. The trial was extensively damaged by hail on July 24 and was not harvested for seed yield.

Wheat injury was not observed on July 1. Foxtail population primarily was yellow foxtail. Foxtail generally was suppressed (69 to 76%) among treatments except poor (35 to 47%) control resulted with Raze + Huskie, Raze + Bronate and Rimfire Max + Huskie (table). Excellent (91to 99%) control of pigweed was achieved among treatments except Raze + MCPA + NIS, Raze at 10.6 fl oz/A + MCPA + basic blend, and Rimfire Max + Huskie. Excellent (90 to 99%) control of volunteer flax occurred with all treatments except Rimfire Max + Huskie.

Table.

Treatment[2]				Weed control[1] 21 to 28 days after treatment		
No.	Name	Rate	Unit	Foxtail	Pigweed	Volunteer flax
					%	
1	Untreated Check	x	x	0	0	0
2	Raze	7	fl oz/a	70	96	98
	MCPA Ester	0.75	pt/a			
	Basic Blend	1	% v/v			
3	Raze	9	fl oz/a	72	80	99
	MCPA Ester	0.75	pt/a			
	NIS	0.25	% v/v			
	Ammonium Sulfate	1	% v/v			
4	Raze	9	fl oz/a	75	97	99
	MCPA Ester	0.75	pt/a			
	Ammonium Sulfate	1	% v/v			
5	Raze	9	fl oz/a	69	91	93
	MCPA Ester	0.75	pt/a			
	Basic Blend	1	% v/v			
6	Raze	10.6	fl oz/a	71	83	95
	MCPA Ester	0.75	pt/a			
	Basic Blend	1	% v/v			
7	Everest 2.0	0.82	fl oz/a	73	95	99
	Supremacy	5	oz wt/a			
	Basic Blend	1	% v/v			
8	ARY-0454-107	5	oz wt/a	75	95	99
	Basic Blend	1	% v/v			
9	ARY-0454-107	6	oz wt/a	76	95	99
	Basic Blend	1	% v/v			
10	Raze	9	fl oz/a	76	96	96
	ARY-0546-001	0.3	oz wt/a			
	ARY-0547-001	0.1	oz wt/a			
	Basic Blend	1	% v/v			
11	Raze	9	fl oz/a	40	99	90
	Huskie	11	fl oz/a			
	Basic Blend	1	% v/v			
12	Raze	9	fl oz/a	47	99	99
	Bronate	1	pt/a			
	Basic Blend	1	% v/v			
13	Goldsky	1	pt/a	72	95	90
	Basic Blend	1	% v/v			
14	Rimfire Max	3	oz wt/a	35	85	71
	Huskie	11	fl oz/a			
	Basic Blend	1	% v/v			
CV (%)				15.7	9.6	10.9
LSD (0.05)				16	14	16

[1]Foxtail=yellow and green; Pigweed=redroot and prostrate.

[2]Basic blend=Newtone; NIS=Preference (Winfield Solutions); AMS=N-Pak AMS Liquid (Agri-Solutions).

Wild oat and green foxtail control with Rimfire in spring wheat (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate wild oat and green foxtail control with Rimfire Max tank mixes. The field site had documented resistance to Puma. Treatments were applied on June 9 to 3-leaf wheat and 3-leaf wild oat. Rimfire Max tank mixes caused 15-21% injury at the June 18 evaluation in the form of chlorosis and stunting. However, the injury symptoms subsided significantly by mid-July. All treatments except for Wolverine provided excellent wild oat control. Wolverine had almost no effect on the wild oat. None of the Rimfire treatments effectively controlled green foxtail. An experimental to be marketed by Bayer in 2012 provided better foxtail control at 71%.

Table. Wild oat and green foxtail control with Rimfire in HRSW. (1133)

		Injury			Weed Control			
		HRSW			Wild Oat			Grft[b]
Treatment[a]	Rate	18-Jun	30-Jun	2-Aug	18-Jun	30-Jun	2-Aug	2-Aug
		----------%----------						
Untreated		0	0	0	0	0	0	0
Rimfire + Huskie + MSO	3 oz + 11 oz + 1.5 pt	21	19	0	76	93	99	38
Rimfire + Huskie + BB	3 oz + 11 oz + 1%	16	12	0	71	92	99	38
Rimfire + Huskie + Destiny HC	3 oz + 11 oz + 0.75 pt	15	13	0	67	90	99	40
Rimfire + Affinity TM + Starane + BB	3 oz + 0.6 oz + 0.18 pt + 1%	15	13	0	67	91	99	40
Experimental	13.7 oz	11	10	0	65	89	99	71
Wolverine	27.4 oz	0	0	0	27	7	10	---
LSD (0.05)		4	4	NS	9	8	7	16
CV		19	21	0	9	7	5	23

[a] *Rimfire=Rimfire Max; Starane=Starane Ultra; BB=Basic Blend; All treatments applied to 3-leaf wheat*

[b] *Grft=Green Foxtail*

Control of ACCase-resistant foxtail with Rimfire tank mixes (Jenks, Willoughby and Hoefing) The objective was to evaluate ACCase-resistant green foxtail control with Rimfire Max tank mixes. Treatments were applied June 23 to 4-leaf wheat and 1-inch foxtail. Rimfire Max tank mixes caused 25-45% injury at the June 30 evaluation in the form of chlorosis and stunting. However, the injury symptoms subsided significantly by mid-July. Wolverine nor any of the Rimfire Max tank mixes effectively controlled foxtail at the August 2 pre-harvest evaluation. An experimental herbicide to be marketed by Bayer in 2012 provided 84% foxtail control and caused less crop injury than the Rimfire tank mixes.

Table. Control of ACCase-resistant foxtail with Rimfire tank mixes. (1126)

		Injury			Weed Control		
		HRSW			Foxtail		
Treatment[abc]	Rate	30-Jun	16-Jul	2-Aug	30-Jun	16-Jul	2-Aug
		----------%					
Untreated		0	0	0	0	0	0
Rimfire + Huskie + MSO	3 oz + 11 oz + 1.5 pt	45	18	3	80	57	47
Rimfire + Huskie + BB	3 oz + 11 oz + 1%	25	6	1	72	48	43
Rimfire + Huskie + HC	3 oz + 11 oz + 0.75 pt	32	8	1	75	55	47
Rim + Affin + Star + BB	3 oz + 0.6 oz + 0.18 pt + 1%	30	7	1	77	65	65
Experimental	13.7 oz	14	2	1	81	80	84
Wolverine	27.4 oz	1	0	0	17	23	13
LSD (0.05)		5	3	1	11	16	17
CV		13	28	79	11	19	22

[a] *Rimfire=Rimfire Max; Affin=Affinity TM; Star=Starane Ultra*

[b] *MSO=Methylated seed oil; BB=Basic Blend; HC=Destiny HC*

[c] *All treatments applied POST to 4-leaf wheat*

Control of ACCase resistant green foxtail and wild oat with Rimfire tank mixes (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate Rimfire tank mixes for control of ACCase-resistant green foxtail and wild oat in spring wheat. All treatments were applied on June 6 at the 3- to 4-leaf wheat stage. Foxtail was about 0.5 inch tall and wild oat was 2- to 3-leaf. Rimfire tank mixed with Huskie plus MSO or Basic Blend caused 13-15% injury within 7-10 days after application, mostly expressed as chlorosis with slight stunting. However, by early July no injury symptoms were visible. At the pre-harvest evaluation on Aug 2, Rimfire tank mixes provided excellent wild oat control, but poor foxtail control. Wolverine provided poor control of both grasses. An experimental product to be marketed by Bayer in 2012 provided excellent wild oat control and good foxtail control.

Table. Control of ACCase-resistant green foxtail and wild oat with Rimfire tank mixes. (1115)

		HRSW			Weed Control					
		Injury			Green foxtail			Wild oat		
Treatment[ab]	Rate	18-Jun	30-Jun	2-Aug	18-Jun	30-Jun	2-Aug	18-Jun	30-Jun	2-Aug
		----------%----------			----------%----------					
Untreated		0	0	0	0	0	0	0	0	0
Rimfire + Huskie + MSO	3 oz + 11 oz + 1.5 pt	15	9	0	89	76	59	93	95	99
Rimfire + Huskie + BB	3 oz + 11 oz + 1%	13	5	0	87	68	57	90	95	99
Rimfire + Huskie + Destiny HC	3 oz + 11 oz + 0.75 pt	8	4	0	86	66	57	89	95	99
Rimfire + Aff TM + Starane + BB	3 oz + 0.6 oz + 0.18 pt + 1%	6	2	0	87	73	65	91	95	98
Experimental	13.7 oz	6	2	0	88	87	88	88	95	99
Wolverine	27.4 oz	0	0	0	33	30	30	47	33	30
LSD (0.05)		3	4	NS	5	9	14	8	4	2
CV		22	64	0	4	9	16	6	3	1

[a] *All treatments applied at 2- to 3-leaf wheat, 2- to 3-leaf wild oat, and 0.5 inch foxtail*

[b] *Rimfire=Rimfire Max; Starane=Starane Ultra; MSO=Methylated seed oil; BB=Basic blend*

Crop tolerance and weed control in Clearfield wheat (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate weed control and Clearfield wheat tolerance with Beyond tank mixes. Treatments were applied July 5 to 4.5-leaf wheat, 2-inch yellow foxtail, and 1-inch pigweed. No crop injury was observed with any of the treatments. Beyond provided good to excellent foxtail control except when applied at 4 fl oz tank mixed with Bronate. Wolverine, Everest 2.0, and Axial XL provided poor to fair foxtail control. All treatments provided excellent pigweed control, with the exception of Axial XL + WideMatch + MCPA ester.

Table. Crop tolerance and weed control in Clearfield wheat. (1139)

		Injury		Weed Control					
		HRSW		Yellow Foxtail			Redroot Pigweed		
Treatment[a]	Rate	15-Jul	19-Jul	19-Jul	4-Aug	18-Aug	19-Jul	4-Aug	18-Aug
		----------%							
Untreated		0	0	0	0	0	0	0	0
Beyond + MSO	4 fl oz + 1%	0	0	83	82	86	95	99	99
Beyond + MSO	6 fl oz + 1%	0	0	92	91	94	95	99	99
Beyond + Bronate + NIS	4 fl oz + 1 pt + 0.25%	0	0	71	67	64	95	99	99
Beyond + Bronate + NIS	6 fl oz + 1 pt + 0.25%	0	0	79	80	81	95	99	99
Beyond + Widematch + NIS	4 fl oz + 1 pt + 0.25%	0	0	81	83	85	95	99	99
Wolverine	1.7 pt	0	0	81	37	33	99	99	99
Everest 2.0 + Widematch + MCPe	1 fl oz + 1 pt + 0.5 pt	0	0	80	60	54	86	99	99
Axial XL + Widematch + MCPe	16.4 fl oz + 1 pt + 0.5 pt	0	0	89	77	70	50	50	45
LSD (0.05)		NS	NS	13	16	17	6	6	3
CV		0	0	10	15	15	4	4	2

[a] *All treatments applied to 4.5-leaf wheat*

2011 Bayer Axiom Herbicide on Winter Wheat

Eric Eriksmoen, Hettinger, ND

'AP503CL2' HRWW was seeded no-till on October 11. Fall post-emergence treatments (FPOST) were applied on November 15, 2010 to wheat that was just beginning to emerge and to tillering downy brome (dobr) with 33° F, 95% RH, cloudy sky and northwest wind at 10 mph. Spring treatments (SPOST) were applied on May 19, 2011 to tillering wheat, jointing downy brome and 2 leaf Japanese brome (jabr) with 48° F, 77% RH, cloudy sky and northeast 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 soil is classified as a silt-loam with a pH of 6.2, OM of 3.2% and 85% hrsw residue ground cover. The trial was a randomized complete block design with four replications. The trial had an application of 12 oz/A Huskie herbicide + 8 oz/A Headline fungicide on June 4, 2011 to control broadleaf weeds and foliar diseases. Weed populations for downy brome and Japanese brome were 50+ and 2 plants /ft^2 respectively. Plots were evaluated for crop injury on May 19, June 1, June 22 and July 18, and were evaluated for weed control on May 19, June 22 and July 18. The trial was not harvested due to a very poor wheat stand.

				- May 19 -		6/1	---- June 22 ----			--------- July 18 ---------			
	Treatment	Product rate	Timing	inj	dobr	inj	inj	dobr	jabr	inj	dobr	jabr	fxba
		oz/A		---------- Percent Control ----------									
1	Untreated			0	0	0	0	0	0	0	0	0	0
2	Axiom	6	FPOST	0	0	0	0	0	0	0	0	0	0
3	Axiom	10	FPOST	0	0	0	0	0	0	0	0	0	0
4	Rimfire Max + MSO	3 + 20	SPOST	0	0	0	0	28	69	0	8	91	10
5	Axiom fb Rimfire Max+ MSO	6 3 + 20	FPOST SPOST	0	0	0	0	54	85	0	35	91	6
6	Axiom fb Rimfire Max+ MSO	10 3 + 20	FPOST SPOST	0	0	0	0	40	80	0	37	94	22
7	PrePare + NIS fb Everest + NIS	0.3 + 0.5% 0.3 + 0.5%	FPOST SPOST	0	8	0	0	18	82	0	20	94	2
	C.V. %			0	529	0	0	77	20	0	166	5	171
	LSD .05			NS	NS	NS	NS	23	14	NS	NS	4	15

NS = no statistical difference between treatments

Summary

Crop injury was not observed. The crop was overwhelmed by downy brome causing poor germination and spring stands. Axiom had no direct effect on downy brome or Japanese brome in this trial but there does appear to be some synergistic effects with spring applied Rimfire Max on both brome species. Foxtail barley (fxba) was prevalent and control levels were minimal for all treatments.

2011 PrePare/Sierra Control of Bromes in Spring Wheat

Eric Eriksmoen, Hettinger, ND

Pre-plant (PP) treatments were applied on May 8 to 3 leaf downy brome (dobr) with 52° F, 69% RH, cloudy sky and east wind at 3 mph. 'Mott' HRSW was seeded no-till on May 16. Post-emergence (POST) treatments were applied on June 8 to 3 leaf wheat, heading downy brome, tillering Japanese brome (jabr), 2 leaf wild oat (wiot) and 1 leaf Persian darnel (peda) with 56° F, 58% RH, cloudy sky and southeast wind at 5 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with three replications. Weed populations for downy brome, Japanese brome, wild oat and Persian darnel were 2, 4, 0.5 and 0.75 plants per square foot, respectively. Plots were evaluated for crop injury on June 8, June 14, June 20, June 30 and July 18, and for weed control on June 30, July 18 and August 16. The trial was harvested on August 20.

	Treatment	Product rate	App. Timing	- June 30 -		--------- July 18 ----------				---- August 16 -----			Test weight	Grain yield
				jabr	peda	inj	wiot	jabr	peda	jabr	dobr	peda		
		oz/A		% control									lbs/bu	bu/A
1	Untreated			0	0	0	0	0	0	0	0	0	53.8	12.7
2	PrePare+AMS+NIS	0.3+1.5lb+0.25%	PP	73	0	0	0	90	0	98	17	0	58.0	25.9
3	PrePare+AMS+T'down Total	0.3+1.5lb+24	PP	93	0	0	0	98	0	98	93	0	58.2	25.5
4	PrePare+AMS+NIS fb Sierra + Basic Blend	0.3+1.5lb+0.25% 0.35 + 1%	PP POST	91	0	0	99	96	10	99	81	0	57.5	25.2
5	PrePare+AMS+T'down Total fb Sierra + Basic Blend	0.3+1.5lb+24 0.35 + 1%	PP POST	98	0	0	99	99	10	98	92	0	58.1	26.9
6	PrePare+AMS+NIS fb Sierra + Basic Blend	0.3+1.5lb+0.25% 0.5 + 1%	PP POST	80	10	0	99	90	10	99	53	0	57.9	28.1
7	PrePare+AMS+T'down Total fb Sierra + Basic Blend	0.3+1.5lb+24 0.5 + 1%	PP POST	99	10	0	99	99	17	99	98	0	58.1	29.6
8	Rimfire Max + Basic Blend	3 + 1%	POST	96	0	0	99	93	7	99	70	0	57.9	25.7
	C.V. %			13	321	0	0	7	192	2	29	0	1.5	13.8
	LSD .05			18	NS	NS	1	10	NS	2	32	NS	1.5	6.1

NS = no statistical difference between treatments

Summary

Crop injury was not observed. All herbicide treatments provided excellent season long control of Japanese brome. Pre-plant treatments alone (trts 2 & 3) did not provide any residual control of wild oats, but the addition of Sierra applied post-emergence provided excellent control of wild oats. The addition of Touchdown Total to pre-plant treatments significantly enhanced downy brome control. None of the treatments controlled Persian darnel.

2011 Persian Darnel Control in Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Early post-emergence (EPOST) treatment was applied on June 8 to 3 leaf wheat, heading downy brome (dobr), tillering Japanese brome (jabr) and one leaf Persian darnel (peda) with 45° F, 89% RH, cloudy sky and north wind at 9 mph. Late post-emergence (LPOST) treatments were applied on June 17 to 5 leaf wheat, seed filling downy brome, Japanese brome in the boot stage and 4 leaf Persian darnel with 58° F, 98% RH, cloudy sky and southeast 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with three replications. Weed populations for downy brome, Japanese brome and Persian darnel were 2, 5 and 2 plants per square foot, respectively. There was also a scattered amount of wild oats (wiot) present. Plots were evaluated for crop injury on June 30 and July 29, and for weed control on June 30, July 29 and August 16. The trial was harvested on August 20.

	Treatment	Product rate	App. timing	June 30				July 29				Aug. 16		Test weight	Grain yield
				inj	dobr	jabr	peda	dobr	jabr	peda	wiot	dobr	jabr		
				Percent Control										lbs/bu	bu/A
1	Untreated			0	0	0	0	0	0	0	0	0	0	57.1	16.7
2	Everest 2.0 + Supremacy + Basic Blend	0.75 + 5.0 + 1%	EPOST	0	27	96	45	27	98	74	99	37	98	56.0	19.9
3	Everest 2.0 + WideMatch + MCPA ester + Basic Blend	0.75 + 16 + 8 + 0.5%	LPOST	0	27	86	0	27	99	0	99	20	99	56.5	20.3
4	Everest 2.0 + Supremacy + Basic Blend	0.75 + 5.0 + 1%	LPOST	0	37	73	50	43	99	--	99	50	96	57.4	20.8
5	Everest 2.0 + Supremacy + Basic Blend	1.0 + 5.0 + 1%	LPOST	0	20	50	50	43	98	99	99	47	93	57.9	19.5
6	Raze + ARY-0546-001 + ARY-0547-001 + Basic Bl	7.0 + 0.3 + 0.1 + 1%	LPOST	0	47	73	50	43	99	--	99	43	98	56.6	25.5
7	Raze + ARY-0546-001 + ARY-0547-001 + Basic Bl	7.0 + 0.45 + 0.15 + 1%	LPOST	0	33	72	--	50	98	--	99	50	96	57.3	22.3
8	Raze + ARY-0546-001 + ARY-0547-001 + Basic Bl	9.0 + 0.3 + 0.1 + 1%	LPOST	0	33	62	--	30	99	--	99	37	93	56.9	20.4
9	Goldsky + Basic Blend	16 + 1%	LPOST	0	82	87	80	77	99	99	99	78	96	57.0	28.3
10	Rimfire Max + Huskie + BB	3.0 + 11 + 1%	LPOST	0	70	92	0	55	99	25	99	77	99	56.8	24.4
	C.V. %			0	66	21	146	64	1	79	--	48	4	1.5	6.6
	LSD .05			NS	43	25	NS	NS	2	NS	--	36	6	NS	2.5

NS = no statistical difference between treatments

Summary

Crop injury was not observed. Herbicide treatments were applied to relatively large downy brome resulting in relatively poor control. All herbicide treatments provided excellent season long Japanese brome and wild oat control. Unfortunately, Persian darnel populations were not evenly dispersed, resulting in poor and inconsistent efficacy observations.

2011 Olympus fb Rimfire Max in Spring Wheat

Eric Eriksmoen, Hettinger, ND

Pre-plant (PP) treatments were applied on May 8 to tillering downy brome (dobr) and 3 leaf Japanese Brome (jabr) with 51° F, 70% RH, cloudy sky and east wind at 5 mph. 'Mott' HRSW was seeded no-till on May 16. Post-emergence (POST) treatments were applied on June 8 to 3 leaf wheat, heading downy brome, tillering Japanese brome, 1 leaf Persian darnel (peda), and to 2 leaf wild oat (wiot) with 45° F, 91% RH, cloudy sky and north 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with three replications. Weed populations for downy brome, Japanese brome, Persian darnel and wild oat were 50+, 4, 0.75 and 0.5 plants per square foot, respectively. Plots were evaluated for crop injury on June 14 and June 30, and for weed control on June 14, June 30 and August 14. The trial was harvested on August 20.

				-June 14-	------ June 30 ------				--------- August 14 ---------				Test	Grain
	Treatment	Product rate	Timing	inj	dobr	dobr	jabr	peda	dobr	jabr	peda	wiot	weight	yield
		oz/A		---------- Percent Control ----------									lbs/bu	bu/A
1	R'up + AMS fb Huskie + AMS	16 + 17lb 11 + 0.5lb	PP POST	0	87	83	87	0	77	77	0	0	58.5	8.4
2	R'up + Olympus + AMS fb Huskie + AMS	16 + 0.2 + 17lb 11 + 0.5lb	PP POST	0	99	96	96	0	96	93	0	99	57.7	14.4
3	R'up + Olympus + AMS fb Rimfire Max + Huskie + MSO	16 + 0.2 + 17lb 3 + 11 + 20.8	PP POST	0	98	99	99	88	99	99	76	99	56.5	10.1
4	R'up + Olympus + AMS fb Huskie + AMS	16 + 0.4 + 17lb 11 + 0.5lb	PP POST	0	95	99	99	43	99	96	0	99	59.7	12.3
5	R'up + Olympus + AMS fb Rimfire Max + Huskie + MSO	16 + 0.4 + 17lb 3 + 11 + 20.8	PP POST	0	96	99	99	88	99	99	83	99	57.6	15.2
6	R'up + PrePare + AMS fb Supremacy + NIS	16 + 0.3 + 17lb 5 + 0.25%	PP POST	0	96	99	93	17	96	89	0	33	58.1	23.0
7	R'up + PrePare + AMS fb Everest + Supremacy + NIS	16 + 0.3 + 17lb 0.5 + 5 + 0.25%	PP POST	0	96	96	99	43	95	96	0	99	57.7	22.8
8	R'up + AMS fb Rimfire Max + Huskie + MSO	16 + 0.2 + 17lb 3 + 11 + 20.8	PP POST	0	95	99	99	78	99	99	60	99	57.8	20.0
9	Untreated			0	0	0	0	0	0	0	0	0	--	3.1
	C.V. %			0	3.5	5.3	5.3	28	9.2	12	85	14	1.5	15.8
	LSD .05			NS	5	8	8	19	13	18	36	17	1.4	3.9

Summary

Crop injury was not observed. All herbicide treatments provided excellent season long control of downy and Japanese brome with the exception of pre-plant Roundup fb Huskie (trt 1). Treatments with POST applied Rimfire Max (trts 3, 5 & 8) were the only treatments to provide some season long control of Persian darnel. All herbicide treatments provided excellent season long control of wild oat with the exception of pre-plant Roundup fb Huskie (trt 1) and PrePare fb Supremacy (trt 6).

2011 Rimfire Max and Huskie Complete on Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Treatments were applied on June 8 to 3 leaf wheat, heading downy brome (dobr), tillering Japanese brome (jabr) and 1 leaf Persian darnel (peda) with 45° F, 90% RH, cloudy sky and north 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with three replications. Weed populations for downy brome, Japanese brome and Persian darnel were 1, 4 and 1 plants per square foot, respectively. Plots were evaluated for crop injury on June 14 and June 29, and for weed control on June 14, June 29 and August 16. The trial was harvested on August 20.

			----- June 14 -----			---------- June 29 ----------				---- August 16 ----			Test	Grain
	Treatment	Product rate	inj	dobr	peda	inj	dobr	jabr	peda	dobr	jabr	peda	weight	yield
		oz/A	---------- Percent Control ----------										lbs/bu	bu/A
1	Untreated		0	0	0	0	0	0	0	0	0	0	56.7	12.7
2	Rimfire Max + Huskie + MSO*	3 + 11 + 24	3	50	33	0	87	98	75	77	99	99	57.7	24.9
3	Rimfire Max + Huskie + BB*	3 + 11 + 1%	2	35	50	0	77	99	80	65	99	99	57.2	24.8
4	Rimfire Max + Huskie + HSOC*	3 + 11 + 12	1	50	50	0	62	93	73	70	99	96	57.5	25.2
5	Rimfire Max + Affinity TM + Starane + BB	3 + 0.6 + 5.3 + 1%	2	30	43	0	63	94	93	55	99	99	57.2	21.9
6	Huskie Complete	13.7	5	35	37	0	3	93	92	50	98	99	58.3	21.7
7	Wolverine	27.4	0	0	0	0	0	0	0	0	0	0	56.3	20.1
	C.V. %		99	57	51	0	23	7	20	50	1	3	1.8	6.3
	LSD .05		NS	29	28	NS	17	8	21	40	2	3	NS	2.4

*Adjuvant: MSO = Methylated Seed Oil, BB = Basic Blend, HSOC = High Surfactant Oil Concentrate.
NS = no statistical difference between treatments.

Summary

Crop injury consisted of leaf chlorosis, was relatively minor in appearance and diminished quickly. Treatments were applied to large downy brome plants resulting in relatively poor control. All herbicide treatments with the exception of Wolverine provided excellent season long control of Japanese brome and Persian darnel. Adjuvant type had no effect on weed control but Rimfire Max + Huskie + adjuvant type (trts 2, 3 & 4) all had significantly higher grain yields than the other treatments.

2011 Syngenta Wild Oat Control in Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Post-emergence (POST) treatments were applied on June 17 to 4 ½ leaf wheat, heading downy brome (dobr), Japanese brome (jabr) in the boot stage, 4 leaf wild oat (wiot), tillering foxtail barley (fxba) and 4 leaf Persian darnel (peda) with 44° F, 94% RH, cloudy sky and north 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with four replications. The trial was sprayed with 12 oz/A Huskie herbicide + 8 oz/A Headline fungicide on June 4 to control broadleaf weeds and foliar diseases. Weed populations for downy brome, Japanese brome, wild oat, foxtail barley and Persian darnel were 1, 1, 0.25, 0.5 and 1 plants per square foot, respectively. Plots were evaluated for crop injury on June 22, July 1, July 16 and July 29, and for weed control on July 16, July 29 and August 14. The trial was harvested on August 20.

			July 16			July 29					August 14			Test	Grain
	Treatment	Product rate	jabr	dobr	fxba	inj	jabr	dobr	fxba	wiot	jabr	dobr	peda	weight	yield
		oz/A	Percent Control											lbs/bu	bu/A
1	Untreated		0	0	0	0	0	0	0	0	0	0	0	57.9	23.7
2	A17713	8.2	0	0	0	0	0	0	0	99	0	0	99	60.0	25.7
3	Rimfire Max + Basic Blend	3.0 + 1%	94	55	45	0	96	72	40	99	97	56	99	59.0	28.5
4	Wolverine	27.2	0	0	0	0	0	0	7	99	0	0	0	59.4	29.1
5	Puma	10.6	0	0	5	0	0	0	7	99	0	0	0	59.1	25.0
6	Goldsky + AMS + NIS	16+1.5lb+0.5%	95	95	20	0	96	90	40	99	98	93	50	59.6	31.1
7	Everest + Basic Blend	0.75 + 1%	91	0	20	0	99	12	40	99	99	18	0	59.3	29.8
	C.V. %		5	18	212	0	4	45	129	--	4	65	--	1.0	8.9
	LSD .05		3	6	NS	NS	3	16	NS	--	3	23	--	0.9	4

NS = no statistical difference between treatments

Summary

Crop injury was not observed. All herbicide treatments provided excellent season long control of wild oats, although populations in this study were minimal and isolated to one replication. A17713 and Rimfire Max treatments provided excellent control of Persian Darnel. Rimfire Max, Goldsky and Everest treatments provided excellent season long control of Japanese brome and marginal control of foxtail barley. Goldsky was the only treatment to provide acceptable season long control of downy brome.

2011 Grassy Weed Control in Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Treatments were applied on June 16 to 4 ½ leaf wheat, Japanese brome (jabr) that was jointing and 4 leaf Persian darnel (peda) with 55° F, 80% RH, clear sky and east wind at 6 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with four replications. The trial had an application of 12 oz/A Huskie herbicide + 8 oz/A Headline fungicide on June 4, 2011 to control broadleaf weeds and foliar diseases. Weed populations for Japanese brome and Persian darnel were 3 and 1 plants per square foot, respectively. Plots were evaluated for crop injury on June 20, June 22, July 1, July 16 and August 11, and for weed control on July 1, July 16 and August 11. The trial was harvested on August 20.

			6/22	----- July 16 -----			--- August 11 ---			Test	Grain
	Treatment	Product rate	inj	inj	jabr	fxba	inj	jabr	peda	weight	yield
		oz/A	---------- Percent Control ----------							lbs/bu	bu/A
1	Untreated		0	0	0	0	0	0	0	57.6	25.8
2	Goldsky+NIS+AMS	16+0.5%+1.5lb	9	4	98	95	0	99	--	57.4	27.7
3	Goldsky+NIS+UAN	16+0.5%+2qt	9	3	97	28	0	99	--	57.3	26.1
4	Goldsky+MCPA est+AMS	16+8.6+1.5lb	9	3	98	30	0	99	99	55.8	27.4
5	GF-2705+NIS+AMS	12+0.5%+1.5lb	9	4	98	10	0	99	99	55.6	26.6
6	GF-2705+NIS+AMS	16+0.5%+1.5lb	7	2	98	25	0	99	--	56.2	27.9
7	G-2705+NIS+UAN	16+0.5%+2qt	9	2	99	25	0	99	99	56.7	27.6
8	GF-2705 + NIS	16 + 0.5%	9	8	98	80	0	99	99	57.2	25.9
9	WideMatch+Pyroxsulam+ NIS + AMS	16+6.8+ 0.5% + 1.5lb	10	2	99	25	0	97	--	57.1	26.2
10	Axial XL + WideMatch + MCPA est	16.4 + 16 + 13	4	0	0	0	0	0	--	57.6	28.6
11	Wolverine	27	3	1	0	12	0	0	99	56.3	28.1
12	Everest 2.0 + 2,4-D est	0.75 + 8.6	4	2	96	90	0	98	99	56.8	27.4
13	Rimfire Max+ Bronate Adv+ NIS + AMS	3 + 12.8 + 0.25% + 1.5lb	10	2	98	--	0	98	99	56.6	28.2
	C.V. %		33	148	2	--	0	2	--	2.0	8.4
	LSD .05		3	NS	3	--	NS	2	--	NS	NS

NS = no statistical difference between treatments

Summary

Crop injury consisted of a combined rating of chlorosis and stunting on June 22. Crop chlorosis diminished quickly but crop stunting was still somewhat noticeable on July 16. All herbicide treatments with the exception of Axial XL (trt 10) and Wolverine (trt 11) provided excellent season long Japanese brome control. Foxtail barley (fxba) and Persian darnel populations were inconsistent between plots and reps so control ratings shown in the above table should be viewed with caution. Test weights and grain yields were not statistically different between treatments.

Station broadleaf control in cereals, Fargo. Howatt, Roach, Harrington. 'Faller' hard red spring wheat was seeded near Fargo on June 7. Treatments were applied to three-leaf wheat, four-leaf common cocklebur, and two-leaf common purslane and redroot pigweed on July 5 with 80°F, 45% relative humidity, clear sky, 6 mph wind at 135°, and dry soil at 70°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates evaluated.

Treatment	Rate	7/22 Vema	7/22 Cocb	7/22 Copu	7/22 Rrpw
Flox&MCPA	8	82	94	99	96
Dicamba&flox	1.85	83	83	92	92
Clpy&flox	3	88	96	99	83
Clpy&MCPA	9.4	89	89	96	85
Clpy&flox+thif-sg+trib-sg	2+0.1+0.1	93	91	99	99
Thif-sg+trib-sg+MCPA+NIS	0.24+0.06+4+0.25%	94	92	99	99
Thif-sg+trib-sg+MCPA+NIS	0.15+0.15+4+0.25%	93	97	99	98
Flas&MCPA+NIS	5.07+0.25%	90	96	99	96
Carf&2,4-D+NIS	4.1+0.25%	91	95	99	96
Pyraflufen+MCPA+NIS	0.013+4+0.25%	82	93	98	93
Bromoxynil&MCPA5	8	91	92	92	93
Bromoxynil&pyrasulfotol	2.9	91	95	98	98
Untreated	0	0	0	0	0
CV		5	5	2	4
LSD 5 %		6	8	4	5

Late seeding of wheat and difficult soil moisture conditions led to minimal weed pressure and an open canopy. This enabled full coverage of weed tissue and promoted good activity of all products. Many products provided greater than 90% control of the weed spectrum. Venice mallow was the most difficult weed to control but treatments that contained thifensulfuron and tribenuron provided 93 to 94% control.

Station broadleaf control in cereals. Chaput, Lukach, and Howatt. 'Glenn' hard red spring wheat was seeded May 20. Treatments were applied to 4.5 leaf wheat, 8 leaf chickweed,6 leaf to bolting wild mustard, 5 leaf annual smartweed and false chamomile, and 12 leaf volunteer flax on June 20 with 61°F, 90% relative humidity, east wind at 12 mph, and dry foliage. Treatments were applied with a tractor-mounted sprayer delivering 10 gpa at 40 psi through 8001.5 DG nozzles to plots the length of 6.7 by 25 feet. The experiment was a randomized complete block design with four replicates. Three replicates were harvested September 12.

Treatment	Rate	6/29 Wht	7/21 Wimu	7/21 Cocw	7/21 Smwd	7/21 Fach	7/21 Flax	9/12 Yld	9/12 Test	9/12 Ht
	oz/A	%	%	%	%	%	%	bu/A	lb/bu	cm
Fluroxypyr&MCPA	8	0	99	81	60	48	90	45	59	93
Dicamba&fluroxypyr	1.85	0	81	58	76	26	95	38	56	93
Clopyralid&fluroxypyr	3	0	60	38	61	25	98	41	59	93
Clopyralid&MCPA	9.4	0	98	48	53	40	0	43	58	94
Clpy&flox+thif-sg+trib-sg	2+0.1+0.1	0	94	90	91	90	64	49	57	94
Thif-sg+trib-sg+Sword+NIS	0.24+0.06+4+0.25%	1	98	89	25	92	81	49	58	90
Thif-sg+trib-sg+Salvo+NIS	0.15+0.15+4+0.25%	0	98	95	50	90	79	50	57	89
Flas&MCPA+NIS	5.07+0.25%	0	99	95	96	74	90	51	58	88
Carf&2,4-D+NIS	4.1+0.25%	3	99	28	90	84	36	34	59	88
Pyraflufen+Salvo+NIS	0.013+4+0.25%	1	96	5	45	48	45	33	59	89
Bromoxynil&MCPA5	8	0	99	43	0	94	66	44	59	94
Bromoxynil&pyrasulfotol	2.9	0	98	43	28	84	31	50	57	95
Untreated	0	0	0	0	0	0	0	28	56	90
CV		155	5	13	16	12	37	16	3	4
LSD 5%		1	6	13	10	28	11	12	3	7

Minor injury occurred with three of the treatments, although injury was not observed on July 21. Only dicamba and flyroxypyr or clopyralid and fluroxypyr gave less than 94% control of wild mustard. Control of common chickweed and false chamomile was greatest when treatment included an ALS-inhibitor, although bromoxynil and MCPA provided 94% control of false chamomile. None of the treatments gave greater than 80% control of each weed. Given the spectrum of unique weeds, clopyralid and fluroxypyr plus thifensulfuron and tribenuron or the premix of florasulam and MCPA gave the most complete weed control.

POST broadleaf weed control in spring wheat, Carrington, 2011. Kirk Howatt, Greg Endres, and Janet Harrington. The experiment was conducted at the NDSU Carrington Research Extension Center on a conventionally-tilled Heimdal-Emrick loam soil. The experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was seeded May 17. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 8.5 gal/A at 35 psi through 11001 TT flat fan nozzles to the center 6.7 ft of 10- by 25-ft plots. Treatments were applied on June 23 with 73°F, 46% RH, 5% cloud-cover, 1 to 3 mph wind at 0°, and damp soil at 78°F to four-leaf wheat, 2- to 5-inch redroot pigweed, 1- to 4-inch common lambsquarters, and 3- to 8-inch flax. The trial was not harvested for seed yield due to significant plant damage caused by hail on July 24. All ratings were recorded July 19

Table.

		Injury	Control		
Treatment	Rate	Wheat	Rrpw	Colq	Flax
	oz/A	%	%	%	%
Fluroxypyr&MCPA	8	0	96	99	99
Dicamba&fluroxypyr	1.85	9	93	94	99
Clopyralid&fluroxypyr	3	0	88	97	95
Clopyralid&MCPA	9.4	0	94	99	60
Clpy&flox+thif-sg+trib-sg	2+0.1+0.1	0	92	95	95
Thif-sg+trib-sg+MCPA+NIS	0.24+0.06+4+0.25%	3	99	99	53
Thif-sg+trib-sg+2,4-D+NIS	0.15+0.15+4+0.25%	3	98	98	78
Flas&MCPA+NIS	5.07+0.25%	0	82	95	82
Carf&2,4-D+NIS	4.1+0.25%	7	95	97	95
Pyraflufen+2,4-D+NIS	0.013+4+0.25%	0	92	95	80
Bromoxynil&MCPA5	8	1	94	97	0
Bromoxynil&pyrasulfotol	2.9	0	94	99	37
Untreated	0	0	0	0	0
CV		69	2	1	6
LSD 5%		2	3	2	6

Large wheat with lush vegetation likely prevented full coverage of weed tissue with spray mixture, but the lush wheat vegetation was very competitive with weeds. Weed vegetation was not above the wheat canopy in untreated plots at evaluation, and the weed population in untreated plots was less than during application.

Herbicide injury to wheat occurred with four treatments. Dicamba and fluroxypyr caused the most injury at 9%. This likely was the action of dicamba as the injury manifested as shorter wheat plants with less leaf tissue and more upright leaf architecture. Carfentrazone and 2,4-D caused 7% injury as small necrotic lesions. Minor injury from thifensulfuron and tribenuron tank-mixed with a phenoxy herbicide was visible as slight chlorosis, but thifensulfuron and tribenuron plus clopyralid and fluroxypyr did not elicit a visible response.

Redroot pigweed and common lambsquarters were quite easily controlled in all plots, except that several pigweed survived florasulam and MCPA. Fluroxypyr provided at least 95% control of flax, and carfentrazone and 2,4-D also controlled flax at 95%.

Flumioxazin application to spring wheat early postemergence. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded at Casselton on June 8. Treatments were applied to four-leaf wheat and cotyledon to 2 leaf Venice mallow on July 5 with 86°F, 32% relative humidity, 20% cloud cover, 8.1 mph wind at 340°, and dry soil at 80°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates for July 8 wheat injury and July 26 Venice mallow control and three replicates for July 26 wheat injury.

Treatment	Rate	7/8 Wht	7/26 Wht	7/26 Vema
	oz/A	%	%	%
Untreated		0	0	0
Flumioxazin	0.5	3	4	78
Flumioxazin	1	3	8	91
Flumioxazin	2	3	8	96
Flumioxazin+pyroxasulfone	2.28	8	7	98
Flumioxazin+pyroxasulfone	4.56	8	15	99
Flucarbazone+NIS	0.42+0.25%	3	18	69
CV		0	61	5
LSD 5%		1	9	5

All herbicides caused wheat to be chlorotic at both evaluations. In addition, pyroxasulfone resulted in small necrotic lesions on tissue that was exposed to the treatment. This necrosis did not express on new tissue, but lesions appeared to be larger at the second evaluation than the first. Also, the two treatments with pyroxasulfone did not have as much new growth as other treatments. Flucarbazone injury included stunting with general chlorosis at the July 26 evaluation.

Flumioxazin at 1 oz ai/A or more provided greater than 90% control of Venice mallow. Other treatments gave less than 80% control.

Broadleaf weed control with pinoxaden and fluroxypyr (Axial Star) tank-mixes. Howatt, Roach, Harrington. 'Faller' hard red spring wheat was planted near Fargo on May 19. Treatments were applied to three-leaf wheat, four-leaf wild mustard, four- to six-leaf wild buckwheat and Venice mallow, and three-leaf yellow foxtail on June 20 with 67°F, 78% relative humidity, 95% cloud cover, dry soil at 68°F, and 7 mph wind at 135°. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 flat fan nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	Jul-18 Wimu	Jul-18 Wibw	Jul-18 Vema	Jul-18 Yeft	Aug-5 Wibw	Aug-5 Vema	Aug-5 Yeft
	oz/A	%	%	%	%	%	%	%
Flas&MCPA+pxdn&flox	5.07+2.36	99	90	92	96	90	90	96
Thif-sg+trib-sg+pxdn&flox	0.24+0.06+2.36	99	93	88	95	96	83	96
Thif-sg+trib-sg+pxdn&flox	0.1+0.1+2.36	99	94	92	96	95	90	96
Brox&MCPA5+pxdn&flox	6+2.36	99	96	93	94	96	92	96
AMS+brox&pyst+pxdn&flox	8+2.84+2.36	99	93	90	94	92	90	94
Fenx&brox&pyst	4.7	99	93	87	87	92	89	85
Pxlm&flas&flox+NIS	1.68+0.25%	99	85	87	75	80	88	80
Flcz 2.0+2,4-D+Basic Blend	0.32+4+1%	99	88	85	63	88	88	72
Prcz&mess+2,4-D+BB	0.2+4+1%	99	80	87	72	78	82	50
Untreated	0	0	0	0	0	0	0	0
CV		0	3	5	7	5	5	5
LSD 5%		0	5	7	9	6	7	6

Herbicides did not cause injury to wheat. All herbicides gave complete control of wild mustard. Control was very consistent between the two evaluation dates. Most of the herbicide treatments provided at least 90% control of wild buckwheat on August 5. Flucarbazone and 2,4-D provided 88% control, but the pyroxsulam/florasulam/fluroxypyr premix or propoxycarbazone and mesosulfuron plus 2,4-D gave 80% or less control. Bromoxynil and MCPA with fluroxypyr resulted in 92% control of Venice mallow with most treatments having similar activity. Pinoxaden provided 94 to 96% control of yellow foxtail compared with fenoxaprop at 85% and ALS-inhibitors ranging from 50 to 80% control.

Weed control with Axial Star in spring wheat, Carrington, 2011. Greg Endres. The experiment was conducted at the NDSU Carrington Research Extension Center in cooperation with Syngenta. Experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was direct seeded into flax stubble on May 17. 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 10 with 60 F, 64% RH and 8 mph wind to 3-leaf wheat, 1- to 3-leaf yellow and green foxtail, 0.5- to 5-inch wide sheperdspurse, 1- to 3-inch tall horseweed, 0.5- to 2-inch tall kochia, and 0.5- to 5-inch tall volunteer flax. The trial was extensively damaged by hail on July 24 and was not harvested for seed yield.

Wheat chlorosis (0=green and 9=yellow) on June 16 (6 days after treatment) was not observed with Wolverine or Everest 2.0 and was highest (scores of 3 to 4) with Axial Star plus Huskie or Bronate Advanced (table). No wheat injury was observed on June 24. Foxtail was generally suppressed with all treatments except Rimfire Max (47 to 58%). Control of sheperdspurse was excellent (95 to 99%), and good to excellent (81 to 99%) for volunteer flax except with Rimfire Max. Horseweed and kochia control generally were excellent except with Everest 2.0 and Rimfire Max.

Table.

		Weed control[1]						Wheat
Herbicide		9-Jul					22-Jul	16-Jun
Treatment	Rate	Fota	Shpu	Howe	KOCZ	Vofl	Fota	Chlorosis
	fl oz product/A	%						0-9[2]
Untreated check	x	0	0	0	0	0	0	0
Orion + Axial Star	17 + 16.5	69	99	97	95	89	68	2
Harmony SG + Express SG + Axial Star	0.48 + 0.12 oz wt + 16.5	76	95	97	92	x	73	1
Harmony SG + Express SG + Axial Star	0.2 + 0.2 oz wt + 16.5	68	98	96	94	98	64	2
Bronate Advanced + Axial Star	9.6 + 16.5	68	98	99	94	96	60	4
Huskie + Axial Star + AMS	11 + 16.5 + 1.2% v/v	67	98	97	94	99	64	3
Wolverine	27.2	71	98	99	99	86	71	0
Goldsky + NIS	16 + 0.25% v/v	72	98	99	85	96	69	2
Everest 2.0 + basic blend	0.75 + 1% v/v	70	98	27	35	81	66	0
Rimfire Max + basic blend	3 oz wt + 1% v/v	58	79	46	16	65	47	1
C.V. (%)		10.3	12.8	26.1	20.5	12.2	16.9	45.3
LSD (0.05)		11	19	34	26	17	17	1

[1]Fota=yellow and green foxtail; Shpu=Sheperdspurse; Howe=horseweed; KOCZ=kochia; Vofl=volunteer flax.

[2]0=green and 9=yellow.

Weed control and barley tolerance with Axial Star (Jenks, Willoughby and Hoefing) The objective of the study was to evaluate barley tolerance to Axial Star as well as control of broadleaf weeds. Axial Star is a premix of Axial + Starane. Axial Star was tank mixed with various standard broadleaf herbicides. We also evaluated barley tolerance to Group 2 herbicides (GoldSky, Everest, and Rimfire Max). Axial Star tank mixes caused minimal barley injury. GoldSky, Everest, and Rimfire caused severe injury to barley soon after application (chlorosis, stunting). Barley maturity was delayed in these treatments and reduced yield only slightly. They did not cause enough injury that they could be relied upon to provide volunteer barley control in a wheat crop. Most treatments provided good to excellent control of common mallow, wild buckwheat, and redroot pigweed. It should be noted that the barley crop was very competitive and that weed density was generally low.

Table. Weed control and barley tolerance with Axial Star. (1110)

		Barley			Weed Control[c]						Barley	
		Injury			Coma		Wibw		Rrpw		Yield	TW
Treatment[b]	Rate	25-Jun	8-Jul	22-Jul	8-Jul	22-Jul	8-Jul	22-Jul	8-Jul	22-Jul	15-Aug	
		----------%----------									bu/A	lb/bu
Untreated		0	0	0	0	0	0	0	0	0	69.6	42.2
Orion + Axial Star	17 fl oz + 1.03 pt	8	4	0	95	95	99	99	98	98	74.8	42.9
Affinity TM + Axial Star	0.60 oz + 1.03 pt	3	1	0	95	95	99	99	99	99	72.5	42.5
Affinity BS + Axial Star	0.4 oz + 1.03 pt	4	2	0	95	95	99	99	99	99	72.1	42.4
Bronate Adv. + Axial Star	0.6 pt + 1.03 pt	3	2	0	87	86	99	99	93	93	74.6	43.2
Huskie + Axial Star + AMS	11 fl oz + 1.03pt + 1.5%	1	1	0	93	93	99	99	99	99	76.3	42.3
Wolverine	1.7 pt	0	0	0	91	90	99	99	99	99	71.8	41.9
Goldsky + NIS	1 pt + 0.25%	63	52	21	93	95	99	99	99	99	55.7	39.7
Everest 2.0[a]	0.75 oz	62	55	22	79	63	99	99	99	99	59.6	40.0
Rimfire Max[a]	3 oz	57	40	18	85	88	99	99	97	99	69.5	40.8
LSD (0.05)		3	7	1	5	8	NS	NS	6	6	7.7	1.4
CV		8	25	12	4	6	0	0	4	4	6	2

[a]*Applied with Basic Blend (1%); Bronate (1 pt) applied 7 days after POST treatment*

[b]*All treatments applied to 5- 5.5-leaf barley*

[c]*Coma=Common mallow; Wibw=Wild buckwheat; Rrpw=Redroot pigweed*

Broadleaf weed control in HRSW with Starane Flex (Jenks, Willoughby, and Hoefing) The objective of the study was to evaluate wheat tolerance and weed control with Starane Flex (Starane + florasulam). All treatments were applied at 4-leaf wheat. Weeds included wild buckwheat (4-lf), horseweed (8 in), and greenflower pepperweed (8 in). Very little injury was observed with any treatment. Generally, most treatments provided excellent control of all weeds. The only exceptions were Affinity + MCPA ester, which provided only fair control of horseweed, and Huskie which provided slightly lower control of greenflower pepperweed.

Table. Broadleaf weed control in HRSW with Starane Flex. (1114)

		HRSW				Weed Control[b]					
		Chlorosis		Stunting		Howe		Grpw		Wibw	
Treatment[a]	Rate	25-Jun	1-Jul	25-Jun	1-Jul	1-Jul	11-Aug	1-Jul	11-Aug	1-Jul	11-Aug
		----------%----------				----------%----------					
Untreated		0	0	0	0	0	0	0	0	0	0
Starane Flex	13.5 fl oz	0	0	0	0	88	98	85	93	92	99
Starane Flex + MCPe	13.5 fl oz + 8.63 fl oz	0	0	0	0	90	99	88	96	92	98
Starane Flex + 2,4-De	13.5 fl oz + 12.6 fl oz	1	0	0	0	90	99	88	98	92	99
Affinity TM + MCPe + NIS	0.6oz + 13oz + 0.25%	1	0	0	0	83	74	88	99	95	98
Huskie + AMS	11 fl oz + 1.5%	0	0	0	0	92	93	94	88	96	98
LSD (0.05)		NS	NS	NS	NS	3	12	1	10	1	2
CV		177	0	0	0	3	9	1	7	1	1

[a] *All treatments applied POST at HRSW 4-Leaf*

[b] *Howe=Horseweed; Grpw=Greenflower pepperweed; Wibw=Wild buckwheat*

2011 Broadleaf Weed Control with Starane Flex in Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Treatments were applied on June 16 to 4 ½ leaf wheat, 1 inch kochia (kocz), 1 inch Russian thistle (ruth) and 4 inch wild buckwheat (wibw) with 54° F, 80% RH, clear sky and east wind at 6 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with four replications. Weed populations for kochia, Russian thistle and wild buckwheat were 6, 3 and 2 plants per square foot, respectively. Plots were evaluated for crop injury on June 20, June 22, July 1, July 16 and August 11, and for weed control on July 1, July 16 and August 11. The trial was harvested on August 20.

			6/22	July 1				7/16	August 11				Test	Grain
	Treatment	Product rate	inj	inj	kocz	ruth	wibw	tamu	kocz	ruth	wibw	plet	weight	yield
			Percent control										lbs/bu	bu/A
1	Untreated		0	0	0	0	0	0	0	0	0	0	54.9	22.3
2	Starane Flex	13.5	0	0	88	65	88	99	88	77	94	99	57.0	27.3
3	Starane Flex + MCPA est	13.5 + 8.6	0	0	90	62	92	99	88	80	94	99	55.8	25.4
4	Starane Flex + 2,4-D est	13.5 + 8.6	1	0	89	64	90	99	94	90	94	99	56.9	26.4
5	Affinity TM + MCPA + NIS	0.6+13+0.25%	2	0	61	75	90	99	66	92	92	99	57.0	24.2
6	Huskie + AMS	11 + 0.5 lb	2	0	55	66	52	99	76	82	10	99	56.5	25.3
	C.V. %		142	0	29	37	23	0	19	21	10	0	3.0	9.1
	LSD .05		NS	NS	28	30	23	1	20	22	10	1	NS	NS

NS = no statistical difference between treatments

Summary

Crop injury was relatively minor and diminished quickly. All herbicide treatments provided good season long kochia control except for Affinity TM (trt 5) and Huskie (trt 6). Starane Flex + 2,4-D (trt 4) and Affinity TM were the only treatments that provided good season long control of Russian thistle. All herbicide treatments provided excellent season long control of wild buckwheat except for Huskie. All herbicide treatments provided excellent control of tansy mustard (tamu) and prickly lettuce (plet).

Broadleaf control with 20211 in cereals, Fargo. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on June 7. Treatments were applied to two-leaf wheat, one-leaf Venice mallow, two-leaf yellow foxtail and common purslane and wild mustard on July 7 with 80° F, 48% relative humidity, 10% cloud cover, 3.5 mph wind at 135°, and dry soil at 70°F. Treatments were applied with a backpack sprayer 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with three replicates for 7/22 evaluation and four replicates for 8/8 and 8/19 evaluations.

Treatment	Rate	7/22 Yeft	7/22 Vema	7/22 Wimu	7/22 Copu	8/8 Yeft	8/8 Vema	8/8 Copu	8/19 Yeft	8/19 Vema
	oz/A	%	%	%	%	%	%	%	%	%
Prcz&mess+brox&pyst +MSO	0.2+2.9 +0.16G	37	87	99	99	70	97	99	63	93
20211	3.45	82	94	99	98	96	98	99	95	97
Fenx&brox&pyst	4.7	85	91	99	99	93	95	99	88	91
Prcz&mess+clpy&flox +MCPA+MSO	0.2+2.26 +4+0.16G	37	90	99	99	66	91	99	65	89
Prcz&mess+thif-sg +trib-sg+flox+MSO	0.2+0.24 +0.06+1+0.16G	68	95	99	99	75	95	99	66	90
Untreated	0	0	0	0	0	0	0	0	0	0
		11	4	0	1	5	3	1	7	4
		10	5	0	1	5	4	1	7	4

Herbicides did not cause wheat injury that could be discerned from the untreated wheat. All herbicides provided excellent control of broadleaf weeds. The fenxaprop premix and 20211 gave better than 80% control of yellow foxtail on July 22. Propoxycarbazone and mesosulfuron gave 37% foxtail control in two of three treatments, but when thifensulfuron and tribenuron were included, control increased to 68%. On August 8, this improved control also was noted but control only reached 75% whereas 20211 provided 96% control of yellow foxtail. By August 19, the treatment 20211 control of yellow foxtail was still 95%, which was better than all other treatments and broadleaf control also was 97 to 99% for the three broadleaf weeds evaluated.

Broadleaf control with 20211 in cereals, Prosper. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seed at Prosper, ND, on June 6. Treatments were applied to two-leaf wheat, two- to four-leaf common cocklebur, two-leaf yellow foxtail, and two-leaf wild oat on July 5 with 84°F, 40% relative humidity, 10% cloud cover, 4 mph wind at 5°, dry soil at 83°. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-ft wide area the length of 10 by 30 ft plots.

Treatment	Rate	Jul-26 Yeft	Jul-26 Wioa	Jul-26 Cocb	Aug-11 Yeft	Aug-11 Wioa	Sep-7 Yeft
Prcz&mess+brox&pyst+MSO	0.2+2.9+0.16G	55	95	99	48	91	0
20211	3.45	90	93	99	92	93	86
Fenx&brox&pyst	4.7	93	95	99	96	83	88
Prcz&mess+clpy&flox +MCPA+MSO	0.2+2.26 +4+0.16G	40	93	99	30	97	0
Prcz&mess+thif-sg+trib-sg +flox+MSO	0.2+0.24+0.06 +1+.16G	53	94	99	38	96	0
Untreated	0	0	0	0	0	0	0
CV		11	2	0	9	2	8
LSD 5%		9	3	0	7	3	3

Wheat injury could not be detected different from untreated wheat. The herbicide 20211 provided excellent control of grass and broadleaf weeds. On July 26, yellow foxtail was already a discriminating weed among the treatments. Propoxycarbazone and mesosulfuron gave 55% control or less of yellow foxtail, while 20211 or the fenoxaprop premix provided 90 and 93% control, respectively. All herbicides gave 93 to 95% control of wild oat on July 26. Wild oat control with 20211 or propoxycarbazone and mesosulfuron remained above 90% in August, but control with the fenoxaprop premix was only 83%. By September, yellow foxtail treated with propoxycarbazone and mesosulfuron were similar in size and number to untreated plants, but 20211 and the fenoxaprop treatments were still rated 86 and 88% control, respectively. All herbicides provided 99% control of common cocklebur.

Broadleaf weed control with Huskie and TCM 4-Way in spring wheat, Carrington, 2011.
Greg Endres. The experiment was conducted at the NDSU Carrington Research Extension Center in cooperation with Bayer CropScience. Experimental design was a randomized complete block with three replicates. 'Glenn' HRS wheat was direct seeded into flax stubble on May 17. 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. Treatments were applied on June 16 with 56 F, 100% RH (fog) and no wind to 4-leaf wheat, 1- to 8-inch wide sheperdspurse, 0.5- to 5-inch tall volunteer flax, 1- to 6-inch tall wild buckwheat, and 1- to 2-inch tall yellow woodsorrel. Puma herbicide at 10.6 fl oz/A was sequentially applied on June 16 to plots previously not receiving a grass herbicide except the untreated check. The trial was extensively damaged by hail on July 24 and was not harvested for seed yield.

Crop injury was not observed on June 24. Volunteer flax control was excellent (90 to 96%) with TCM 4-Way, WideMatch + MCPA, and Affinity TankMix + Starane when evaluated about 3 weeks after treatment (Table). Wild buckwheat control was good to excellent (86 to 92%) on July 9 with Huskie, TCM 4-Way, Wolverine, and WideMatch + MCPA. TCM 4-Way provided excellent (92 to 99%) control of all broadleaf weeds in the trial on July 9.

Table.

Herbicide		Weed control[1]						
		24-Jun				9-Jul		
Treatment[2]	Rate	Shpu	Vofl	Wibw	Yews	Shpu	Vofl	Wibw
	fl oz product/A	%						
Untreated check	x	0	0	0	0	0	0	0
Huskie + AMS	11 + 28	69	65	88	75	95	83	90
TCM 4-Way	13.7	80	70	85	69	99	92	92
Wolverine	27.4	75	65	85	78	96	73	86
WideMatch + MCPA	12 + 8	65	87	58	73	76	90	88
Affinity TankMix + Starane + NIS	0.6 oz wt + 5.3 + 0.25% v/v	72	83	78	70	90	96	78
C.V. (%)		8.4	6.7	16.6	7.8	12.0	13.7	9.6
LSD (0.05)		9	7	20	9	17	18	13

[1]Shpu=Sheperdspurse; Vofl=volunteer flax; Wibw=wild buckwheat; Yews=Yellow woodsorrel.

[2]AMS=N-Pak (Agri-Solutions); NIS=Preference (Winfield Solutions).

2011 Broadleaf Weed Control with Huskie and Huskie Complete in Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Treatments were applied on June 16 to 4 ½ leaf wheat, 1 inch kochia (kocz), 1 inch Russian thistle (ruth) and 4 inch wild buckwheat (wibw) with 54° F, 79% RH, clear sky and east wind at 5 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with four replications. Weed populations for kochia, Russian thistle and wild buckwheat were 8, 6 and 2 plants per square foot, respectively. There was also a scattered amount of dandelion (dand), tansy mustard (tamu) and prickly lettuce (plet) present. Plots were evaluated for crop injury on June 22 and July 16, and for weed control on June 22, July 16 and August 11. The trial was harvested on August 20.

			June 22					July 16				
	Treatment	Product rate	inj	kocz	wibw	ruth	dand	inj	kocz	wibw	plet	tamu
		oz/A	Percent Control									
1	Untreated		0	0	0	0	0	0	0	0	0	0
2	Huskie + AMS	11 + 0.5 lb	0	80	74	72	38	0	89	90	99	99
3	Huskie Complete	13.7	5	50	58	50	45	0	88	92	98	99
4	Wolverine	27.4	2	60	80	72	50	0	85	92	99	99
5	WideMatch + MCPA	12 + 8	2	48	48	18	52	0	97	98	99	99
6	Affinity TM+Starane+NIS	0.6+5.3+0.25%	2	60	60	15	42	0	96	94	99	99
	C.V. %		87	30	28	35	56	0	6	5	1	0
	LSD .05		3	22	22	20	32	NS	7	6	1	1

			August 11				Test	Grain
	Treatment	Product rate	kocz	wibw	ruth	plet	weight	yield
		oz/A	Percent Control				lbs/bu	bu/A
1	Untreated		0	0	0	0	55.8	19.0
2	Huskie + AMS	11 + 0.5 lb	94	89	88	88	56.3	26.6
3	Huskie Complete	13.7	92	82	98	99	56.2	26.7
4	Wolverine	27.4	86	85	97	99	56.0	25.1
5	WideMatch + MCPA	12 + 8	92	96	74	99	57.6	25.9
6	Affinity TM+Starane+NIS	0.6+5.3+0.25%	94	90	93	99	56.5	25.6
	C.V. %		5	6	14	0	1.7	5.4
	LSD .05		6	7	17	1	NS	2.0

NS = no statistical difference between treatments

Summary

Crop injury consisted of leaf chlorosis which diminished quickly. All herbicide treatments provided good season long control of kochia, tansy mustard and prickly lettuce. All herbicide treatments provided good season long control of Russian thistle except for WideMatch (trt 5). SP...20211 (trt 3) and Wolverine (trt 4) provided fair control of wild buckwheat while the other herbicide treatments provided good to excellent control. All herbicide treatments had marginal efficacy on dandelion. All herbicide treatments had statistically similar test weights and grain yields.

2011 Broadleaf Weed Control with Supremacy in Spring Wheat

Eric Eriksmoen, Hettinger, ND

'Mott' HRSW was seeded no-till on May 16. Treatments were applied on June 16 to 4 ½ leaf wheat, 1 inch kochia (kocz), 1 inch Russian thistle (ruth) and 4 inch wild buckwheat (wibw) with 54° F, 80% RH, clear sky and east wind at 6 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with four replications. Weed populations for kochia, Russian thistle and wild buckwheat were 4, 3 and 2 plants per square foot, respectively. There was also a scattered amount of prickly lettuce (plet) present. Plots were evaluated for crop injury on July 1 and July 29, and for weed control on July 29 and August 11. The trial was harvested on August 18.

			7/1	July 29					August 11				Test	Grain
	Treatment	Product rate	inj	inj	kocz	ruth	wibw	plet	kocz	ruth	wibw	plet	weight	yield
			Percent control										lbs/bu	bu/A
1	Untreated		0	0	0	0	0	0	0	0	0	0	54.9	24.1
2	Supremacy + NIS	4.0 + 0.25%	0	0	81	87	98	99	74	84	97	99	56.5	26.7
3	Supremacy + NIS	5.0 + 0.25%	0	0	94	97	93	99	93	96	98	99	56.9	26.8
4	Supremacy + NIS	6.0 + 0.25%	0	0	93	99	96	99	96	98	96	99	56.6	25.3
5	Supremacy + MCPA est	5.0 + 12	0	0	94	94	90	93	88	99	90	99	56.0	24.7
6	Supremacy + 2,4-D est	5.0 + 12	0	0	95	99	98	96	98	99	97	99	57.0	25.5
7	Supremacy + Bronate	5.0 + 16	0	0	87	99	90	65	93	99	96	88	56.5	25.8
8	ARY-0454-107 + NIS	5.0 + 0.25%	0	0	96	94	94	94	98	96	94	99	56.5	27.5
9	WideMatch + MCPA est	16 + 12	0	0	91	99	94	93	94	98	96	99	56.0	26.6
10	Starane Flex + NIS	13.5 + 0.25%	0	0	99	97	85	99	97	94	85	99	56.3	26.5
11	Huskie	11	0	0	82	88	20	99	91	99	62	99	55.8	26.0
	C.V. %		0	0	10	9	17	7	11	8	16	1	2.2	3.9
	LSD .05		NS	NS	12	12	19	9	14	11	19	1	NS	1.5

NS = no statistical difference between treatments

Summary

Crop injury was not observed. All herbicide treatments provided good season long control of kochia and Russian thistle except for the 4 oz/A rate of Supremacy (trt 2) which provided only marginal control of those weeds. All herbicide treatments provided good season long control of wild buckwheat except for Huskie (trt 11). All herbicide treatments provided excellent control of prickly lettuce.

Broadleaf weed control with fluroxypyr + SU premix, Supremacy. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on May 20. Treatments were applied to three-leaf wheat; six-leaf, flowering wild mustard; and four- to six-leaf wild buckwheat, annual smartweed, and Venice mallow on June 20 with 67°F, 78% relative humidity, 95% cloud cover, dry soil at 68°F, and 7 mph wind at 135°. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	Jul-18 Wht	Jul-18 Wimu	Jul-18 Wibw	Jul-18 Answ	Jul-18 Vema
	oz/A	%	%	%	%	%
Untreated	0	0	0	0	0	0
Flox&thif&trib+NIS	1.24+0.25%	0	99	78	87	87
Flox&thif&trib+NIS	1.56+0.25%	0	99	82	83	88
Flox&thif&trib+NIS	1.86+0.25%	0	99	88	91	93
Flox&thif&trib+MCPA-Ester	1.56+6	0	99	91	95	94
Flox&thif&trib+2,4-D Ester	1.56+6	0	99	93	94	94
Flox&thif&trib+clpy+NIS	1.56+1.12+0.25%	0	99	94	97	96
Flox&thif&trib+carf+NIS	1.56+0.128+0.25%	0	99	85	94	94
ARY-0454-107+NIS	1.98+0.25%	0	99	93	96	96
Clpy&flox+MCPA-Ester	3+6	0	99	93	87	93
Flas&flox+NIS	1.5+0.25%	0	99	92	92	93
Brox&pyst	3.86	0	99	94	96	96
CV		0	0	5	3	3
LSD 5%		0	0	7	5	4

Wheat did not express injury with any of the herbicides. Wild mustard, even in this advanced development stage, was easily controlled by all herbicide treatments. Wild buckwheat was more difficult to control. The low labeled field rate of fluroxypyr and SU, 1.24 oz ai/A gave only 78% control, and control increased to 88% with the high labeled field rate of 1.86 oz/A. Addition of MCPA, 2,4-D, or clopyralid improved control with fluroxypyr and SU to as much as 94%. These same trends occurred for annual smartweed and Venice mallow. In general, tank-mixing an additional herbicide with the fluroxypyr premix was more effective than increasing the rate of the premix. The standard field rate of florasulam and fluroxypyr or the high field rate of bromoxynil and pyrasulfotole provided 92 to 99% control of broadleaf weeds present.

Supremacy use in spring wheat. Lukach and Howatt. 'Glenn' hard red spring wheat was seeded in Langdon, ND on May 20. Treatments were applied to 6.5 leaf wheat, budding false chamomile, flowering wild mustard and volunteer canola, 9 leaf common lambsquarters, 5 leaf smartweed, 8 leaf redroot pigweed, 4 leaf common mallow and 7 leaf wild buckwheat on June 29 with 81°F, 62% relative humidity, south east wind at 7 mph, and dry foliage. Treatments were applied with a tractor-mounted sprayer with hood delivering 10 gpa at 40 psi through 8001.5 DG nozzles to a plot the length of 6.7 by 25 feet. The experiment was a randomized complete block design with three replicates and harvested on September 12.

Treatment	Rate	Yield	Test weight	Height
	oz/a	bu/A	lb/bu	cm
Untreated	0	33	57	97
Fluroxypyr&thif&trib+NIS	1.24+0.25%	42	57	93
Fluroxypyr&thif&trib+NIS	1.56+0.25%	38	58	94
Fluroxypyr&thif&trib+NIS	1.86+0.25%	43	58	92
Fluroxypyr&thif&trib+MCPA-Ester	1.56+6	36	59	90
Fluroxypyr&thif&trib+2,4-D Ester	1.56+6	37	58	93
Fluroxypyr&thif&trib+clpy+NIS	1.56+1.12+0.25%	44	59	92
Fluroxypyr&thif&trib+carf+NIS	1.56+0.128+0.25%	38	57	92
ARY-0454-107+NIS	1.98+0.25%	36	58	90
Clpy&fluroxypyr+MCPA-Ester	3+6	30	58	89
Florasulam&fluroxypyr+NIS	1.5+0.25%	37	49	90
Bromoxynil&pyrasulfotol	3.86	34	49	92
CV		18	12	3
LSD 5%		11	11	5

2011 BASF Clearfield Spring Wheat Trial

Eric Eriksmoen, Hettinger, ND

'ND901CL' HRSW was seeded no-till on May 9. Treatments were applied on June 8 to 4 leaf wheat and to 2 leaf volunteer RR canola (vcan), 1 inch kochia (kocz), 1 inch Russian thistle (ruth), 1 inch common mallow (cmal), 4 inch wild buckwheat (wibw) and tillering Japanese brome (jabr) with 45° F, 91% RH, cloudy sky and north wind at 10 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 soil is classified as a silt-loam with a pH of 6.2 and OM of 3.2%. The trial was a randomized complete block design with three replications. 8 oz/A Headline fungicide was applied on June 18 to control foliar diseases. Weed populations for volunteer canola, kochia, Russian thistle, common mallow, wild buckwheat and Japanese brome were 4, 6, 3, 2, 4 and 0.75 plants per square foot, respectively. Plots were evaluated for crop injury on June 14 and for weed control on June 22 and July 18. The trial was harvested on August 20.

			6/14	June 22						July 18					Test	Grain
	Treatment	Product rate	inj	vcan	wibw	kocz	ruth	dand	cmal	wibw	plet	kocz	vcan	jabr	weight	yield
		oz/A	Percent control												lbs/bu	bu/A
1	Untreated		0	0	0	0	0	0	0	0	0	0	0	0	55.6	19.7
2	Beyond + MSO	4 + 20	0	90	47	25	98	53	90	0	0	10	99	99	55.8	26.5
3	Beyond + MSO	6 + 20	1	93	50	30	95	37	90	0	17	17	99	--	54.6	24.0
4	Beyond+Bronate+NIS	4+16+0.25%	1	93	95	40	88	47	88	93	50	99	99	99	55.5	28.3
5	Beyond+Bronate+NIS	6+16+0.25%	0	88	85	63	95	60	90	90	50	99	99	99	55.0	27.0
6	Beyond+WideMatch+NIS	4+12+0.25%	1	92	47	80	93	67	85	93	99	93	99	99	55.6	27.4
7	Wolverine	27.2	5	95	93	60	99	63	70	83	--	99	90	0	56.3	25.3
8	Everest 2.0+WideMatch+ MCPA ester + Basic Bl.	0.75 + 12 + 8 + 1%	0	90	60	90	95	52	12	93	--	99	96	99	54.5	25.8
9	Axial XL + WideMatch + MCPA ester	16.5 + 12 + 8	4	90	67	90	67	80	27	93	--	99	99	0	55.9	24.1
	C.V. %		67	3	15	40	8	43	15	12	106	16	4	0	3.1	6.2
	LSD .05		1	4	16	37	11	38	16	12	NS	19	6	1	NS	2.7

NS = no statistical difference between treatments

Summary

Crop injury was relatively minor and diminished quickly. All herbicide treatments provided excellent season long control of volunteer canola. Beyond alone treatments (trts 2 & 3) were relatively ineffective at controlling wild buckwheat and kochia, however, the addition of Bronate or WideMatch to these treatments provided excellent season long control of these weeds. All herbicide treatments with the exception of Axial XL (trt 9) provided good control of Russian thistle. All herbicide treatments provided marginal control of dandelion (dand). Beyond treatments (trts 2 – 6) were the only treatments to provide good to excellent control of common mallow. Beyond + WideMatch (trt 6) provided excellent control of prickly lettuce (plet) although observations were not conclusive for all treatments. As would be expected, Wolverine (trt 7) and Axial XL (trt 9) had no efficacy on Japanese brome.

Canada thistle and grass control in wheat (Jenks, Willoughby, and Hoefing) The objective of the stud was to evaluate Canada thistle control in spring wheat with WideMatch compared to a new formulation, PerfectMatch. PerfectMatch is not labeled for use as of 2011. None of the treatments caused significant crop injury. All treatments provided good Canada thistle control with the exception of Everest 2.0 + 2,4-D amine. A side note observation was the difference in grass control provided by the different treatments. GoldSky provided excellent control of barnyardgrass, fair control of green foxtail, and excellent control of yellow foxtail. Axial XL provided fair control of barnyardgrass, poor control of green foxtail, and excellent control of yellow foxtail. Everest 2.0 provided poor control of barnyardgrass, excellent control of green foxtail, and fair control of yellow foxtail.

Table. Canada Thistle and grass control in wheat. (1151)

		HRSW			Weed Control[c]					
		Growth Reduction			Canada Thistle			Bygr	Grft	Yeft
Treatment[a]	Rate	15-Jul	19-Jul	5-Aug	19-Jul	5-Aug	24-Aug	5-Aug	5-Aug	5-Aug
		----------%----------			----------% control----------					
Untreated		0	0	0	0	0	0	0	0	0
GoldSky + WideMatch + NIS + AMS	16 fl oz + 16 fl oz + 0.5% + 4.4%	0	6	5	77	83	81	99	79	95
PerfectMatch[b] + NIS + AMS	16 fl oz + 0.5% + 4.44%	0	0	1	75	85	84	99	78	94
PerfectMatch[b] + MCPe + AMS	16 fl oz + 8.63 fl oz + 4.44%	0	0	3	79	86	85	99	74	94
PerfectMatch[b] + NIS + 28% N	16 fl oz + 0.5% + 64 fl oz	0	0	0	76	88	87	99	85	93
Widematch + Pyroxsulam + NIS + AMS	16 fl oz + 6.84 fl oz + 0.5% + 4.44%	0	0	1	78	91	90	99	77	93
Axial XL + WideMatch	16.4 fl oz + 16 fl oz	0	0	0	76	90	91	75	48	96
Everest 2.0 + 2,4-D Amine	0.75 fl oz + 14.9 fl oz	0	0	0	52	42	41	37	94	67
LSD (0.05)		NS	NS	2	8	7	7	4	19	4
CV		0	0	83	7	5	6	3	16	3

[a] All treatments applied to 5- to 5.5-leaf wheat

[b] PerfectMatch is not registered for use in 2011

[c] Bygr=Barnyardgrass; Grft=Green foxtail; Yeft=Yellow foxtail

Wild buckwheat control with auxinic herbicides. Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded near Fargo on May 20. Treatments were applied to two- to three-leaf wheat, two- to four-leaf wild mustard, three-leaf wild buckwheat, and one-leaf Venice mallow on June 14 with 83°F, 45% relative humidity, 80% cloud cover, 12.5 mph wind at 180°, and dry soil at 69°F. Treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-foot wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with three replicates.

		July 18		
Treatment	Rate	wimu	wibw	vema
	oz/A	%	%	%
E-99	8	27	27	23
LV-6	7.5	99	68	77
Amine 4	7.6	99	85	87
AGH09008	7	99	82	85
AGH09008+NIS+AG02013	7+0.25%+0.03G	99	75	75
AGH09035	5.8	99	87	87
AGH09035+AG02013	5.8+0.03G	99	93	92
AGH09035	7.7	99	92	87
AGH09035+AG02013	7.7+0.03G	99	92	89
AGH09035	8.7	99	95	93
Clpy&flox	3	98	90	85
Brox&MCPA5	8	99	95	89
Brox&pyst	2.9	99	94	92
CV		3	7	6
LSD 5%		5	10	9

E-99 herbicide gave less than 30% control for the weed species present. All other herbicide treatments provided 99% control of wild mustard. Amine 4 more effectively controlled wild buckwheat and Venice mallow than LV-6 ester. The droplet retention adjuvant AG02013 did not improve weed control in this study. Control tended to increase with increasing rates of the auxinic premix AGH09035. The low labeled rate of bromoxynil and pyrasulfotole provided at least 92% control of broadleaf weeds present, as did the high rate of AGH09035 and the low rate of AGH09035 plus the droplet retention adjuvant.

Can wheat nitrogen management be incorporated into the herbicide application? Howatt, Roach, and Harrington. 'Faller' hard red spring wheat was seeded at Crookston, MN, on May 16. Treatments 1 through 5 were applied to two-leaf wheat and one-leaf wild oat and smartweed on June 3 with 81°F, 44% relative humidity, clear sky, 10 mph wind at 315°, and dry soil at 70°F. Treatments 5 through 20 were applied to three-leaf wheat, two-leaf wild oat, and two- to four-leaf smartweed on June 10 with 61°F, 48% relative humidity, 80% cloud cover, 8 mph win at 90°, and damp soil at 62°F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7-ft wide area the length of 10 by 30 ft plots. The experiment was a randomized complete block design with four replicates.

		June 29			Aug 11		Aug 18	
Treatment	Rate	Wht	Wioa	Smwd	Wioa	Smwd	Protein	Yield
	oz/A	%	%	%	%	%	%	bu/A
Prcz&mess[a]	0.2	0	98	98	97	99	13.9	51
Prcz&mess+2,4-De	0.2+5.3	7	99	97	98	99	14.1	45
Prcz&mess+2,4-Dacid	0.2+5.3	1	96	95	97	97	13.4	40
Prcz&mess+brox&pyst	0.2+2.8	0	99	97	98	99	14	49
Prcz&mess+flox&2,4-D	0.2+5	7	98	97	98	99	13.8	38
Prcz&mess	0.2	1	96	95	99	98	13.1	46
Prcz&mess+CoRon	0.2+2	0	92	91	99	95	12.9	40
Prcz&mess+2,4-De	0.2+5.3	7	94	91	99	95	13.8	43
Prcz&mess+2,4-De+CoRon	0.2+5.3+2	1	94	90	99	96	13.4	42
Prcz&mess+2,4-Dacid	0.2+5.3	13	92	94	99	98	14.1	42
Prcz&mess+2,4-Dacid+CoRon	0.2+5.3+2	10	94	91	99	95	14.1	44
Prcz&mess+brox&pyst	0.2+2.8	2	95	96	99	99	13.9	47
Prcz&mess+brox&pyst+CoRon	0.2+2.8+2G	0	96	98	99	99	13.7	48
Prcz&mess+flox&2,4-D	0.2+5	8	95	93	99	97	13.7	43
Prcz&mess+flox&2,4-D+CoRon	0.2+5+2G	3	96	93	99	97	13.6	44
Fenx+brox&MCPA	1.32+8	0	97	95	98	98	14	46
Fenx+brox&MCPA+CoRon	1.32+8+2G	0	95	96	98	99	13.8	41
Fenx+flox&2,4-D	1.32+5	0	95	90	99	95	13.8	44
Fenx+flox&2,4-D+CoRon	1.32+5+2G	0	95	95	97	98	14.2	46
Untreated	0	0	0	0	0	0	13.4	23
CV		75	2	4	1	3	4.4	10
LSD 5%		3	3	5	1	3	0.8	6

[a] All treatments with propoxycarbazone and mesosulfuron received methylated seed oil at 0.18 G/A as MSO from Loveland Products, Inc., P.O Box 1286, Greeley, CO 80632.

Wheat injury was evident shortly after application and persisted through the first evaluation. Injury manifested as shorted plants and necrotic lesions on tissue for most treatments where it occurred. This injury did not correlate with less grain yield or protein compared with treatments that did not cause visible injury.

All herbicide treatments provided exceptional weed control of at least 90% on June 29 and 95% or better on August 11. While there were differences among herbicide treatments for wheat yield, consistent trends or common components were not identified, other than treatments with bromoxynil and pyrasulfotole tended to be on the higher end of the yield range.

Spray quality effect on weed control. Chaput, Lukach and Howatt. 'Glenn' hard red spring wheat was seeded at Langdon, North Dakota on May 20. Treatments were applied to 6.5 leaf wheat, flowering wild mustard, 9 leaf common lambsquarters, and 8 leaf redroot pigweed on June 29 with 82°F, 64% relative humidity, southeast wind at 14 mph, cloudy sky and dry foliage. Treatments were applied with a tractor-mounted 3 pt sprayer with hood delivering 10 gpa at 40 psi through 8001.5 DG nozzles to plots the length of 6.7 by 25 feet. The experiment was a randomized complete block design with three replicates.

Treatment	Rate	Quality	7/21 Wimu	7/21 Colq	7/21 Rrpw	Yield	Test	Height
	oz/A		%	%	%	bu/A	lb/bu	cm
Fenx+clpy&flox	1+3	medium	85	83	83	63	57	93
Fenx+clpy&flox	1+3	coarse	77	68	67	62	58	98
Fenx+clpy&flox	1+3	v. coarse	89	83	87	60	59	96
Fenx+clpy&flox	1.32+3	medium	90	76	81	65	60	95
Fenx+clpy&flox	1.32+3	coarse	70	57	58	66	58	98
Fenx+clpy&flox	1.32+3	v. coarse	70	60	63	62	58	95
Pinoxaden+brox&MCPA5	0.65+8	medium	98	95	91	62	59	95
Pinoxaden+brox&MCPA5	0.65+8	coarse	97	90	85	54	59	98
Pinoxaden+brox&MCPA5	0.65+8	v. coarse	98	95	79	58	57	92
Pinoxaden+brox&MCPA5	0.86+8	medium	99	91	85	65	58	96
Pinoxaden+brox&MCPA5	0.86+8	coarse	89	75	63	62	57	95
Pinoxaden+brox&MCPA5	0.86+8	v. coarse	91	87	67	61	58	92
Untreated	0		0	0	0	57	55	100
CV			8	9	13	9	3	2
LSD 5%			11	12	16	9	3	3

Increased droplet size resulted in less broadleaf weed control. Although not consistent, this effect occurred with wild mustard, common lambsquarters, and redroot pigweed. The greater grass herbicide rate seemed to be correlated with more antagonism, especially for clopyralid and fluroxypyr. However, this needs more investigation before a causal relationship is discussed because of the highly variable results in this experiment. Results demonstrate the potential for greatly reduced broadleaf weed control as droplet sizes increase as has been observed in studies the previous 3 years.