

KIH-485 applied in the Fall. Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control in the spring from KIH-485 applied in the fall. Fall herbicide treatments were applied on October 9, 2008 at 2:10 pm with 57 F air, 53 F soil surface, 32% relative humidity, 40% clouds, 4 to 8 mph W wind, damp soil surface, wet subsoil, and no dew present. DeKalb 'DKC38-89' Roundup Ready corn was planted on May 28, 2009. Soil characteristics were: 28.9% sand, 48.2% silt, 22.9% clay, loam texture, 4.8% OM, and 6.8 pH. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles. The experiment had a randomized complete block design with three replicates per treatment.

Residual weed control from a fall application of KIH-485 is dependant on rate and susceptibility of weed species. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. KIH-485 applied in the Fall (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	7 MAT							8 MAT								
		Yeft	Rrpw	Colq	Koch	Blww	Wibw	Corw	Wimu	Yeft	Rrpw	Colq	Koch	Blww	Wibw	Corw	Wimu
		----- % control -----															
RUPM+AMS+	27fl oz+8.5lb/100gal+	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
KIH-485	2.8oz	57	40	62	89	67	66	67	66	76	57	40	58	89	37	33	37
KIH-485	3.5oz	72	77	80	99	60	45	67	98	98	65	70	73	99	53	45	60
KIH-485	4.5oz	80	88	92	99	72	60	85	99	99	80	82	95	99	58	60	80
KIH-485	5.04oz	92	98	99	98	78	77	95	96	92	86	86	99	98	63	70	90
Dual II Magnum	2pt	90	60	20	20	20	0	53	0	90	47	20	20	20	20	0	40
Outlook	18fl oz	80	50	20	20	20	0	47	0	80	37	20	20	20	20	0	27
Define	20fl oz	83	40	20	20	20	0	37	0	77	27	20	20	20	20	0	23
LSD (0.05)		11	14	2	10	11	10	15	15	14	14	8	10	26	15	16	15

¹RUPM = Roundup PowerMax; KIH-485 = saflufenacil from Kumiai.

KIH-485 applied EPP and PRE. Hunt, Ryan L. and Richard K. Zollinger. Two experiments were setup near Prosper, ND, to evaluate KIH-485 weed control activity (longevity). Study one, KIH-485 was applied as an EPP. EPP treatments were applied with glyphosate on May 19 with 62 F air, 48 F subsoil at 4 inches, 52% relative humidity, wet soil, and 5 – 10 mph wind. PRE treatments were applied on May 28 with 76 F air, 54 F subsoil at 4 inches, 39% relative humidity, dry soil surface, moist subsoil, and 5-13 mph wind. All applications were made with a backpack-type sprayer delivering 17 gpa, at 40 psi through 11002 TurboTeeJet nozzles. The experiment had a randomized complete block design with four replicates per treatment.
(Dept. of Plant Sciences, North Dakota State University, Fargo).

KIH-485 applied EPP (Hunt and Zollinger)

Treatment	Rate (product/acre)	June 30			
		Yeft	wibw	rrpw	colq
RUPM	22 fl oz	0	0	0	0
RUPM+KIH-485	22 fl oz+2.1oz	60	58	65	64
RUPM+KIH-485	22 fl oz+2.8oz	78	70	78	71
RUPM+KIH-485	22 fl oz+3.5oz	83	84	86	79
RUPM+KIH-485	22 fl oz+5.6oz	89	81	88	81
RUPM+Dual II Magnum	22 fl oz+1.33pt	48	26	15	14
RUPM+Harness	22 fl oz+2.25pt	86	92	90	88
LSD (0.05)		12	16	13	13

KIH-485 applied PRE (Hunt and Zollinger)

Treatment	Rate (product/acre)	June 30				July 10			
		yeft	wibw	rrpw	colq	yeft	wibw	rrpw	colq
RUPM	22 fl oz	0	0	0	0	0	0	0	0
RUPM+KIH-485	22 fl oz+2.1oz	38	63	59	20	21	37	36	9
RUPM+KIH-485	22 fl oz+2.8oz	63	64	69	45	43	32	46	20
RUPM+KIH-485	22 fl oz+3.5oz	84	65	84	58	64	45	65	37
RUPM+KIH-485	22 fl oz+5.6oz	89	86	93	78	73	59	71	54
RUPM+Dual II Magnum	22 fl oz+1.33pt	51	15	23	13	31	8	9	5
RUPM+Harness	22 fl oz+2.25pt	96	86	97	89	80	68	78	70
LSD (0.05)		13	19	12	13	11	16	12	10

Marshelder control with Valor applied in the Fall and Spring. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Valley City, ND, to evaluate weed control in the spring from Valor and other tank-mixes applied in the fall and spring. FALL herbicide treatments were applied on October 29, 2008 at 10:25 am with 48 F air, 35 F soil at a four inch depth, 50% relative humidity, 10% clouds, 5 mph W wind, dry soil surface, moist subsoil, and no dew present. Pioneer '63N82' ExpressSun Sunflower was planted on May 6, 2009, followed by the application of SPRING (PRE) treatments at 10:50 am with 65 F air, 46 F soil at a four inch depth, 35% relative humidity, 20% clouds, 8 mph S wind, wet soil surface, wet subsoil, and no dew present. Soil characteristics were: 41.2% sand, 41.6% silt, 17.2% clay, loam texture, 6.0% OM, and 7.9 pH. The weed species present at the time of the spring application was cotyledon (1 to 5/yd²) marshelder. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles. The experiment had a randomized complete block design with three replicates per treatment.

Fall application of any of the three herbicides did not control marshelder in the spring. A spring application of Spartan applied after the fall application increased marshelder control but was not adequate at the final evaluation. No sunflower injury was observed. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Marshelder control with Valor applied in the Fall and Spring (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	May 8, 2009	June 22, 2009
		Mael - % control -	Mael - % control -
FALL			
Valor+RUPM+AMS	2oz+22fl oz+8.5lb/100gal	50	37
Valor+RUPM+AMS	4oz+22fl oz+8.5lb/100gal	48	47
Valor+RUPM+AMS	6oz+22fl oz+8.5lb/100gal	70	60
KIH-485+RUPM+AMS	2.8oz+22fl oz+8.5lb/100gal	31	13
KIH-485+RUPM+AMS	4.2oz+22fl oz+8.5lb/100gal	57	33
Valor+KIH-485	2oz+2.8oz	50	17
Spartan	4fl oz	20	7
FALL/SPRING (PRE)			
Valor+RUPM+AMS/Spartan	2oz+22fl oz+8.5lb/100gal/3fl oz	99	73
Valor+RUPM+AMS/Spartan	4oz+22fl oz+8.5lb/100gal/3fl oz	99	83
Valor+RUPM+AMS/Spartan	6oz+22fl oz+8.5lb/100gal/3fl oz	99	85
LSD (0.05)		9	8

¹RUPM = Roundup PowerMax; KIH-485 = Saflufenacil from Kumiai.

Valor Early Preplant (EPP) in corn. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from various tank-mixes and application timings in corn. EPP treatments were applied May 18, 2009 at 10:05 am with 55 F air, 51 F soil at a four inch depth, 36% relative humidity, 10% cloud cover, 3 to 5 mph NW wind, moist soil surface, and wet subsoil. DeKalb 'DKC38-89' Roundup Ready corn was planted on May 28 followed by the application of PRE treatments at 3:05 pm with 75 F air, 54 F soil at a four inch depth, 38% relative humidity, 5% cloud cover, 8 to 12 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 28.7% sand, 49.7% silt, 21.6% clay, loam texture, 4.2% OM, and 7.2 pH. POST treatments were applied on June 26 at 9:00 am with 77 F air, 74 F soil surface, 40% relative humidity, 10% clouds, 8 to 10 mph S wind, dry soil surface, moist subsoil, good crop vigor and no dew present to V4 to V5 (8 to 12 inch) corn. Weed species present at the time of POST applications were: 1 to 4 inch (1 to 20/yd²) common lambsquarters; 1 to 4 inch (1 to 5/yd²) common ragweed; 1 to 3 inch (1 to 3/yd²) hairy nightshade; 1 to 3 inch (1/yd²) wild mustard; 1 to 5 inch (5 to 100/ft²) yellow foxtail; 1 inch (1/yd²) common cocklebur; 1 to 2 inch (1 to 2/yd²) wild buckwheat; and 1 to 4 inch (1 to 5/yd²) redroot pigweed. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for EPP and PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

No corn injury was observed. On June 26, all treatments, except Roundup Original Max EPP (0%), gave 99% control of redroot pigweed, common lambsquarters, wild mustard, and hairy nightshade. On July 10, 24 and August 7, all treatments gave 99% control of wild mustard and common cocklebur (data not shown). (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Valor Early Preplant (EPP) in corn (Zollinger, Ries, Kazmierczak).

Treatment	Rate (product/A)	June 26				July 10				July 24 and August 7							
		Yeft	Wibw	Corw	Cocb	Yeft	Rrpw	Colq	Wibw	Hans	Corw	Yeft	Rrpw	Colq	Wibw	Hans	Corw
		-----% control-----				-----% control-----				-----% control-----							
<u>EPP/POST</u>																	
RUOM+AMS/	22fl oz+2.5lb/	0	0	0	0	97	93	82	99	70	65	82	75	82	99	70	65
RUOM+AMS	22fl oz+2.5lb																
RUOM+Valor SX+Atrazine+	22fl oz+2oz+0.56lb+	38	99	73	57	99	99	99	99	99	99	73	88	99	99	99	99
AMS/RUOM+AMS	2.5lb/22fl oz+2.5lb																
RUOM+Valor SX+AMS/	22fl oz+2oz+2.5lb/	27	53	42	23	80	99	99	99	53	43	87	99	99	53	99	99
RUOM+Valor SX+AMS	22fl oz+2oz+2.5lb																
RUOM+Valor SX+Sencor+AMS/	22fl oz+2oz+4oz+2.5lb/	47	99	72	20	96	99	99	99	99	99	73	99	99	99	99	99
RUOM+AMS	22fl oz+2.5lb																
<u>PRE/POST</u>																	
RUOM+Bicep II Magnum+AMS/	22fl oz+1qt+2.5lb/	45	99	45	30	62	99	99	99	99	99	92	99	99	99	99	99
RUOM+AMS	22fl oz+2.5lb																
RUOM+Lumax+AMS/	22fl oz+3qt+2.5lb/	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
RUOM+AMS	22fl oz+2.5lb																
RUOM+Balance Flexx+AMS/	22fl oz+3fl oz+2.5lb/	43	99	47	0	95	99	99	99	99	99	88	99	99	99	99	99
RUOM+AMS	22fl oz+2.5lb																
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)		4	2	5	4	8	2	2	2	3	4	5	4	2	2	4	3

¹RUOM = Roundup OriginalMax.

Balance Flexx and Laudis in corn. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from Balance Flexx and Laudis tank-mixes in corn. Pioneer '39B23' Liberty Link/Roundup Ready corn was planted on May 28, 2009 followed by the application of PRE treatments at 2:30 pm with 77 F air, 54 F soil at a four inch depth, 39% relative humidity, 5% cloud cover, 8 to 12 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 27.7% sand, 50.7% silt, 21.6% clay, silt loam texture, 4.3% OM, and 6.3 pH. EPOST treatments were applied on June 24 at 9:50 am with 77 F air, 76 F soil surface, 44% relative humidity, 25% clouds, 1 to 3 mph W wind, dry soil surface, moist subsoil, good crop vigor and no dew present to V4 to V5 (8 to 10 inch) corn. Weed species present at the time of EPOST only applications were: 1 to 5 inch (5 to 10/yd²) common lambsquarters; 1 to 2 inch (<1/yd²) common ragweed; 1 to 2 inch (<1/yd²) hairy nightshade; 1 to 3 inch (1 to 5/yd²) wild mustard; 0.5 to 4 inch (50 to 100/ft²) yellow foxtail; 1 to 3 inch (1 to 2/yd²) common cocklebur; 0.5 to 3 inch (1 to 5/yd²) annaual smartweed; and 1 to 3 inch (1 to 10/ft²) redroot pigweed. MPOST treatments were applied on June 26 at 8:22 am with 74 F air, 74 F soil surface, 59% relative humidity, 10% clouds, 7 to 9 mph S wind, dry soil surface, moist subsoil, good crop vigor and no dew present to V4 to V5 (8 to 14 inch) corn. Weed species in plots with PRE/MPOST treatments were: 0.5 to 4 inch (1 to 3/yd²) common lambsquarters; 1 to 3 inch (<1/yd²) hairy nightshade; 2 to 5 inch (1 to 5/yd²) redroot pigweed; 0.5 to 4 inch (1 to 10/ft²) yellow foxtail; and 1 to 2 inch (<1/yd²) common cocklebur. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

All treatments gave 99% control of common lambsquarters, wild mustard, annual smartweed, common ragweed at 28 and 56 DAT (data not shown). No corn injury was observed for any timing or application treatment. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table: Balance Flexx and Laudis in corn (Zollinger, Ries, and Kazmierczak).

Treatment	Rate (product/A)	28 DAT PRE								28 and 50 DAT POST			
		Yeft	Rrpw	Colq	Wimu	Smwe	Hans	Corw	Cocb	Yeft	Rrpw	Hans	Cocb
		----- % control -----								---- % control ----			
PRE/MPOST													
Balance Flexx/Laudis+	3fl oz/3fl oz+												
Atrazine+Scoil	0.42lb+1.25pt	78	50	75	99	99	50	75	65	99	99	99	99
Lumax/Lumax+R-11	1.5qt/1.5qt+0.25%v/v	99	99	99	99	99	99	99	99	99	99	99	99
Balance Flexx/Ignite+	3fl oz/22fl oz+												
Laudis+Atrazine+	2fl oz+0.42lb+												
AMS	17lb/100gal	78	52	72	99	99	53	67	32	96	99	99	74
EPOST													
Laudis+Atrazine+	3fl oz+0.42lb+												
Scoil+28% N	1.25pt+1.5qt									96	82	88	88
Ignite+Laudis+	22fl oz+3fl oz+												
Atrazine+AMS	0.42lb+17lb/100gal									73	99	99	72
Untreated		0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)		3	3	3	NS	NS	6	6	4	2	2	2	4

Corvus and Laudis in corn. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from Corvus and Laudis tank-mixes in corn. Pioneer '39B23' Liberty Link/Roundup Ready corn was planted on May 28, 2009 followed by the application of PRE treatments at 2:55 pm with 77 F air, 55 F soil at a four inch depth, 40% relative humidity, 5% cloud cover, 8 to 12 mph N wind, dry soil surface and wet subsoil. Soil characteristics were: 27.7% sand, 50.7% silt, 21.6% clay, silt loam texture, 4.3% OM, and 6.3 pH. EPOST treatments were applied on June 26 at 8:45 am with 76 F air, 74 F soil surface, 40% relative humidity, 10% clouds, 8 to 10 mph S wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V4 to V5 (8 to 12 inch) corn. Weed species present at the time of EPOST only applications were: 1 to 4 inch (1 to 5/yd²) common lambsquarters; 1 to 2 inch (1 to 2/yd²) common ragweed; 0.5 to 3 inch (1 to 5/yd²) hairy nightshade; 2 to 4 inch (1 to 3/yd²) wild mustard; 1 to 5 inch (20 to 50/ft²) yellow foxtail; 1 to 2 inch (<1/yd²) common cocklebur; and 1 to 4 inch (1 to 5/yd²) redroot pigweed. Weed species present at PRE/EPOST treatments were: 0.5 to 3 inch (1 to 3/yd²) common lambsquarters; and 1 to 4 inch (10 to 30/yd²) yellow foxtail. MPOST treatments were applied on June 30 at 9:30 am with 64 F air, 62 F soil surface, 70% relative humidity, 0% clouds, 8 to 12 mph NW wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V4 to V5 (8 to 14 inch) corn. Weed species present at the time of PRE/MPOST applications were: 2 to 5 inch (1 to 5/yd²) common lambsquarters; 1 to 3 inch (<1/yd²) common ragweed; 1 to 4 inch (1 to 10/yd²) yellow foxtail; 2 to 3 inch (<1/yd²) common cocklebur; and 1 to 2 inch (1 to 2/yd²) redroot pigweed. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

All PRE applications on 28 DAT gave 99% control of yellow foxtail, redroot pigweed, common lambsquarters, wild mustard, annual smartweed, hairy nightshade, common ragweed, and common cocklebur (data not shown). All treatments gave 99% control of redroot pigweed, annual smartweed, and hairy nightshade on July 7 (data not shown). All treatments gave 99% control of redroot pigweed, annual smartweed, hairy nightshade, common lambsquarters, wild mustard, common ragweed, and common cocklebur on July 28 (data not shown). All treatments gave 99% control of annual smartweed, hairy nightshade, common lambsquarters, common ragweed, and common cocklebur on August 14 (data not shown). (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Corvus and Laudis in corn (Zolliner, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	July 7					July 28		August 14		
		Yeft	Colq	Wimu	Corw	Cocb	Yeft	Wimu	Yeft	Rrpw	Wimu
		----- % control -----					-- % control --		---- % control ----		
PRE											
Corvus+Atrazine	2.5oz+0.5lb	90	99	99	99	99	90	99	90	99	99
PRE/EPOST											
Harness/Impact+Atrazine+Scoil+AMS	2.25pt/0.75fl oz+0.42lb+ 1.25pt+8.5lb/100gal	99	99	67	47	22	99	67	99	99	67
PRE/MPOST											
Corvus+Atrazine/Laudis+Atrazine+Scoil+28% N	2.5oz+0.56lb/3fl oz+ 0.42lb+1.25pt+1.5qt	99	99	99	99	99	99	99	99	99	99
Lumax/Lumax+R-11	1.5qt/1.5qt+0.25% v/v	91	99	99	70	60	94	99	94	99	99
Harness/Laudis+Atrazine+Scoil+28% N	2.25pt/3fl oz+0.42lb+ 1.25pt+1.5qt	99	72	99	99	99	99	99	99	99	99
EPOST											
Laudis+Atrazine+RUPM+AMS	3fl oz+0.42lb+11fl oz+ 8.5lb/100gal	99	99	99	99	99	77	99	77	99	99
Laudis+Atrazine+RUPM+AMS	3fl oz+0.42lb+22fl oz+ 8.5lb/100gal	99	99	99	99	99	88	99	88	99	99
Laudis+Atrazine+RUPM+Destiny HC+AMS	3fl oz+0.42lb +11fl oz+ 12fl oz+8.5lb/100gal	99	99	99	99	99	97	99	97	99	99
Impact+RUPM+Atrazine+Scoil+AMS	0.5fl oz+11fl oz+0.42lb+ 1.25pt+8.5lb/100gal	99	99	99	99	99	94	99	94	95	99
Untreated		0	0	0	0	0	0	0	0	0	0
LSD (0.05)		1	2	3	3	2	2	3	2	2	3

¹RUPM = Roundup PowerMax.

Fluroxypyr in corn. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from Fluroxypyr in corn. DeKalb 'DKC38-89' Roundup Ready corn was planted on May 28, 2009. Soil characteristics were: 27.7% sand, 50.7% silt, 21.6% clay, silt loam texture, 4.3% OM, and 6.3 pH. POST treatments were applied on June 24 at 9:03 am with 78 F air, 76 F soil surface, 44% relative humidity, 25% clouds, 1 to 3 mph W wind, dry soil surface, moist subsoil, good crop vigor and no dew present to V4 to V5 (8 to 10 inch) corn. Weed species present at the time of POST applications were: 1 to 5 inch (1 to 3/yd²) common lambsquarters; 2 to 3 inch (1 to 5/yd²) common ragweed; 1 to 3 inch (<1/yd²) hairy nightshade; 1 to 3 (1 to 2/yd²) wild mustard; 0.5 to 5 inch (50 to 100/ft²) yellow foxtail; 1 to 4 inch (<1/yd²) common cocklebur; and 0.5 to 4 inch (10 to 30/ft²) redroot pigweed. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles. The experiment had a randomized complete block design with three replicates per treatment.

No corn injury was observed. On 14 and 28 ratings, all treatment gave 99% control of wild mustard and common ragweed, although WideMatch alone at 1 pt/A gave 50% control of wild mustard (data not shown). (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Fluroxypyr in corn (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	14 DAT				28 DAT			
		Yeft	Rrrpw	Colq	Cocb	Yeft	Rrrpw	Colq	Cocb
		----- % control -----				----- % control -----			
Helm Fluroxypyr	8fl oz	0	50	10	99	0	50	27	99
Helm Fluroxypyr	11fl oz	0	60	27	99	0	92	90	99
Starane Ultra	5.9fl oz	0	30	10	99	0	30	30	99
Helm BW Glyphosate+AMS	20fl oz+8.5lb/100gal	95	96	95	90	95	96	95	90
Helosate Plus+AMS	1qt+8.5lb/100gal	95	98	96	86	95	98	96	91
Helm 70 (51-A)+AMS	20fl oz+8.5lb/100gal	90	98	98	96	85	98	98	96
Helm 70 (391-HA)+AMS	20fl oz+8.5lb/100gal	90	95	95	76	80	95	95	92
Roundup PowerMax+AMS	22fl oz+8.5lb/100gal	94	93	98	93	78	87	98	87
Helosate Plus +Helm Fluroxypyr+AMS	1qt+8fl oz+8.5lb/100gal	95	99	99	99	89	99	99	99
Helosate Plus +Helm Fluroxypyr+AMS	1qt+11fl oz+8.5lb/100gal	97	99	99	89	88	99	99	99
WideMatch	1pt	0	30	50	99	0	30	50	99
Impact+Atrazine+Scoil	0.75fl oz+0.42lb+1.25pt	95	99	99	90	95	99	99	95
Laudis+Atrazine+Scoil	3fl oz+0.42lb+1.25pt	96	98	99	88	96	98	99	95
Callisto+Atrazine+Scoil	3fl oz+0.42lb+1.25pt	73	99	99	99	77	99	99	99
Steadfast+Atrazine+Dicamba+Scoil	0.75oz+0.42lb+4fl oz+1.25pt	72	99	99	89	70	99	99	99
Untreated		0	0	0	0	0	0	0	0
LSD (0.05)		4	7	8	9	2	7	3	5

¹Helosate and Helm products are proprietary herbicides from Helm Agro.

Kixor system in corn. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from Kixor tank-mixes in corn. DeKalb 'DKC38-89' Roundup Ready corn was planted on May 28, 2009 followed by the application of PRE treatments at 2:30 pm with 77 F air, 54 F soil at a four inch depth, 39% relative humidity, 5% cloud cover, 8 to 12 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 27.7% sand, 50.7% silt, 21.6% clay, silt loam texture, 4.3% OM, and 6.3 pH. POST treatments were applied on June 26 at 8:30 am with 74 F air, 74 F soil surface, 59% relative humidity, 10% clouds, 7 to 9 mph S wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V5 to V6 (9 to 11 inch) corn. Weed species present at the time of POST applications were: 0.5 to 3 inch (1 to 10/ft²) common lambsquarters; cotyledon to 3 inch (1 to 10/yd²) common ragweed; 1 to 4 inch (5 to 15/yd²) hairy nightshade; cotyledon to bloom (1 to 5/yd²) wild mustard; 0.5 to 3 inch (1 to 10/ft²) yellow foxtail; 1 to 2 inch (1 to 5/yd²) common cocklebur; 0.5 to 3 inch (1 to 5/yd²) annual smartweed, and cotyledon to 5 inch (20 to 50/ft²) redroot pigweed. Weed species in plots with PRE treatments were: 1 to 5 inch (1 to 10/yd²) common lambsquarters; cotyledon to 5 inch (1 to 20/yd²) common ragweed; cotyledon to 3 inch (1 to 5/yd²) hairy nightshade; emergence to 6 inch (1 to 5/yd²) redroot pigweed; 0.5 to 4 inch (1 to 10/yd²) yellow foxtail; and 1 to 3 inch (<1/yd²) common cocklebur. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

All PRE treatments gave 99% control of redroot pigweed, wild mustard, annual smartweed, hairy nightshade and common ragweed (data not shown). All 14 and 28 DAT ratings gave 99% control of redroot pigweed, wild mustard, annual smartweed, and hairy nightshade (data not shown). No corn injury was observed. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Kixor system in corn (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	28 DAT PRE			14 DAT POST			28 DAT POST			
		Yeft	Colq	Cocb	Yeft	Colq	Corw	Cocb	Colq	Corw	Cocb
		----- % control -----			----- % control -----			----- % control -----			
PRE											
Lumax	6pt	88	99	99	94	99	99	99	99	99	99
Harness Xtra	6pt	99	99	99	99	99	99	73	99	99	85
Integrity	25fl oz	72	72	99	72	72	99	99	72	99	99
Corvus+Attrazine	5.6fl oz+0.83lb	77	99	40	77	78	99	40	77	99	40
Sharpen+Prowl H ₂ O	4fl oz+2qt	70	99	99	85	90	83	99	95	83	99
PRE/POST											
Integrity/RUPM+R-11+AMS	17fl oz/22fl oz+0.25% v/v+17lb/100gal	70	99	77	96	99	99	99	96	99	99
Sharpen+Prowl H ₂ O/RUPM+R-11+AMS	3fl oz+2qt/22fl oz+0.25% v/v+17lb/100gal	70	99	99	96	99	99	99	96	99	99
Harness Xtra/RUPM+R-11+AMS	3pt/22fl oz+0.25% v/v+17lb/100gal	99	99	99	99	99	99	99	95	99	99
Sharpen+Harness Xtra/RUPM+R-11+AMS	3fl oz+3pt/22 fl oz+0.25% v/v+17lb/100gal	99	99	99	99	99	99	99	99	99	99
SureStart/RUPM+R-11+AMS	1qt/22fl oz+0.25% v/v+17lb/100gal	72	57	99	95	99	99	99	82	99	99
Integrity/ RUPW+Status+R-11+AMS	17fl oz/22fl oz+2.5oz+0.25% v/v+17lb/100gal	72	67	99	96	99	99	99	96	99	99
LSD (0.05)		3	4	2	3	3	2	3	3	2	3

¹RUPM = Roundup PowerMax.

Nicosulfuron in corn. Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from various nicosulfuron tank-mixes in corn. DeKalb 'DKC38-89' Roundup Ready corn was planted on May 28, 2009 followed by the application of PRE treatments at 2:50 pm with 76 F air, 54 F soil at a four inch depth, 40% relative humidity, 10% cloud cover, 8 to 12 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 27.7% sand, 50.7% silt, 21.6% clay, silt loam texture, 4.3% OM, and 6.3 pH. POST treatments were applied on June 24 at 8:45 am with 78 F air, 76 F soil surface, 44% relative humidity, 25% clouds, 1 to 3 mph W wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V5 to V6 (8 to 10 inch) corn. Weed species present at the time of POST applications were: 1 to 5 inch (1 to 3/yd²) common lambsquarters; 2 to 3 inch (<1/yd²) common ragweed; 1 to 3 inch (<1/yd²) hairy nightshade; 1 to 3 inch (1 to 2/yd²) wild mustard; 0.5 to 4 inch (50 to 100/ft²) yellow foxtail; 1 to 4 inch (<1/yd²) common cocklebur; 1 to 2 inch (1 to 2/yd²) biennial wormwood; and cotyledon to 5 inch (20 to 50/ft²) redroot pigweed. Weed species in plots with PRE treatments were: 1 to 3 inch (<1/yd²) common lambsquarters; and 0.5 to 1 inch (5 to 20/ft²) yellow foxtail. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

No corn injury observed. All treatments gave 99% control of wild mustard, hairy nightshade, and biennial wormwood on 14 and 28 DAT. All treatments also gave 99% control of common lambsquarters on the 28 DAT rating (data not shown). (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Nicosulfuron in corn (Zollinger, Ries, and Kazmierczak).

Treatment	Rate (product/A)	14 DAT				21 DAT				28 DAT					
		Yeft	Rrpw	Colq	Corw	Cocb	Yeft	Rrpw	Colq	Corw	Cocb	Yeft	Rrpw	Corw	Cocb
		----- % control -----				----- % control -----				----- % control -----					
PRE/POST															
Glyfos X-trat+Surpass/Nic-It+ Scoil+28% N	1qt+1.5pt/2fl oz+ 1.5pt+2qt	99	96	80	83	33	99	96	80	93	88	99	96	99	99
POST															
Nic-It+Atrazine+Scoil+28% N	1.5fl oz+0.56lb+1.5pt+2qt	87	99	99	37	30	90	99	99	37	30	90	87	93	53
Nic-It+Atrazine+Scoil+28% N	2fl oz+0.56lb+1.5pt+2qt	89	99	99	33	33	92	99	99	33	33	88	96	90	68
Nic-It+Banvel+Scoil+28% N	1.5fl oz+6fl oz+1.5pt+2qt	85	87	93	99	57	87	87	93	99	92	83	93	99	99
Nic-It+Banvel+Scoil+28% N	2fl oz+6fl oz+1.5pt+2qt	87	83	91	91	83	88	83	94	91	96	87	99	99	99
Nic-It+Banvel+Atrazine+ Scoil+28% N	1.5fl oz+4fl oz+0.42lb+ 1.5pt+2qt	73	99	99	99	99	75	99	99	99	99	73	99	99	99
Nic-It+Harass+Scoil+28% N	2fl oz+0.05oz+1.5pt+2qt	88	92	99	62	67	82	92	99	88	87	70	99	82	99
Accent+Atrazine+Scoil+28%N	0.67oz+0.56lb+1.5pt+2qt	50	99	99	60	47	27	99	99	60	47	27	99	53	40
Stout+Atrazine+Scoil+28% N	0.75oz+0.42lb+1.5pt+2qt	77	99	99	57	40	75	99	99	57	40	72	99	99	50
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)		7	5	6	9	10	7	5	6	10	9	6	4	4	5

SU herbicides and mesotrione in corn. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from various tank-mixes in corn. Pioneer '39B23' Liberty Link/Roundup Ready corn was planted on May 28, 2009 followed by the application of PRE treatments at 2:45 pm with 78 F air, 55 F soil at a four inch depth, 38% relative humidity, 10% cloud cover, 5 to 10 mph W wind, dry soil surface and moist subsoil. Soil characteristics were: 27.7% sand, 50.7% silt, 21.6% clay, silt loam texture, 4.3% OM, and 6.3 pH. POST treatments were applied on June 24 at 9:25 am with 78 F air, 76 F soil surface, 44% relative humidity, 25% clouds, 1 to 3 mph W wind, dry soil surface, moist subsoil, good crop vigor and no dew present to V4 to V5 (8 to 10 inch) corn. Weed species present at the time of POST only applications were: 1 to 5 inch (5 to 10/yd²) common lambsquarters; 1 to 2 inch (<1/yd²) common ragweed; 0.5 to 4 inch (50 to 100/ft²) yellow foxtail; 1 to 3 inch (1 to 2/yd²) common cocklebur; 0.5 to 3 inch (1 to 5/yd²) annual smartweed; and 1 to 3 inch (1 to 10/ft²) redroot pigweed. Weed species in plots with PRE/POST treatments were: 1 to 3 inch (1 to 10/yd²) common lambsquarters; 1 to 2 inch (<1/yd²) common ragweed; emergence to 6 inch (1 to 5/yd²) redroot pigweed; 1 to 4 inch (5 to 10/ft²) yellow foxtail; and 1 to 3 inch (1/yd²) common cocklebur. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plot with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

No corn injury observed (data not shown). All treatments gave 99% control of annual smartweed 14 DAT POST, and 99% control of common lambsquarters and annual smartweed 28 and 44 DAT POST (data not shown). (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. SU herbicides and Mesotrione in corn (Zollinger, Ries, Kazmierczak).

Treatment ¹	Rate (product/A)	14 DAT POST					28 and 44 DAT POST			
		Yeft	Rrpw	Colq	Corw	Cocb	Yeft	Rrpw	Corw	Cocb
		----- % control -----					----- % control -----			
PRE/POST										
Cinch ATZ/Resolve+Isoxadifen+ Mesotrione+Herbimax+AMS	1qt/1.2oz+0.3oz+ 2.5oz+1% v/v+2lb	96	99	99	99	99	93	99	99	99
POST										
Resolve+Isoxadifen+Mesotrione+ Herbimax+AMS	1.2oz+0.3oz+2.5oz 1% v/v+2lb	78	94	94	93	92	78	99	93	88
Resolve+Isoxadifen+Mesotrione+ RUPM+AMS	1.2oz+0.3oz+2.5oz 22fl oz+2lb	96	99	99	99	93	96	99	99	98
Resolve+Isoxadifen+Mesotrione+ Ignite+AMS	1.2oz+0.3oz+2.5oz+ 22fl oz+2lb	96	99	99	99	82	92	88	99	77
Resolve+Isoxadifen+Mesotrione+ Atrazine+Herbimax+AMS	1.2oz+0.3oz+2.5oz+ 0.42lb+1% v/v+2lb	70	99	99	99	92	70	99	99	92
Resolve+HarmonyGT+Isoxadifen+ Mesotrione+Herbimax+AMS	1.2oz+0.1oz+0.23oz 2.5oz+1% v/v+2lb	79	99	99	99	96	96	99	99	98
Accent+Mesotrione+Herbimax+AMS	0.67oz+2.5oz+1% v/v+12lb	62	99	99	99	99	40	99	99	99
Steadfast+Isoxadifen+Mesotrione+ Herbimax+AMS	0.75oz+0.25oz+2.5oz+ 1% v/v+2lb	67	99	99	99	97	67	78	99	97
Untreated		0	0	0	0	0	0	0	0	0
LSD (0.05)		8	5	5	1	9	7	2	4	7

¹Isoxadifen = safener; Mesotrione = 50 WG formulation.

Optimum GAT Corn Carruth, David J., Richard K. Zollinger, Jerry L. Ries, and Angela J. Kazmierczak.

An experiment was conducted near Prosper, ND, to evaluate weed control from one and two pass herbicide programs developed for Optimum GAT corn. 09-016-101 corn was planted on May 28, 2009, followed by the application of PRE treatments at 1:00 pm, 76 F air, 54 F soil at a four inch depth, 39% relative humidity, 10% clouds, 5 to 13 mph N wind, dry soil surface, and moist subsoil. Soil characteristics were 26.8% sand, 49.1% silt, 24.1% clay, loam texture, 4.6% OM, and 7.2 pH. An EPOST application was made on June 17 at 9:30 am with 65 F air, 65 F soil surface, 97% relative humidity, 100% clouds, 5 to 10 mph SE wind, moist soil surface, wet sub soil, good crop vigor, and dew was present to V2 to V3 corn. Weed species present at the EPOST application were: 0.5 to 1.5 inch (20 to 30/ft²) yellow foxtail; cotyledon to 0.5 (1 to 5/yd²) redroot pigweed; and cotyledon to 0.5 inch (1 to 3/yd²) hairy nightshade. MPOST treatments were 3/yd² common lambsquarters; cotyledon to 1 inch (1/yd²) wild buckwheat; and cotyledon to 0.5 inch (1 to 2/yd²) hairy nightshade. MPOST treatments were made on June 30 at 9:00 am with 62 F air, 64 F soil surface, 72% relative humidity, no cloud cover, 8 to 12 mph NW wind, dry soil surface, wet subsoil, excellent crop vigor, and no dew present to V4 to V5 (8 to 14 inch) corn. Weed species present at the MPOST application were: 1 to 6 inch (20 to 50/ft²) yellow foxtail; 2 to 6 inch (1 to 5/ft²) redroot pigweed; 2 to 6 inch (1 to 2/yd²) wild mustard; 1 to 6 inch (1 to 3/yd²) common lambsquarters; 1 to 3 inch diameter (1 to 2/yd²) wild buckwheat; 1 to 4 inch (1 to 3/yd²) hairy nightshade; and 1 to 4 inch (1 to 3/yd²) common ragweed. POST treatments were made on July 7 at 9:30 am with 75 F air, 74 F soil surface, 51% relative humidity, 90% clouds, 4 to 6 mph NE wind, dry soil surface, moist subsoil, and no dew present to V4 to V6 (10 to 18 inch) corn. Weed species present at POST application were: 2 to 8 inch tillering (20-40/ft²) yellow foxtail; 1 to 8 inch (1 to 10/ft²) redroot pigweed; 2 to 12 inch flowering (1 to 2/yd²) wild mustard; 2 to 12 inch (2 to 10/yd²) common lambsquarters; 2 to 4 inch diameter (1/yd²) wild buckwheat; 2 to 5 inch (1 to 3/yd²) hairy nightshade; and 2 to 4 inch (<1/yd²) common ragweed. Treatments were applied to the center 6.7 feet of the 10 by 30 foot plot with a backpack-type plot sprayer. 11002 Turbo TeeJet nozzles delivering 17 gpa at 40 psi were used for the PRE treatments while 11001 Turbo TeeJet nozzles delivering 8.5 gpa at 40 psi were used for all POST treatments. The experiment had a randomized complete block design with four replicates per treatment.

The month of May was cold and wet followed by a cool and dry June. These environmental factors resulted in slow emergence and growth of corn and weeds. PRE treatments provided variable weed control that was most likely due to the lack of sufficient rainfall for activation. On July 14 (28 DAT EPOST) the EPOST treatment gave 99% control of all weed species except for yellow foxtail. On July 29 (29 DAT MPOST) all treatments gave at least 76% control of all weed species. On August 4 (28 DAT POST) all treatments gave at least 90% control of all weed species. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table 1. Optimum GAT Corn (Carruth, Zollinger, Ries, and Kazmierczak)

Treatment	Rate (Product/A)	33 DAT - PRE					
		Yeft	Rrpw	Colq	Wibw	Hans	
PRE		% Control					
Breakfree	1 pt	71	58	29	3	40	
Breakfree	1 pt	69	63	29	3	47	
Breakfree	1 pt	75	65	54	4	48	
Classic+Resolve +Mesotrione	1.3oz+1.3oz +4.3oz	64	75	69	10	67	
LSD (0.05)		16	16	32	8	33	

Corn response to nitrogen and timing of weed control, Carrington, 2009.

(Greg Endres and Dave Franzen)

Trial objective was to determine the combination of soil N and timing of weed control to optimize corn yield. The dryland field trial was established at the NDSU Carrington Research Extension Center on a Heimdal-Emrick loam soil. Experimental design was a randomized complete block with split plot arrangement [main plot=N (3 treatments targeted at 50, 100, 150 lb N/acre) and subplots=timing of weed control (4 treatments targeted at 2- to 4-inch weed height, 8- to 12-inch weed height, and weed-free and untreated checks)] with four replications. Spring soil analysis indicated 24 lb nitrate-N/A, 13 ppm phosphorus, 181 ppm potassium, 0.95 ppm zinc, 4.2% organic matter, and 5.9 pH. Nitrogen as urea (46-0-0) was surface applied on May 12 at 50 and 100 lb nitrate-N/A to medium- and high-N plots, respectively. Rainfall was delayed until 0.78 inches was received on May 25. DeKalb Roundup Ready 'DKC 38-19' (85-day relative maturity) was direct planted into barley stubble at 28,000 seeds/A in 30-inch row spacing on May 15. Nitrogen as liquid 28-0-0 (urea-ammonium nitrate) was surface applied with stream nozzles to 4-leaf corn on June 26 at 25 lb nitrate-N/A to all plots. Rainfall of 0.94 inches was received on June 26. Herbicides were applied using a CO₂ hand-boom sprayer with 8001 flat fan nozzles delivering 12 gal/A at 35 psi. Glyphosate (Roundup PowerMax) at 0.75 lb ae/A + acetochlor&dichlormid safener (Surpass) at 2 lb ai/A + AMS (Cornbelt Amstik) at 64 fl oz/A was applied PRE on May 16 with 43 degrees F, 45% RH to a moist soil surface. Corn emergence was May 31 to June 1. Glyphosate (Roundup PowerMax) at 1.12 lb ae/A + AMS (Cornbelt Amstik) at 64 fl oz/A was applied POST. POST1 was applied to the early POST plots on May 28 with 69 degrees F and 43% RH. POST2 was applied to the late POST plots on June 20 with 77 degrees F and 44% RH to 3-leaf corn. POST3 was applied to the weed-free check and early POST plots on June 29 with 64 degrees F and 74% RH to 4-leaf corn and 1- to 4-inch tall weeds. POST4 was applied on the late POST plots on July 28 with 70 degrees F and 42% RH to 8-leaf (25- to 30-inches tall) corn and 1- to 8-inch tall weeds. Table 1 lists weed species, size, and density during application of POST herbicides. The trial was harvested with a plot combine on November 23.

Table 1.

Species	Weed			
	POST1 (May 28)		POST2 (June 20)	
	Size (inches in height)	Density (plt/ft ²)	Size (inches in height)	Density (plt/ft ²)
Quackgrass	6-12	1.4	x	0.3
Volunteer barley	3-4	1.9	12	x
Yellow foxtail	x	x	2-3	0.1
Biennial wormwood	x	x	3	x
Common lambsquarters	1-2	3.0	2-12	0.4
Field pennycress	1-2	0.4	x	x
Horseweed	x	x	2-10	2.5
Kochia	0.5-2	15.0	x	2.0
Redroot pigweed	x	x	1-2	x
Shepardspurse	2-12	1.0	12-16	2.7
White whitlowwort	1-4	0.9	x	x
Yellow woodsorrel	2-4 (diameter)	3.9	8-9 (diameter)	1.7

Among N treatments, plant green color was higher with the high versus low N (Table 2). Basal stalk nitrate test indicated nitrate-N levels were deficient among all N treatments (marginal = 250 to 700 ppm), likely due to untimely rain for incorporating the preplant urea. The highest N level increased grain yield, moisture and protein compared to low N. Weed control generally increased plant height and green color, and reduced time from planting to silking. Nitrate-N levels indicated by the basal stalk test tended to be highest with the PRE/early POST weed control. Early weed control provided higher grain yield. Yield improved by 20 bu/A (24%) with PRE/early POST compared to yield with late POST application timing of herbicides. Also, test weight was higher and moisture lower with PRE/early POST versus late POST treatment. Grain protein was highest with delayed control of weeds. No statistically significant interactions were present for corn response among N levels and application timings for control of weeds.

Treatment	Plant ¹					Seed				
Factor	Height	Silk date	Green color (NDVI)		Basal stalk nitrate	Yield	Test weight	Moisture	Protein	Starch
	inches	Jday	16-Jul	30-Jul	ppm	bu/A	lb/bu	————— % —————		
soil N (lb/A)										
50	19	227	0.54	0.71	x	46.7	49.7	24.0	9.4	69.4
100	21	226	0.56	0.75	92	65.2	49.7	23.1	9.7	69.6
150	21	227	0.61	0.80	198	69.5	49.0	25.9	10.7	69.6
LSD (0.05)	NS	NS	0.05	0.05	87	10.0	NS	1.6	0.5	NS
Weed control ²										
untreated check	15	231	0.51	0.67	x	27.1	48.3	26.6	9.9	69.4
PRE/early POST	23	225	0.64	0.80	229	80.2	50.2	22.3	9.8	69.6
early POST	23	225	0.58	0.79	100	74.5	50.0	23.4	9.4	69.8
late POST	19	226	0.56	0.76	107	60.1	49.3	24.9	10.7	69.3
LSD (0.05)	2	2	0.06	0.05	NS	11.5	0.9	1.9	0.6	NS
mean	20.0	227	0.57	0.75	60	60.5	49.5	24.3	9.9	69.5
CV (%)	13.4	0.9	11.9	7.7	81.0	23.3	2.1	9.3	6.6	1.3
¹ Height measurements taken on July 20; Green color readings taken with GreenSeeker; Basal stalk nitrate samples taken on October 22.										
² Weed-free check=PRE/POST3; early POST weed control=POST1/POST3; late POST weed control=POST2/POST4.										

Corn response to fungicide and preharvest desiccant, Carrington, 2008.

(Greg Endres and Joel Ransom)

The conventional-till field trial was established at the NDSU Carrington Research Extension Center on a Heimdal Emrick loam soil with soybean as the previous crop. Experimental design was a randomized complete block with split plot arrangement [main plot=hybrids (2) and subplots=fungicide (2 trts) and desiccant (2 trts)] with four replications. Spring soil analysis indicated 8 ppm (med.) phosphorus, 164 ppm (high) potassium, 0.75 ppm (med.) zinc, 3.0% organic matter, and 6.2 pH. Pioneer '39D97' [79-day relative maturity (RM)] and DeKalb '38-92' (88-day RM) were planted at about 24,000 seeds/A in 8-row plots with 30 ft depth and 30-inch row spacing on May 12. Best management practices were used for corn production. Headline at 6 fl oz/A + Preference (NIS) at 0.25% v/v was applied on August 8 with a tractor-mounted CO₂ sprayer with 015F110 flat fan nozzles delivering 15 gal/A at 40-45 psi with 73 F, 71% relative humidity (RH), and 10 mph wind to both hybrids at VT (tassel) to R1 (silk) stages. Gramoxone Inteon (paraquat) at 32 fl oz/A + Preference (NIS) at 0.25% v/v was applied on October 2 with 57 F, 70% RH, and 7 mph wind to the 79-day RM hybrid and on October 14 with 44 F, 76% RH, and 12 mph wind to the 88-day RM hybrid at R6 (physiological maturity) stage. Visual evaluation of ear leaf disease measured as percent severity (average of 10 leaves/plot) was taken on October 2. The trial was harvested with a plot combine on November 4.

Seed yield and moisture was less with the early-maturing hybrid while test weight was greater compare to the late hybrid (table). Although ear leaf disease was low, the fungicide reduced disease and improved yield by 10.1 bushels compared to the untreated check. Seed yield tended to be greater and moisture content less with use of the desiccant compared to the untreated check. No statistically significant differences were present with factor interactions, with the exception of fungicide and no desiccant having lower disease (1.6%) compared to no fungicide and no desiccant (3.5%).

Table.						
Treatment	Corn					
Name	Ear leaf disease	Seed yield	Test weight	Seed moisture	Seed protein	Seed starch
	% severity	bu/A	lb/bu	————— % —————		
<u>Hybrid:</u>						
Pioneer 39D97 (79 day RM)	2.4	123.5	58.3	17.9	10.9	68.6
DeKalb 38-92 (88 day RM)	2.7	144.0	53.2	23.1	10.5	68.3
LSD (0.05)	NS	6.7	0.9	1.0	NS	NS
<u>Fungicide:</u>						
Headline	1.6	138.8	55.9	20.6	10.6	68.6
untreated check	3.5	128.7	55.6	20.4	10.8	68.3
LSD (0.05)	0.5	6.7	NS	NS	NS	NS
<u>Desiccant:</u>						
paraquat	x	136.8	55.6	20.1	10.6	68.4
untreated check	x	130.7	55.9	21.0	10.8	68.5
LSD (0.05)	x	NS	NS	NS	NS	NS
mean	2.5	133.3	55.8	20.5	10.7	0.5
CV (%)	34.1	9.4	2.1	7.2	5.3	0.8

Field pea weed control with Kixor. Carrington, 2009. (Greg Endres). The trial was conducted in cooperation with BASF to measure weed control and crop response with soil-applied Kixor (Sharpen and Optill). The field trial was established on a Heimdal-Emrick loam soil with 4.2% organic matter and 5.9 pH. The experimental design was a randomized complete block with three replicates. Herbicide treatments were applied with a CO₂-hand-boom plot sprayer delivering 10 gal/A at 35 psi through 8001 flat-fan nozzles. PP treatments were applied on May 7 with 49 F, 73% RH, 10% cloudy sky, and dry soil surface to 6-inch tall quackgrass, 1- to 2-leaf volunteer barley, 1-inch tall fairy candelabra, 0.5-inch tall kochia, 1- to 5-inch wide sheperdspurse, and 2-inch wide yellow woodsorrel . Rainfall totaled 0.48 inches during 5 d after PP application of herbicides. Inoculated 'Admiral' field pea was direct-seeded into barley stubble at 300,000 pure live seeds/A on May 15. PRE treatment was applied on May 16 with 43 F, 45% RH, clear sky, and moist soil surface to 6- to 8-inch tall quackgrass, 3-leaf volunteer barley, 1-inch tall fairy candelabra, 1- to 5-inch wide sheperdspurse, 0.5- to 1-inch tall kochia, and 2-inch wide yellow woodsorrel . Rainfall totaled 0.87 inches during 9 d after PRE application of herbicides. The trial was harvested with a plot combine on August 25.

Weed control, except quackgrass, was good to excellent (85 to 95%) with PP Kixor (Sharpen and Optill) plus glyphosate, and greater than weed control with glyphosate on May 15 [8 days after treatment (DAT)] (Table). On May 21 (14 DAT), weed control generally was similar with glyphosate and Kixor plus glyphosate treatments, while the PRE treatment resulted in less control. Kochia control generally was good to excellent with PP and PRE Kixor treatments on June 5 (29 DAT), but declined to 70 to 78% on June 19 (43 DAT). No crop response was observed (data not shown). Field pea seed yield was similar among herbicide treatments and greater than yield with the untreated check.

Table.		Weed control ¹																Field pea			
Herbicide		5/15								5/21								6/5		6/19	
Treatment ²	Rate fl oz product/	Timing ³	Qugr	Voba	Faca	Shpu	KOCZ	Yews	Qugr	Voba	Faca	Shpu	KOCZ	Yews	Qugr	Shpu	KOCZ	KOCZ	Yield		
%																					
Untreated check	x	x	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15.5		
Glyphosate	32	PP	40	80	40	70	48	52	82	98	95	96	95	99	91	96	67	40	33.5		
Sharpen + glyt	1+16	PP	65	86	92	92	85	90	90	98	99	99	97	99	98	99	84	73	34.9		
Sharpen + glyt	1+32	PP	67	87	88	92	87	90	90	95	99	99	97	99	96	99	86	74	33.8		
Sharpen + glyt	2+32	PP	70	88	92	95	89	92	90	98	97	99	98	99	99	99	91	76	39.3		
Sharpen + glyt	4+32	PP	71	88	93	95	86	88	90	98	99	99	98	99	98	99	90	78	37.5		
Optill + glyt	1 oz wt +32	PP	66	86	90	95	86	93	90	97	99	99	97	99	98	99	79	70	34.6		
Sharpen + pendamethalin+ glyt	1+40+ 32	PRE	x	x	x	x	x	x	70	90	88	94	80	96	99	99	80	72	32.8		
C.V. (%)			5.6	3.3	2.3	4.2	9.4	12.2	4.8	2.6	3.8	2.8	0.5	0.4	6.2	2.1	5.4	4.0	16.7		
LSD (0.05)			5	4	3	6	11	16	6	4	6	4	1	1	9	3	7	4	9.5		

¹Qugr=quackgrass; Voba=volunteer barley; Faca=fairy candelabra; Shpu=sheperdspurse; KOCZ=kochia; Yews=yellow woodsorrel.

²Glyt=Mirage Plus (Loveland); Sharpen=safinufenacil (BASF); Optill=safinufenacil&imazethapyr (BASF); pendamethalin=ProwlH2O (BASF). Glyphosate includes tank mixture of NIS=Preference (Winfield) at 0.25% v/v and AMS=Cornbelt Amstik (West Central) at 64 fl oz/A. All other treatments include tank mixture of MSO=Destiny HC (Winfield) at 1% v/v and AMS at 64 fl oz/A.

³PP=May 7; PRE=May 16.

Corn response to fungicide and preharvest desiccant, Carrington, 2009.

(Greg Endres, Joel Ransom, and Paul Hendrickson)

Trial objectives are to measure potential yield increase with foliar-applied 'plant health' fungicide and explore potential for quicker seed dry-down and harvest using a pre-harvest desiccant. The conventional-till, dryland field trial was established at the NDSU Carrington Research Extension Center on a Heimdal-Emrick loam soil with crambe as the previous crop. Experimental design was a randomized complete block with split plot arrangement [main plot=hybrids (2) and subplots=fungicide (2 trts) and desiccant (2 trts)] with four replications. Fall soil analysis indicated 139 lb nitrate-N/A, 5 ppm phosphorus, 146 ppm potassium, 2.0% organic matter, and 7.9 pH. Pioneer '39D97' [79-day relative maturity (RM)] and DeKalb '38-89' (88-day RM) were planted at 26,000 seeds/A in 8-row plots with 30 ft depth and 30-inch row spacing on May 19. 10-34-0 was applied at 5 gal/A in a 2x2-inch band during planting. Best management practices were used for corn production. Early-season zinc deficiency symptoms were expressed by plants, which were treated twice with foliar zinc during trial treatments with glyphosate. Headline at 6 fl oz/A + Preference (NIS) at 0.25% v/v was applied with a tractor-mounted CO₂ sprayer with 015F110 flat fan nozzles delivering 13 gal/A at 30 psi at the R1 (silk) stage on August 10 with 66 degrees F and 86% RH to the 79-day RM hybrid and August 12 with 76 degrees F and 62% RH to the 88-day RM hybrid. Gramoxone Inteon (paraquat) at 32 fl oz/A + Preference (NIS) at 0.25% v/v was applied at approximately the half-milk stage on September 29 with 49 degrees F and 68% RH to the 79-day RM hybrid and on October 7 with 45 degrees F and 84% RH to the 88-day RM hybrid. Seed was sampled from the early-maturing hybrid on September 28 and seed moisture estimated at 43%. Seed was sampled from the late-maturing hybrid on October 7 and seed moisture estimated at 47%. Two hours of 30-31 degrees F occurred on September 29 and a minimum air temperature of 22 degrees F occurred on October 8. Common corn leaf rust was visually evaluated on October 5 by examining five ear leaves/plot. The trial was harvested with a plot combine on November 23.

Test weight was greater and seed moisture less, while seed yield tended to be greater, with the early-maturing hybrid (Table 1). Leaf rust severity was very low, essentially providing no practical opportunity for influence by fungicide. Corn seed yield and quality were similar compared to the untreated check. Seed moisture tended to be less with preharvest desiccant, but generally did not impact seed yield or quality. Factor interactions were statistically non-significant among disease, seed yield and seed quality (Table 2).

Table 1. Corn response to main factors, Carrington, 2009.

Treatment	Corn					
	Common leaf rust % severity	Seed yield bu/A	Test weight lb/bu	Seed moisture	Seed protein %	Seed starch
<u>Hybrid:</u>						
Pioneer 39D97 (79 day RM)	1	130.8	50.8	18.9	10.4	67.5
DeKalb DKC38-89 (88 day RM)	1	128.1	47.8	24.3	10.4	68.0
LSD (0.05)	NS	NS	1.1	2.2	NS	NS
<u>Fungicide:</u>						
Headline	1	129.3	49.2	21.7	10.4	67.6
untreated check	2	129.6	49.5	21.5	10.4	67.8
LSD (0.05)	1	NS	NS	NS	NS	NS
<u>Desiccant:</u>						
paraquat	1	128.3	49.4	21.0	10.6	67.7
untreated check	1	130.7	49.2	22.2	10.3	67.8
LSD (0.05)	NS	NS	NS	NS	0.3	NS
mean	1	129.5	49.3	21.6	10.4	67.7
CV (%)	67.0	8.6	2.9	13.8	3.7	1.1

Table 2. Corn response to factor interactions, Carrington, 2009.

Treatment		Corn					
		Common leaf rust	Seed yield	Test weight	Seed moisture	Seed protein	Seed starch
		% severity	bu/A	lb/bu	%		
<u>Hybrid:</u>	<u>Fungicide:</u>						
Pioneer 39D97 (79 day RM)	Headline	1	131.9	50.8	18.6	10.5	67.4
DeKalb DKC38-89 (88 day RM)	untreated check	1	126.7	47.5	24.7	10.4	67.9
Pioneer 39D97 (79 day RM)	Headline	2	129.8	50.8	19.3	10.4	67.6
DeKalb DKC38-89 (88 day RM)	untreated check	2	129.5	48.2	23.8	10.4	68.1
LSD (0.05)		NS					
	<u>Desiccant:</u>						
Pioneer 39D97 (79 day RM)	paraquat	1	129.2	51.1	18.3	10.7	67.3
DeKalb DKC38-89 (88 day RM)	untreated check	1	127.3	47.6	23.7	10.5	68.1
Pioneer 39D97 (79 day RM)	paraquat	2	132.5	50.5	19.6	10.2	67.7
DeKalb DKC38-89 (88 day RM)	untreated check	1	128.9	48.0	24.8	10.4	67.9
LSD (0.05)		NS					
<u>Fungicide:</u>	<u>Desiccant:</u>						
Headline	paraquat	1	128.7	49.4	20.7	10.6	67.5
untreated check	paraquat	2	127.8	49.3	21.3	10.6	67.9
Headline	untreated check	1	129.9	48.9	22.6	10.3	67.8
untreated check	untreated check	2	131.5	49.6	21.8	10.3	67.8
LSD (0.05)		NS					
mean		1	129.5	49.3	21.6	10.4	67.7
CV (%)		67.0	8.6	2.9	13.8	3.7	1.1

EPP weed control in soybean. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Buffalo, ND, to evaluate weed efficacy in soybeans from treatments applied 14 days (EPP) before planting followed by a POST application. EPP treatments were applied on May 20, 2009 at 10:30 am with 79 F air, 60 F soil at a four inch depth, 39% relative humidity, 40% cloud cover, 8 to 12 mph SW wind, dry soil surface and moist subsoil. Soil characteristics were: 57.1% sand, 29% silt, 13.9% clay, silt loam texture, 3.1% OM, and 7.6 pH. Dyna-Gro '33T36' Roundup Ready soybean was planted on May 30, 2009. POST treatments were applied on July 8 at 10:00 am with 69 F air, 68 F soil surface, 42% relative humidity, 50% clouds, 5 to 8 mph S wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V3 to V5 (6 to 8 inch) soybean. Weed species present at the time of POST applications were: 2 to 6 inch (1 to 3/ft²) common lambsquarters; 1 to 3 inch (1/yd²) common ragweed; 1 to 4 inch (1 to 3/yd²) marshelder; 2 to 6 inch (1 to 5/yd²) kochia; 0.5 to 3 inch (1 to 5/ft²) biennial wormwood; 1 to 3 inch (1 to 2/yd²) knotweed; and 1 to 3 inch (1/yd²) redroot pigweed. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for EPP treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

All EPP treatments gave 99% control of shepherdspurse, knotweed, marshelder, redroot pigweed, and common ragweed 35 DAT EPP (data not shown). All POST treatments gave 99% control common lambsquarters, kochia, biennial wormwood, common ragweed, knotweed, and redroot pigweed at 14 DAT rating (data not shown). The soybean crop was destroyed after the last rating. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. EPP weed control in soybean (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	19 DAT EPP			35 DAT EPP		
		Colq	Koch	Biww	Colq	Koch	Biww
		---- % control ----			---- % control ----		
EPP/POST							
RUPM+R-11+AMS/ RUPM+R-11+AMS	22fl oz+0.25% v/v+17lb/100gal/ 22fl oz+0.25% v/v+17lb/100gal	63	63	63	40	40	40
RUPM+2,4-D Ester+R-11+AMS/ RUPM+R-11+AMS	22fl oz+1pt+0.25% v/v+17lb/100gal/ 22fl oz+0.25% v/v+17lb/100gal	77	67	87	63	53	80
RUPM+Sharpen+Scoil+AMS/ RUPM+R-11+AMS	22fl oz+1fl oz+1% v/v+17lb/100gal/ 22fl oz+0.25% v/v+17lb/100gal	96	94	98	95	92	96
RUPM+Optill+Scoil+AMS/ RUPM+R-11+AMS	22fl oz+2fl oz+1% v/v+17lb/100gal/ 22fl oz+0.25% v/v+17lb/100gal	90	78	95	88	73	91
Extreme+Sharpen+Scoil+AMS/ RUPM+R-11+AMS	2.3pt+1fl oz+1% v/v+17lb/100gal/ 22fl oz+0.25% v/v+17lb/100gal	99	99	99	98	98	98
RUPM+Sharpen+Prowl H ₂ O+Scoil+AMS/ RUPM+R-11+AMS	22fl oz+1fl oz+1qt+1% v/v+17lb/100gal/ 22fl oz+0.25% v/v+17lb/100gal	99	98	99	99	99	99
LSD (0.05)		7	9	5	8	9	7

¹RUPM = Roundup PowerMax.

PRE weed control in soybeans. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from PRE programs in soybean. Asgrow 'AG 0803' Roundup Ready soybean was planted on May 28, 2009 followed by the application of PRE treatments at 9:35 am with 65 F air, 47 F soil at a four inch depth, 47% relative humidity, 0% cloud cover, 8 to 12 mph SW wind, dry soil surface and moist subsoil. Soil characteristics were: 28.7% sand, 49.7% silt, 21.6% clay, loam texture, 4.2% OM, and 7.2 pH. EPOST treatments were applied on June 26 at 10:20 am with 82 F air, 80 F soil surface, 37% relative humidity, 10% clouds, 8 to 11 mph S wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V1 (3 to 5 inch) soybean. Weed species present at the time of POST applications were: 0.5 to 3 inch (1 to 2/ft²) common lambsquarters; 0.5 to 3 inch (1 to 3/yd²) common ragweed; 1 to 2 inch (1 to 2/yd²) hairy nightshade; 1 to 4 inch (1/yd²) wild mustard; 0.5 to 5 inch (5 to 50/ft²) yellow foxtail; 1 to 4 inch (1/yd²) common cocklebur; 1 to 2 inch (1/yd²) annual smartweed, and 0.5 to 4 inch (1 to 20/ft²) redroot pigweed. LPOST applications were made on July 21 at 9:00 am with 62 F air, 64 F soil surface, 41% relative humidity, 20% cloud cover, 5 to 8 mph S wind, dry soil surface and moist subsoil to V3 to V5 (8 to 12 inch) soybean. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for EPOST and LPOST treatments. The experiment had a randomized complete block design with three replicates per treatment

No soybean injury was observed. Data is not shown for July 24 and August 10 ratings due to little to no differences in weed efficacy ratings. Most PRE/POST treatments gave near complete weed control at the final evaluation. Treatments containing only glyphosate does not give wide spectrum or season long weed control. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. PRE weed control in soybeans (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	28 DAT - PRE					14 DAT - EPOST												
		Yeft	Rrpw	Colq	Wimu	Smwe	Hans	Conw	Cocb	% control	Yeft	Rrpw	Colq	Wimu	Smwe	Hans	Conw	Cocb	% control
PRE/EPOST ²																			
Valor SX	2oz	40	99	80	99	99	99	10	20	99	99	99	99	99	99	99	99	99	99
Valor SX+Intro	2oz+1pt	90	99	90	99	99	99	50	20	99	99	99	99	99	99	99	99	99	99
Valor SX+Intro	2oz+1qt	90	99	90	99	99	99	50	20	99	99	99	99	99	99	99	99	99	99
Ganster FirstRate+Gangster Valor	0.4oz+2oz	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
V-10233	3oz	80	99	80	99	99	99	70	50	99	99	99	99	99	99	99	99	99	99
Authority First(Sonic)	3.2oz	70	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Authority First(Sonic)	4oz	70	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Authority Assist	5oz	90	99	99	99	99	99	70	70	99	99	99	99	99	99	99	99	99	99
Authority Assist	6oz	90	99	99	99	99	99	80	80	99	99	99	99	99	99	99	99	99	99
Authority MTZ	10oz	90	99	99	99	99	99	50	70	99	99	99	99	99	99	99	99	99	99
Authority MTZ	12oz	90	99	99	99	99	99	75	70	99	99	99	99	99	99	99	99	99	99
Sharpen	1fl oz	20	40	40	40	40	40	40	40	99	99	99	99	99	99	99	99	99	99
Sharpen	2fl oz	50	60	60	60	60	60	60	60	99	99	99	99	99	99	99	99	99	99
Optill	2oz	99	99	99	99	99	99	70	70	99	99	99	99	99	99	99	99	99	99
Optill+Prowl H ₂ O	2oz+1qt	99	99	99	99	99	99	80	80	99	99	99	99	99	99	99	99	99	99
Valor XLT(Valor)+Valor XLT(Classic)	2.35oz+1.65oz	30	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
EPOST																			
RUOM+AMS	22fl oz+8.5lb/100 gal		73	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
EPOST/LPOST																			
RUOM+AMS/ RUOM+AMS	22fl oz+8.5lb/100 gal/ 22fl oz+8.5lb/100 gal		72	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
LSD (0.05)		8	5	5	5	5	5	8	9	2	NS	NS	NS	NS	2	1	1	NS	NS

¹V-10233 = proprietary compound from Valent; RUOM = Roundup Original Max.

²EPOST = all PRE were followed by a EPOST of Roundup Original Max at 22fl oz+ AMS at 8.5lb/100 gal.

Preemergence and Postemergence Herbicides in Roundup Ready Soybean, Casselton, ND, 2009. (Stachler and Luecke). Soil was tilled twice prior to seeding 'Asgrow AG0604' soybean with a drill in 7.5" rows perpendicular to the treatments on May 28. PRE treatments were applied May 29 and POST treatments were applied July 2. All treatments were applied with a bicycle sprayer in 17 gpa water at 40 psi through 8002 nozzles to the center 6.67 feet of 11 feet wide plots that were 30 feet in length. Experiment designed as randomized complete block with four replications. Soybean and/or waterhemp were evaluated on July 2, 8, 15, and 29. All evaluations are a visual estimate of percent fresh weight reduction in the treated plot compared to the adjacent untreated strip.

Application Code	PRE	POST
Date of Application	May 29	July 2
Time of Day	9:30 am	3:00 pm
Air Temperature (°F)	63	84
Relative Humidity (%)	48	34
Soil Temp. (°F at 6")	55	66
Wind Velocity (mph) / Direction	11 / W	2 / N
Cloud Cover (%)	0	0
Soil Moisture	good	good
Soybean (range / avg.)	-	V 1-3.5 / V3
Waterhemp (range-stage / height)	-	Cot-19 lf / 0.1-9.5"
Waterhemp (avg. density)	-	75 plants/m ²

Table. Preemergence and Postemergence Herbicides in Roundup Ready Soybean (Stachler and Luecke).

Treatment*	Rate (product/a)	Timing	July 2		July 8
			Soyb inju %	Wahe cntl %	Soyb inju %
Roundup WeatherMAX	10.7 fl oz	POST	0	0	1
Flexstar + Roundup WeatherMAX	12.0 fl oz + 10.7 fl oz	POST	0	0	2
Cobra + Roundup WeatherMAX	6.0 fl oz + 10.7 fl oz	POST	0	0	24
Flexstar + Harmony GT	12.0 fl oz + 0.125 oz	POST			
+ Roundup WeatherMAX	+ 10.7 fl oz	POST	0	0	29
Cadet + Roundup WeatherMAX	0.4 fl oz + 10.7 fl oz	POST	0	0	11
Harmony GT + Roundup WeatherMAX	0.125 oz + 10.7 fl oz	POST	0	0	29
Prowl H2O	3.0 pt	PRE			
Roundup WeatherMAX	10.7 fl oz	POST	1	83	3
Prowl H2O	3.0 pt	PRE			
Flexstar + Roundup WeatherMAX	12.0 fl oz + 10.7 fl oz	POST	0	90	1
Valor	2.5 oz	PRE			
Roundup WeatherMAX	10.7 fl oz	POST	0	76	0
Prefix	2.0 pt	PRE			
Roundup WeatherMAX	10.7 fl oz	POST	1	95	3
Boundary	1.8 pt	PRE			
Roundup WeatherMAX	10.7 fl oz	POST	0	93	1
Sharpen	0.75 fl oz	PRE			
Roundup WeatherMAX	10.7 fl oz	POST	1	86	2
Sharpen + Valor	0.75 fl oz + 2.0 oz	PRE			
Roundup WeatherMAX	10.7 fl oz	POST	0	98	2
LSD (0.05)			NS	6	3
CV			428	9	29

*NIS (Premier 90 – West Central) [0.25 %v/v] + Amstik (West Central) [1.5 qt/a] added to all POST treatments.

Experiment continued on next page!

Table. Preemergence and Postemergence Herbicides in Roundup Ready Soybean (Stachler and Luecke).

Treatment*	Rate (product/a)	Timing	July 15		July 29	
			Soyb	Wahe	Soyb	Wahe
			inju %	cntl %	inju %	cntl %
Roundup WeatherMAX	10.7 fl oz	POST	3	85	0	96
Flexstar + Roundup WeatherMAX	12.0 fl oz + 10.7 fl oz	POST	3	81	6	88
Cobra + Roundup WeatherMAX	6.0 fl oz + 10.7 fl oz	POST	18	75	13	83
Flexstar + Harmony GT + Roundup WeatherMAX	12.0 fl oz + 0.125 oz + 10.7 fl oz	POST	29	80	15	89
Cadet + Roundup WeatherMAX	0.4 fl oz + 10.7 fl oz	POST	10	71	4	80
Harmony GT + Roundup WeatherMAX	0.125 oz + 10.7 fl oz	POST	28	85	14	95
Prowl H2O	3.0 pt	PRE				
Roundup WeatherMAX	10.7 fl oz	POST	2	97	3	99
Prowl H2O	3.0 pt	PRE				
Flexstar + Roundup WeatherMAX	12.0 fl oz + 10.7 fl oz	POST	5	97	3	100
Valor	2.5 oz	PRE				
Roundup WeatherMAX	10.7 fl oz	POST	3	93	0	100
Prefix	2.0 pt	PRE				
Roundup WeatherMAX	10.7 fl oz	POST	6	99	1	100
Boundary	1.8 pt	PRE				
Roundup WeatherMAX	10.7 fl oz	POST	5	99	0	100
Sharpen	0.75 fl oz	PRE				
Roundup WeatherMAX	10.7 fl oz	POST	5	98	0	99
Sharpen + Valor	0.75 fl oz + 2.0 oz	PRE				
Roundup WeatherMAX	10.7 fl oz	POST	3	99	0	100
LSD (0.05)			4	4	7	5
CV			33	3	108	4

*NIS (Premier 90 – West Central) [0.25 %v/v] + Amstik (West Central) [1.5 qt/a] added to all POST treatments.

Summary: Almost no soybean injury was observed from the preemergence herbicides. Cadet, Cobra, and Harmony GT caused the greatest soybean injury shortly after application and injury continued for 27 days after application with the exception of Cadet. Boundary, Prefix, and Sharpen plus Valor controlled waterhemp greater than 90% at the time of the POST applications. Valor controlled the least waterhemp at the time of the POST applications. All PRE herbicides followed by Roundup WeatherMAX controlled waterhemp better than any POST herbicide/combination on July 15. Waterhemp control improved over time for all POST herbicides. All PRE herbicides followed by Roundup WeatherMAX controlled nearly all of the waterhemp on July 29 and Roundup WeatherMAX and Harmony GT plus Roundup WeatherMAX was similar. All contact herbicide mixtures caused a reduction in waterhemp control on July 29.

Soybean weed control with Kixor. Carrington, 2009. (Greg Endres). The trial was conducted in cooperation with BASF to measure weed control and crop response with soil-applied Kixor (Sharpen and Optill). The field trial was established on a Heimdal-Erick loam soil with 4.2% organic matter and 5.9 pH. The experimental design was a randomized complete block with three replicates. Herbicide treatments were applied with a CO₂-hand-boom plot sprayer delivering 21 gal/A at 35 psi through 8002 flat-fan nozzles. PP treatments were applied on May 16 with 55 F, 28% RH, 10 mph wind, 80% clear sky, and dry soil surface to 6- to 9-inch tall quackgrass, 3- to 5-leaf volunteer barley, 1- to 2-inch tall fairy candelabra, 0.5- to 1-inch tall kochia, 2- to 4-inch wide sheperdspurse, and 2-inch wide yellow woodsorrel. Rainfall totaled 0.87 inches during 9 d after application of herbicides. Inoculated Dairyland Seed '401RR' soybean was direct-seeded into barley stubble in 30-inch rows on May 21. POST glyphosate was applied on July 2 with 79 F, 55% RH, 11 mph wind, and 60% clear sky to 2- to 10-inch tall kochia. The trial was harvested with a plot combine on October 14.

Weed control, except quackgrass, generally was good (77 to 92%) with PP or PRE Kixor (Sharpen or Optill) plus glyphosate, and greater than weed control with glyphosate on May 20 [4 days after treatment (DAT)] (Table). On May 29 (13 DAT), weed control was similar with glyphosate and Kixor plus glyphosate treatments, and all treatments provided excellent (92 to 99%) weed control. Kochia control declined to 72 to 76% with Kixor treatments on July 2 (47 DAT). POST glyphosate provided good to excellent (85 to 96%) control of kochia when evaluated on August 14 and September 18. No crop response was observed (data not shown). Soybean seed yield was similar among treatments, although yield tended to be highest with Sharpen + Extreme.

Table.		Weed control ¹														Soybean						
Herbicide		5/20														Seed						
Treatment ²	Rate fl oz product/	Timing ³	Qugr	Voba	Faca	Shpu	KOCZ	Yews	Qugr	Shpu	KOCZ	Yews	Qugr	KOCZ	7/2	8/14	9/18	KOCZ	KOCZ	yield	bu/A	
%																						
Untreated check	x	x	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19.6	
Glyphosate	22	PP	40	67	39	65	40	55	95	95	96	99	98	83	50	88	91	88	91	88	21.0	
Glyt + 2,4-De	22+16	PP	43	75	64	67	40	55	96	97	98	99	94	86	66	85	87	85	87	85	22.2	
Sharpen + glyt	1+22	PP	76	82	87	87	86	85	96	96	98	99	96	89	72	88	89	88	89	88	26.3	
Optill + glyt	2+22	PP	72	77	86	85	86	85	97	99	97	99	96	96	75	89	92	89	92	89	21.0	
Sharpen + Extreme	1+ 48	PP	78	83	92	86	88	88	92	99	99	99	96	96	76	95	96	95	96	95	33.8	
Sharpen + pendamethalin+ glyt	1+ 32+	PRE	78	82	88	86	86	88	93	98	98	99	97	92	74	92	93	92	93	92	22.5	
C.V. (%)			4.6	6.2	4.6	2.4	2.6	11.3	3.5	3.0	1.2	0.0	2.5	6.7	11.3	3.8	3.4	3.8	3.4	45.2		
LSD (0.05)			5	7	6	3	3	13	5	4	2	0	4	9	12	5	5	5	5	5	NS	

¹Qugr=quackgrass; Voba=volunteer barley; Faca=fairy candelabra; Shpu=sheperdspurse; KOCZ=kochia; Yews=yellow woodsorrel.

²Glyphosate=Roundup PowerMax (Monsanto); Sharpen=safinacil (BASF); Optill=safinacil&imazethapyr (BASF); Extreme=glyphosate&imazethapyr (BASF); pendamethalin=ProwH2O (BASF). Glyphosate and glyphosate + 2,4-De includes tank mixture of NIS=Preference (Winfield) at 0.25% v/v and AMS=Combelt Amstik (West Central) at 64 fl oz/A. All other treatments include tank mixture of MSO=Destiny HC (Winfield) at 1% v/v and AMS at 64 fl oz/A. POST treatment applied on July 2 across all plots except untreated check included glyphosate at 22 fl oz/A + NIS + AMS.

³PP=May 7; PRE=May 16.

Weed control and soybean response to glyphosate plus foliar supplements, Carrington, 2008.
(Greg Endres)

A field study was conducted at the NDSU Carrington Research Extension Center in cooperation with Loveland Products to examine weed control and soybean performance with glyphosate plus foliar supplements. Experimental design was a randomized complete block with three replications. The previous crop was spring wheat. The conventional-till trial was established on a Heimdal Emrick loam soil with 89 lb/A (0-24") nitrate-N, 15 ppm P, 231 ppm K, 8 lb/A (0-24") Cl (very low), 68 lb/A (0-24") S, 0.4 ppm B (very low), 0.72 ppm Zn, 64.6 ppm Zn, 12.4 ppm Mn, 0.68 ppm Cu, 425 ppm Mg, 2182 ppm Ca, 0% carbonate, 0.2 mmho/cm (0-6") and 0.26 mmho/cm (6-24") soluble salts, 15.1 meq CEC, 2.8% organic matter and 5.9 pH. Inoculated 'RG600RR' was planted in 7-inch rows at 200,000 seeds/A on May 19. Treatments were applied with a CO₂-pressurized hand-boom sprayer delivering 10 gal/A at 35 psi with 8001 flat-fan nozzles. The V2 soybean growth stage treatments were applied on July 1 with 83 F, 52% RH, 90% clear sky, and 9 mph wind to 4- to 5-leaf yellow and green foxtail, 1- to -inch tall common lambsquarters, wild buckwheat, and prostrate and redroot pigweed. Weed density generally was medium to high with all weeds except wild buckwheat. R3 soybean growth stage treatments were applied on July 31 with 76 F, 72% RH, 40% clear sky and 9 mph wind. The trial was harvested with a plot combine on October 2.

No crop response was observed from herbicide treatments and physiological maturity was similar among treatments (data not shown). Soybean seed yield was similar among treatments (Table). Common lambsquarters control was excellent (93-96%), and foxtail and pigweed control were good (83-88%) while wild buckwheat control was fair (68-78%) when evaluated one week after application of the V2 treatments. Foxtail, common lambsquarters, and pigweed control were excellent (96-98%) about three weeks after the application of the V2 treatments, while wild buckwheat control ranged from 77-86%. The second herbicide application at R2 provided excellent control of all weeds when evaluated on August 14.

Table.																	
Treatment					Weed control (%) ¹												
No.	Name	Rate	Unit	Timing	Yield	7/8				7/22				8/14			
						bu/A	fota	colq	piwe	wibw	fota	colq	piwe	wibw	fota	colq	piwe
1	Mad Dog	32	fl oz/a	V2	16.6	85	94	87	73	98	97	98	77	97	96	99	88
	LI 177	2	fl oz/a	V2													
	Choice Weather Master	0.5	%v/v	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
2	LI 6266	32	fl oz/a	V2	20.1	84	95	84	75	98	97	98	78	98	98	99	91
	Choice Weather Master	0.5	fl oz/a	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
3	Mad Dog Plus	32	fl oz/a	V2	18.0	88	96	84	68	98	98	98	81	97	98	99	86
	LI 177	2	fl oz/a	V2													
	Choice Weather Master	0.5	%v/v	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
4	LI 6267	32	fl oz/a	V2	19.9	85	96	85	73	98	98	98	83	97	99	99	88
	Choice Weather Master	0.5	%v/v	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
5	Mad Dog	32	fl oz/a	V2	20.3	85	95	83	75	97	98	98	86	97	98	99	91
	Choice Weather Master	0.5	%v/v	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
6	Mad Dog Plus	32	fl oz/a	V2	18.9	87	96	86	75	97	98	98	82	98	98	98	87
	Choice Weather Master	0.5	%v/v	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
7	Mad Dog Plus	32	fl oz/a	V2	19.2	84	93	84	78	97	98	96	81	97	97	98	88
	LI 6268	16	fl oz/a	V2													
	Choice Weather Master	0.5	%v/v	V2													
	LI 700	0.25	%v/v	V2													
	Makaze	32	fl oz/a	R2													
	Choice Weather Master	0.5	%v/v	R2													
C.V. (%)					10.1	3.1	2.0	6.5	7.1	0.6	0.9	1.1	4.5	1.1	0.8	1.1	7.7
LSD (0.05)					NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1	NS	NS

¹fota=yellow and green foxtail; colq=common lambsquarters; piwe=prostrate and redroot pigweed; wibw=wild buckwheat.

Ignite in Liberty Link soybean. Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak. Two identical studies were conducted near Buffalo Prosper, ND, to evaluate weed efficacy and yield in Liberty Link soybean weed control programs. Liberty Link 'SO80118' was planted on June 2 in Buffalo, and June 3, 2009 in Prosper. In Buffalo PRE applications were applied on June 3 at 10:10 am with 55 F air, 56 F soil at a four inch depth, 29% relative humidity, 10% cloud cover, 3 to 5 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 40.4% sand, 40.5% silt, 19.1% clay, loam texture, 3.9% OM, and 7.9 pH. 22 DAE (44DAE were not applied do to weed free plots from 22 DAE applications) were applied June 30 at 11:30 am with 73 F air, 75 F soil surface, 35% relative humidity, 0% clouds, 8 to 12 mph N wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V1 to V2 (3 to 4 inch) soybean. Weed species present at the time of POST applications were: 1 to 3 inch (1 to 3/yd²) common lambsquarters; 1 to 3 inch (1 to 2/yd²) redroot pigweed; 0.5 to 1 inch (1/yd²) easternblack nightshade; 2 to 6 inch (1 to 2/yd²) common mallow, 1 inch (1/yd²) biennial wormwood, and 1 to 2 inch (1/yd²) common cocklebur.

At Prosper, PRE applications were applied on June 3 at 9:10 am with 65 F air, 52 F soil at a four inch depth, 32% relative humidity, 10% cloud cover, 3 to 6 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 28.9% sand, 48.2% silt, 22.9% clay, loam texture, 4.8% OM, and 6.8 pH. 22 DAE (44DAE were not applied do to weed free plots from 22 DAE applications) were applied June 30 at 9:45 am with 65 F air, 64 F soil surface, 68% relative humidity, 0% clouds, 8 to 12 mph NW wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V2 to V3 (7 to 11 inch) soybean. Weed species present at the time of POST applications were: 3 to 12 inch (1 to 5/yd²) yellow foxtail; 1 to 3 inch (1 to 5/yd²) common lambsquarters; 1 to 3 inch (1 to 5/yd²) redroot pigweed; 1 to 2 inch (1/yd²) hairy nightshade; 1 to 3 inch (1 to 2/yd²) common ragweed; and 1 to 3 inch (1/yd²) common cocklebur.

Treatments were applied to the entire 20 feet 30 foot plots with a backpack-type plot sprayer and a 10 foot boom delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for all applications. The experiment had a randomized complete block design with three replicates per treatment.

At Buffalo and Prosper, July 21 and August 4 ratings were unchanged from the July 15 ratings (data not shown). No soybean injury was observed at either location. The trial in Prosper was not yielded do to excess white mold lodging. Most treatment provided excellent weed control. Yield was generally similar for all treatments. Moisture and test weight were taken with a Dickey John Mini-Gac moisture tester, moisture was standardized to 13% moisture. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Ignite in Liberty Link Soybean, Buffalo (Zollinger, Ries, and Kazmierczak).

Treatment	Rate (product/A)	21 DAT - PRE					July 8					July 15					Soyb Yield bu/A	Soyb test wt lb/bu
		Rrpw	Colq	Blww	Cocb	Coma	Rrpw	Colq	Blww	Cocb	Coma	Rrpw	Colq	Blww	Cocb	Coma		
<u>PRE/22 DAE/(44DAE)</u>																		
Valor SX/ignite+	2oz/22fl oz+	95	95	95	90	95	95	95	90	92	99	98	99	99	96	55.9	58	
AMS	8.5lb/100 gal																	
Authority First/ignite+	4oz/22fl oz+	99	99	99	99	99	99	99	99	99	99	99	99	99	99	50.2	58	
AMS	8.5lb/100 gal																	
Sharpen/ignite+	1oz/22fl oz+	99	99	99	99	99	99	99	99	82	99	95	99	99	93	53.2	58	
AMS	8.5lb/100 gal																	
<u>PRE/22 DAE</u>																		
Valor SX/ignite+	2oz/22fl oz+	95	93	95	90	92	95	93	90	92	99	98	99	99	91	56.5	58	
AMS	8.5lb/100 gal																	
Authority First/ignite+	4oz/22fl oz+	99	99	99	99	99	99	99	99	99	99	99	99	99	99	48.0	58	
AMS	8.5lb/100 gal																	
<u>22 DAE</u>																		
Ignite+	22fl oz+																	
AMS	8.5lb/100 gal										94	80	75	99	60	58.1	58	
<u>22 DAE/(44DAE)</u>																		
Ignite+	22fl oz+																	
AMS	8.5lb/100 gal										99	99	99	99	99	54.8	58	
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	49.6	58	
LSD (0.05)		0	2	0	0	4	0	2	0	4	5	10	13	0	11	11	ns	

Table. Ignite in Liberty Link Soybean, Prosper (Zollinger, Ries, and Kazmierczak).

Treatment	Rate (product/A)	21 DAT - PRE										July 15									
		Yeft	Rrpw	Colq	Wimu	Wibw	Hans	Corw	Cocb	Yeft	Rrpw	Colq	Wimu	Wibw	Hans	Corw	Cocb				
<u>PRE/22 DAE/(44DAE)</u>																					
Valor SX/Ignite+	2oz/22fl oz+																				
AMS	8.5lb/100 gal	50	70	70	70	72	85	50	20	83	99	99	99	99	99	99	99				
Authority First/Ignite+	4oz/22fl oz+																				
AMS	8.5lb/100 gal	50	88	99	99	99	99	83	83	82	99	99	99	99	99	99	99				
Sharpen/Ignite+	1oz/22fl oz+																				
AMS	8.5lb/100 gal	50	62	99	69	99	99	72	99	58	62	99	99	99	72	99	99				
<u>PRE/22 DAE</u>																					
Valor SX/Ignite+	2oz/22fl oz+																				
AMS	8.5lb/100 gal	50	70	70	70	72	85	50	20	72	99	99	99	99	99	99	99				
Authority First/Ignite+	4oz/22fl oz+																				
AMS	8.5lb/100 gal	50	90	99	99	99	99	85	77	50	99	99	99	99	99	99	99				
<u>22 DAE</u>																					
Ignite+	22fl oz+																				
AMS	8.5lb/100 gal									27	50	50	50	50	50	50	50				
<u>22 DAE/(44DAE)</u>																					
Ignite+	22fl oz+																				
AMS	8.5lb/100 gal									82	99	99	99	99	99	99	99				
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
LSD (0.05)		0	3	0	3	3	0	3	4	6	2	0	0	0	2	0	0				

Yield in Liberty Link and Roundup Ready soybean. Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak. An experiment was conducted near Buffalo, ND, to evaluate yield to two Liberty Link varieties and one Roundup Ready variety. Ignite weed control programs were applied to Liberty Link soybean and Roundup. PowerMax weed control program was applied to Roundup Ready soybean. Liberty Link 'SO80118' and Liberty Link 'SO80119' and Pioneer '90M60' Roundup Ready soybean was planted on June 5, 2009 followed by PRE applications at 11:55 am with 52 F air, 59 F soil at a four inch depth, 39% relative humidity, 5% cloud cover, 3 to 5 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 40.4% sand, 40.5% silt, 19.1% clay, loam texture, 3.9% OM, and 7.9 pH. 22 DAE (44DAE were not applied do to weed free plots from 22 DAE applications) were applied July 8 at 9:00 am with 69 F air, 75 F soil surface, 70% relative humidity, 0% clouds, 3 to 7 mph E wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V1 to V3 (6 to 10 inch) soybean. Weed species present at the time of POST applications were: 1 to 2 inch (1 to 2/yd²) common lambsquarters; cotyledon to 2 inch (1 to 2/yd²) redroot pigweed; 1 inch (1 to 3/yd²) easternblack nightshade; and cotyledon to 1 inch (1/yd²) biennial wormwood. Treatments were applied to the entire 30 feet 50 foot plot with a backpack-type plot sprayer and a 10 foot boom delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for all applications. The experiment had a randomized complete block design with six replicates per treatment.

All PRE and POST treatments gave 99% control of redroot pigweed, common lambsquarters, and eastern black nightshade, and 70% control of biennial wormwood (data not shown). All soybean types were planted at 58 lbs/A. Stine 'SO80118' soybean had 60 to 75% white mold on the top 1/3 of stems. Pioneer '90M60' soybean had 30 to 50% white mold on the top 1/3 of stems. Stine 'SO80119' soybean had 5 to 15% white mold on the top 1/3 of stems. Moisture and test weight was taken with a Dickey John Mini-Gac moisture tester, moisture was standardized to 13% moisture. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Yield in Liberty Link and Roundup Ready Soybean (Zollinger, Ries, and Kazmierczak).

Treatment	Rate (product/A)	Soybean	Soyb	Soyb
		Variety	Yield - bu/A -	Test wt - lbs/bu -
PRE/22 DAE				
Authority First+Ignite+AMS	4oz/22fl oz+8.5lb/100gal	Stine 'SO80118'	44.4	58
Authority First+Roundup PowerMax+AMS	4oz/22fl oz+8.5lb/100gal	Pioneer '90M60'	41.7	57
Authority First+Ignite+AMS	4oz/22fl oz+8.5lb/100gal	Stine 'SO80119'	46.1	58
LSD (0.05)			7	1

Liberty Link and Roundup Ready soybean with seed treatments. Zollinger, Richard K., Jerry L. Ries, and Angela J. Kazmierczak. Two experiments were conducted near Buffalo, ND, to evaluate seed treatments on two soybean types, Roundup Ready seed and Liberty Link seed. Ignite weed control programs were applied to Liberty Link soybean and Roundup PowerWeather weed control program were applied to Roundup Ready soybean. Applications were made at the same time for both studies. Liberty Link 'SG0979LL' and Stine '03064' Roundup Ready soybean was planted on June 3. PRE treatments were applied at 11:00 am with 65 F air, 56 F soil at a four inch depth, 24% relative humidity, 10% cloud cover, 3 to 5 mph N wind, dry soil surface and moist subsoil. Soil characteristics were: 40.4% sand, 40.5% silt, 19.1% clay, loam texture, 3.9% OM, and 7.9 pH. 22 DAE (44DAE were not applied do to weed free plots from 22 DAE applications) were applied July 8 at 9:25 am with 69 F air, 75 F soil surface, 70% relative humidity, 0% clouds, 3 to 7 mph E wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V2 to V3 (6 to 10 inch) soybean. Weed species present at the time of POST applications were: 1 to 2 inch (1 to 2/yd²) common lambsquarters; cotyledon to 2 inch (1 to 2/yd²) redroot pigweed; 1 inch (1 to 3/yd²) easternblack nightshade; cotyledon to 1 inch (1/yd²) biennial wormwood. R3 applications were made on August 17 at 10:00 am with 54 F air, 78 F soil surface, 54% relative humidity, 0% clouds, 5 to 8 mph w wind, moist soil surface, moist subsoil, good crop vigor and no dew present to R3 (23 to 33 inch) soybean. Treatments were applied to the entire 10 feet 30 foot plot with a backpack-type plot sprayer and a 10 foot boom delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for all applications. The experiment had a randomized complete block design with six replicates per treatment.

Seed Treatments: Liberty Link and Roundup Ready soybean treated by Bayer.

Treatment 1 = Pro-ized red colorant at 1oz/cwt.

Treatment 2 = Trilex 2000 at 1oz/cwt + Yield Shield at 0.1oz/cwt + Aeris Seed Applied System at 12.1 oz/cwt + GB 126 at 5m/1000 seeds + Pro-ized red colorant at 1 oz/cwt.

Treatment 3 = Trilex 2000 at 1oz/cwt + Yield Shield at 0.1oz/cwt + Aeris Seed Applied System at 12.1 oz/cwt + GB 126 at 5m/1000 seeds + Pro-ized red colorant at 1 oz/cwt.

Treatment 4 = Trilex 2000 at 1oz/cwt + Yield Shield at 0.1oz/cwt + Aeris Seed Applied System at 12.1 oz/cwt + GB 126 at 5m/1000 seeds + Pro-ized red colorant at 1 oz/cwt.

Soybean observations were taken on July 14, for soybean injury and stand count. Stand counts were made at one measurement on rows 3, 4, 5 in each plot (1 square foot was used).

In both studies, all treatments gave 99% control of redroot pigweed, common lambsquarters, and eastern black nightshade on June 25 and July 8 (data not shown). Also, in both studies, all treatments gave about 70% biennial wormwood control on June 25 and July 8 (data not shown). In both studies, all POST treatments gave 99% control of redroot pigweed, common lambsquarters, eastern black nightshade, and biennial wormwood on July 14 (data not shown). All soybean types were planted at 58 lbs/A. Moisture and test weight was taken with a Dickey John Mini-Gac moisture tester, moisture was standardized to 13% moisture. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Liberty Link soybean, July 14, (weed control data shown) (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	Soyb leaf burn - % injury -	Row 3 plants - 1 foot -	Row 4 plants - 1 foot -	Row 5 plants - 1 foot -	Soyb Yield - bu/A -	Soyb test wt - lbs/bu -
<u>Trt 1/PRE/22 DAE</u> Seed Trt/Authority First/Ignite+AMS	Seed Trt/4oz/22fl oz+1.5lb	10	15	13	13	48.2	57
<u>Trt 2/PRE/22 DAE</u> Seed Trt/Authority First/Ignite+AMS	Seed Trt/4oz/22fl oz+1.5lb	12	13	14	13	47.1	58
<u>Trt 3/PRE/22 DAE/R3</u> Seed Trt/Authority First/Ignite+AMS/USF0731	Seed Trt/4oz/22fl oz+1.5lb/4fl oz	12	14	14	13	52.7	58
<u>Trt 4/PRE/22 DAE/R3</u> Seed Trt/Authority First/Ignite+AMS/ USF0731+Leverage	Seed Trt/4oz/22fl oz+1.5lb/ 4fl oz+3.8fl oz	12	14	13	13	46.8	57
LSD (0.05)		3	3	2	1	6	1

¹Seed Trt = Seed treatment, see above paragraph; USF0731 = a proprietary product from Bayer.

Table. Roundup Ready soybean, July 14 (weed control data shown) (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	Soyb leaf burn - % injury -	Row 3 plants - 1 foot -	Row 4 plants - 1 foot -	Row 5 plants - 1 foot -	Soyb Yield - bu/A -	Soyb test wt - lbs/bu -
<u>Trt 1/PRE/22 DAE</u> Seed Trt/Authority RUWMM+AMS	Seed Trt/4oz/22fl oz+1.5lb	10	11	11	11	38.6	55
<u>Trt 2/PRE/22 DAE</u> Seed Trt/Authority First/RUWMM+AMS	Seed Trt/4oz/22fl oz+1.5lb	12	10	10	11	38.2	57
<u>Trt 3/PRE/22 DAE/R3</u> Seed Trt/Authority First/RUWMM+AMS/USF0731	Seed Trt/4oz/22fl oz+1.5lb/4fl oz	14	11	11	10	39.5	57
<u>Trt 4/PRE/22 DAE/R3</u> Seed Trt/Authority First/RUWMM+AMS/ USF0731+Leverage	Seed Trt/4oz/22fl oz+1.5lb/ 4fl oz+3.8fl oz	12	12	12	9	37.9	57
LSD (0.05)		3	2	1	2	4	2

¹Seed Trt = Seed treatment, see above paragraph;RUWMM = Roundup WeatherMax; USF0731 = a proprietary product from Bayer.

Optimum GAT soybean. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from Optimum Gat soybean programs. Pioneer 'CEK-09-169' Optimum Gat soybean was planted on May 28, 2009 followed by the application of PRE treatments at 1:30 pm with 76 F air, 54 F soil at a four inch depth, 38% relative humidity, 5% cloud cover, 5 to 10 mph SW wind, dry soil surface and moist subsoil. Soil characteristics were: 28.9% sand, 53.2% silt, 22.9% clay, loam texture, 4.8% OM, and 6.8 pH. POST treatments were applied on June 30 at 9:15 am with 62 F air, 64 F soil surface, 72% relative humidity, 0% clouds, 8 to 11 mph NW wind, dry soil surface, wet subsoil, good crop vigor and no dew present to V1 to V2 (3 to 5 inch) soybean. Weed species present at the time of POST applications were: 2 to 5 inch (1 to 5/yd²) common lambsquarters; 1 to 4 inch (2 to 5/yd²) common ragweed; 2 to 4 inch (1 to 2/yd²) hairy nightshade; 2 to 6 inch (1/yd²) wild mustard; 1 to 6 inch (10 to 50/yd²) yellow foxtail; 1 to 3 inch (1 to 2/yd²) wild buckwheat; and 2 to 5 inch (5 to 25/yd²) redroot pigweed. MPOST applications were made on July 7 at 9:45 am with 75 F air, 44 F soil surface, 51% relative humidity, 90% cloud cover, 4 to 6 mph NE wind, dry soil surface and moist subsoil to V2 to V3 (6 to 10 inch) soybean. Weed species present at the time of POST applications were: 2 to 12 inch (10 to 75/ft²) yellow foxtail; 1 to 10 inch (1 to 5/yd²) redroot pigweed; 2 to 16 inch (1 to 2/yd²) common lambsquarters; 3 to 6 inch (<1/yd²) wild buckwheat; 2 to 8 inch (1 to 2/yd²) common ragweed; and 4 to 8 inch (1 to 2/yd²) wild buckwheat. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for EPOST and LPOST treatments. The experiment had a randomized complete block design with three replicates per treatment

On July 14 and 28, all treatments gave greater than 97% of redroot pigweed, common lambsquarters, wild mustard, hairy nightshade, and common cocklebur, although on July 28 yellow foxtail control was 99%. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Optimum GAT Soybean (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	28 DAT - PRE												
		Yeft	Rrpw	Colq	Wimu	Wlbw	Corw	Codb	Yeft	Wfbw	Corw	Wfbw	Corw	
-----% control-----														
PRE/POST														
Classic+Harmony GT/RUPM+	0.33oz+0.5oz+2oz/22fl oz+													
Harmony GT+Express SG+AMS	0.25oz+0.25oz+1b	55	99	97	99	87	84	91	76	94	82	94	96	
Classic+Harmony GT+Valor SX+RUPM/	0.33oz+0.5oz+2oz+22fl oz/													
Classic+Harmony GT+Express SG+AMS	0.33oz+0.25oz+0.25oz+2lb	55	90	92	99	90	81	87	75	99	75	99	93	
Classic+Harmony GT+Valor SX/	0.33oz+0.5oz+2oz/													
RUPM+AMS	22fl oz+2lb	48	99	85	99	91	79	79	73	99	75	99	83	
Classic+Resolve+Valor SX/	1oz+1oz+2oz/													
RUPM+AMS	22fl oz+2lb	75	97	89	99	93	81	68	88	96	80	99	95	
Valor SX/RUPM+Classic+Harmony GT+	2oz/22fl oz+0.33oz+0.25oz+													
Express SG+2lb	0.25oz+2lb	53	64	74	99	63	66	30	74	99	74	99	84	
Authority First/RUPM+AMS	3oz/22fl oz+2lb	-	-	-	-	-	-	-	75	88	78	88	90	
MPOST														
RUPM+AMS	22fl oz+2lb								99	99	86	99	86	
RUPM+Classic+Harmony GT+	22fl oz+0.33oz+0.25oz													
Express SG+AMS	0.25oz+2lb								99	99	88	99	88	
RUPM+Harmony GT+	22fl oz+0.25oz+													
Express SG+AMS	0.25oz+2lb								99	98	86	98	86	
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	
LSD (0.05)		10	6	8	NS	12	13	13	7	5	8	4	6	

¹RUPM = Roundup PowerMax.

Tackle in Roundup Ready soybean. Zollinger, Richard K., Jerry L. Ries, Angela J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from Tackle treatments applied at two application timings. Burndown (21 days before planting) treatments and PRE's were applied on May 28, 2009, at 2:00 pm with 77 F air, 54 F soil at a four inch depth, 39% relative humidity, 5% clouds, 7 to 10 mph S wind, dry soil surface and wet subsoil, followed by the planting of Asgrow 'AG0803' Roundup Ready soybean. Soil characteristics were: 28.9% sand, 48.2% silt, 22.9% clay, loam texture, 4.8% OM and 6.8 pH.

POST applications (21 days after planting) were made on June 26 at 9:35 am with 77 F air, 74 F soil surface, 54% relative humidity, 10% clouds, 6 to 8 mph SE wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to cotyledon to V1 (3 to 4 inch) soybean. Weed species present at the time of POST treatments were: 1 to 3 inch (1 to 5/yd²) common lambsquarters; 0.5 to 3 inch (5 to 30/yd²) common ragweed; 1 to 3 inch (1 to 2/yd²) hairy nightshade; 3 inch to bloom (1 to 3/yd²) wild mustard; 1 to 3 inch (5 to 20/ft²) yellow foxtail; 1 to 3 inch (1 to 10/yd²) redroot pigweed; 1 to 3 inch (<1/yd²) common cocklebur; and 2 to 5 inch diameter (1 to 2/yd²) wild buckwheat. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plot with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for Burndown and PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

Burndown and PRE treatments were made at the same time because of the late, wet cool spring. No soybean injury was observed except treatment 2 showed 10 to 15% decrease in growth and a 20 to 25% increase in chlorosis, likely due to the two passes of Tackle. On July 10, all treatments gave 99% control of yellow foxtail, redroot pigweed, common lambsquarters, wild mustard, wild buckwheat, and hairy nightshade (data not shown). On July 31, all treatments gave 99% control of yellow foxtail, redroot pigweed, and wild buckwheat (data not shown). Tackle is a formulation of glyphosate plus Pursuit (imazethapyr) similar to Extreme. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Tackle in Roundup Ready soybean (Zollinger and Ries).

Treatment ¹	Rate (product/A)	June 25					July 10					July 31					
		Yeft	Rrpw	Colq	Wimu	Wifw	Hans	Corw	Cocb	Corw	Cocb	Corw	Cocb	Corw	Cocb	Corw	Cocb
		-----% control-----					-----% control---					-----% control-----					
<u>Burndown</u>																	
Tackle+AMS+R-11	1qt+17lb/100gal+0.25%v/v	80	99	80	99	70	99	50	50	53	99	99	99	99	53	99	99
<u>Burndown/PRE</u>																	
Tackle+AMS+R-11/ CHA-019	1qt+17lb/100gal+0.25%v/v+ 1qt	82	99	80	99	70	99	50	50	70	99	85	99	70	77	70	75
<u>Burndown/POST</u>																	
Tackle+AMS+R-11/ Tackle+AMS+R-11	1qt+17lb/100gal+0.25%v/v/ 1qt+17lb/100gal+0.25% v/v	82	99	80	99	72	99	50	50	88	99	99	99	99	99	99	99
Glyfos Xtra/ Tackle +AMS+R-11	1qt+17lb/100gal+0.25% v/v 1qt/	8	5	3	0	0	12	10	0	99	99	99	99	99	99	99	99
Glyfos Xtra/ Extreme+AMS+R-11	3pt+17lb/100gal+0.25% v/v 1qt/	7	3	7	10	0	10	10	0	99	99	99	99	99	99	99	99
Glyfos Xtra/ Tackle +AMS+R-11	2qt+17lb/100gal+0.25% v/v	5	2	3	10	0	12	10	0	99	99	99	68	99	99	99	99
LSD (0.05)		4	3	4	10	2	3	8	7	7	NS	4	12	2	6	4	4

¹CHA-019 = a proprietary product from Cheminova.

Weed management in Roundup Ready soybean. Zollinger, Richard K., Jerry L. Ries, and Angela. J. Kazmierczak. An experiment was conducted near Prosper, ND, to evaluate weed control from soybean herbicide tank-mixes. Treatments were applied 7 day early postemergence (7 EPP). 7 EPP treatments were applied on May 28, 2009 at 10:00 pm with 65 F air, 47 F soil at a four inch depth, 47% relative humidity, 0% cloud cover, 8 to 12 mph SW wind, dry soil surface and moist subsoil. Soil characteristics were: 28.7% sand, 49.7% silt, 21.6% clay, loam texture, 4.2% OM, and 7.2 pH. Asgrow 'AG 0803' soybean was planted on June 3. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plot with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet nozzles for 7 EPP treatments. The experiment had a randomized complete block design with three replicates per treatment.

Ratings from 35 and 49 DAT evaluations are not shown due to very little to no change in weed ratings when compared to 21 DAT ratings. No injury was observed. Envive was the only tank-mix partner with glyphosate that gave over 90% control of all weed species. However, Envive contains Classic (chlorimuron) and should not be used in North Dakota due to very long chemical residue in the soil and severe crop rotation restrictions. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Weed management in Roundup Ready soybean (Zollinger, Ries, and Kazmierczak).

Treatment ¹	Rate (product/A)	21 DAT - 7 EPP						
		Yeft	Rrpw	Colq	Wimu	Hans	Corw	Cocb
		----- % control -----						
RUWM+AMS+2,4-D Ester+	22fl oz+2% v/v+0.5pt+	7	20	20	20	20	20	20
Lorox	1lb	40	23	23	23	23	23	23
FirstRate	0.3oz	73	63	80	93	99	77	95
Prowl H ₂ O	1qt	68	68	65	68	68	40	27
Valor SX	2oz	63	77	77	93	99	40	20
Valor SX	2.5oz	73	82	87	96	96	65	45
Valor XLT	3oz	77	99	75	99	99	73	80
Authority First	3oz	63	70	72	83	99	70	83
Authority First	4oz	57	50	53	96	96	40	20
Authority MTZ	8oz	50	43	43	63	43	20	20
Ganster FirstRate+Gangster Valor	1.5oz+0.3oz	77	85	73	99	99	82	83
Canopy EX	1.1oz	57	70	70	99	99	72	73
Canopy EX	2.25oz	50	72	72	99	99	70	68
Envive	2.5oz	90	95	95	99	99	88	88
Prefix	1qt	63	93	47	99	73	80	63
Extreme	3pt	85	99	63	91	99	63	78
LSD (0.05)		10	10	10	7	6	5	10

¹RUWM = Roundup WeatherMax.