Blue Section: Weed control in corn and soybean Page

Non-Crop application of glyphosate, dicamba, and other herbicides. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control on bare ground. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 2-6" at 2-3/ft2, cocb 6-8" at 1-2/yd2, yeft 2-4 lf at 2-3/yd2, rrpw 1-4" at 4-6/ft2, colq 1-2" at 1-2/yd2, and vol corn V3 at 1/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 pH. 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 through 11001 TT nozzles at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

All treatments resulted in excellent weed control at all timings.

Table. Non-Crop application of glyphosate, dicamba and other herbicides (Zollinger, Wirth, Adams).

Treatment	Rate	12, 22, & 42 DA POST					
		Yeft	Rrpw	Colq	Hans	Corw	Cocb
	(Product/A)	----------% control----------					
Clarity+RUPM[1]	8floz+22floz	99	99	99	99	99	99
Clarity+RUPM	16floz+22floz	99	99	99	99	99	99
Cobra+RUPM+COC[2]	10floz+22floz+1pt	99	99	99	99	99	99
Cobra+RUPM+COC	12.5floz+22floz+1pt	99	99	99	99	99	99
Cobra+RUPM+COC	16floz+22floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	8floz+22floz+10floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	8floz+22floz+12.5floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	16floz+22floz+10floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	16floz+22floz+12.5floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	8floz+22floz+10floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	8floz+22floz+12.5floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	16floz+22floz+10floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Cobra+COC	16floz+22floz+12.5floz+1pt	99	99	99	99	99	99
Clarity+RUPM+Flexstar+COC	16floz+22floz+0.75pt+1pt	99	99	99	99	99	99
V-10405+RUPM+COC	24floz+22floz+1pt	99	99	99	99	99	99
LSD (0.05)		0	0	0	0	0	0

[1]RUPM=Roundup Powermax

[2]COC=Crop Oil Concentrate

PRE applications in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to PRE herbicides. RR corn was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 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 TT nozzles for the PRE applications. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well. All products gave excellent weed control on redroot pigweed, common lambsquarters, and hairy nightshade but varied in control in common cocklebur and yellow foxtail. There was no corn injury.

Table. PRE applications in corn (Zollinger, Wirth, Adams).

		14, 28, and 56 DAA	14 DAA					56 DAA				
Treatment	Rate	Corn	Yeft	Rrpw	Colq	Hans	Cocb	Yeft	Rrpw	Colq	Hans	Cocb
	(Product/A)	-% inj-	----------% control----------					----------% control----------				
Untreated		0	0	0	0	0	0	0	0	0	0	0
A20540	2qt	0	99	99	99	99	99	99	99	99	99	99
Acuron	2.5qt	0	99	99	99	99	99	99	99	99	99	99
SureStart II	2pt	0	99	99	99	99	75	99	99	99	99	83
Corvus	5.6floz	0	99	99	99	99	78	99	99	99	99	95
Instigate	6oz	0	70	99	99	99	73	70	99	99	99	93
Verdict	16floz	0	87	99	99	99	72	87	99	99	99	82
LSD (0.05)		0	4	0	0	0	13	4	0	0	0	4

PRE followed by POST applications and POST alone applications. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to PRE, EPOST, and LPOST herbicides. RR/LL corn was planted on June 1, 2015. PRE was applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. EPOST treatments were applied on June 24, 2015 at 10:00 AM with 81 F air, 69 F soil at a four inch depth, 60% RH, 15% cloud cover, 3-5 mph SE wind, and moist soil moisture. Weeds present at the time of EPOST application were cocb 2-3" at 1-2/yd2, yeft 2 lf at 15-20/ft2, and wibw 2-3" at 1-2/yd2. LPOST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 2-3" at 1/yd2, cocb 4-6" at 1/yd2, yeft 2 lf at 4-6/yd2, rrpw 2-3" at 1/yd2, and colq 2-3" at 1/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 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 through 11002 TT nozzles for PRE and 8.5 gpa through 11001 TT nozzles for the EPOST and LPOSTapplications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well. All treatments resulted in excellent weed control after POST applications. There was no corn injury.

Table. PRE followed by POST applications and POST alone applications (Zollinger, Wirth, Adams).

		Prior to Post								14, 28, & 42 DAA							
Treatment[1]	Rate	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------							-% inj-	----------% control----------						
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PRE/LPOST V6 Corn																	
(PRE) Corvus+Atrazine	5.6floz+0.56lb																
(POST) RUPM[2]	32floz	0	99	99	99	99	99	99	57	0	99	99	99	99	99	99	99
(PRE) Corvus+Atrazine	4floz+0.56lb																
(POST) RUPM+Diflexx	32floz+8floz	0	99	99	99	99	99	99	57	0	99	99	99	99	99	99	99
(PRE) Corvus+Atrazine	4floz+0.56lb																
(POST) RUPM+Diflexx	32floz+10floz	0	99	99	99	99	99	99	47	0	99	99	99	99	99	99	99
(PRE) Corvus+Atrazine	4floz+0.56lb																
(POST) RUPM+Laudis+Diflexx	32floz+3floz+8floz	0	99	99	99	99	99	99	63	0	99	99	99	99	99	99	99
(PRE) Corvus+Atrazine	4floz+0.56lb																
(POST) RUPM+Laudis Flexx	32floz+32floz	0	99	99	99	99	99	99	40	0	99	99	99	99	99	99	99
(PRE) Corvus+Atrazine	4floz+0.56lb																
(POST) RUPM+Laudis Flexx	32floz+40floz	0	99	99	99	99	99	99	57	0	99	99	99	99	99	99	99
PRE/EPOST V4 Corn																	
(PRE) Corvus+Atrazine	4floz+0.56lb																
(EPOST) RUPM+Status	32floz+4floz	0	99	99	99	99	99	99	52	0	99	99	99	99	99	99	99
EPOST V4 Corn																	
(EPOST) Capreno+Atrazine	3floz+0.56lb																
+RUPM	+32floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(EPOST) Capreno+Atrazine	3floz+0.56lb																
+RUPM+Diflexx	+32floz+8floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(EPOST) Laudis+Atrazine	3floz+0.56lb																
+RUPM	+32floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(EPOST) Laudis+Atrazine	3floz+0.56lb																
+RUPM+Diflexx	+32floz+8floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(EPOST) Laudis Flexx+Atrazine	32floz+0.56lb																
+RUPM	+32floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(EPOST) Laudis Flexx+Atrazine	40floz+0.56lb																
+RUPM	+32floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(EPOST) Halex GT+Atrazine+NIS[3]	3.6pt+0.56lb+0.25%v/v	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	85
LSD (0.05)		0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0

[1] All POST treatments contained AMS and Interlock at rates of 17lb/100gal and 4floz/a respectively

[2] RUPM=Roundup Powermax

[3] NIS=Nonionic Surfactant

Tankmix applications in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to PRE and POST herbicides. RR/LL corn was planted on June 1, 2015. PRE was applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. POST treatments were applied on June 24, 2015 at 10:00 AM with 81 F air, 69 F soil at a four inch depth, 60% RH, 15% cloud cover, 3-5 mph SE wind, and moist soil moisture. Weeds present at the time of POST application were cocb 2-6" at 2/ft2, yeft 3 lf at 3-7/ft2, corw 2-3" at 5-10/ft2, rrpw 0-2" at 5-10/ft2, and colq 1-3" at 2-5/ft2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 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 through 11002 TT nozzles for PRE and 8.5 gpa through 11001 TT nozzles for the POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well. All treatments resulted in excellent weed control. There was no corn injury.

Table. Tankmix applications in corn (Zollinger, Wirth, Adams).

		14, 28, & 56 DAA							
Treatment	Rate	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------						
Untreated		0	0	0	0	0	0	0	0
PRE									
(PRE) Corvus+Atrazine	5.6floz+0.83lb	0	99	99	99	99	99	99	99
PRE/POST V4 Corn									
(PRE) Balance Flexx+Atrazine	4floz+0.56lb								
(POST) Laudis+RUPM[1]+Diflexx	3floz+22floz+8floz								
+MSO[2]+AMS	+1%v/v+8.5lb/100								
+Interlock	+4floz	0	99	99	99	99	99	99	99
(PRE) Balance Flexx	4floz								
(POST) Laudis+RUPM+Diflexx	3floz+22floz+8floz								
+Atrazine+MSO	+0.56lb+1%v/v								
+AMS+Interlock	+8.5lb/100+4floz	0	99	99	99	99	99	99	99
POST V4 Corn									
(POST) Capreno+RUPM+Atrazine	3floz+22floz+0.56lb								
+PO+AMS	+1%v/v+8.5lb/100	0	99	99	99	99	99	99	99
(POST) Capreno+RUPM+Diflexx	3floz+22floz+8floz								
+Atrazine+PO	+0.56lb+1%v/v								
+AMS	+8.5lb/100	0	99	99	99	99	99	99	99
(POST) Laudis+RUPM+Atrazine	3floz+22floz+0.56lb								
+MSO+AMS	+1%v/v+8.5lb/100	0	99	99	99	99	99	99	99
(POST) Laudis+RUPM+Diflexx	3floz+22floz+8floz								
+Atrazine+PO	+0.56lb+1%v/v								
+AMS	+8.5lb/100	0	99	99	99	99	99	99	99
(POST) Status+RUPM	4oz+22floz								
+Atrazine+AMS	+0.56lb+8.5lb/100	0	99	99	99	99	99	99	99
(POST) Lumax EZ	4pt	0	99	99	99	99	99	99	99
LSD (0.05)		0	0	0	0	0	0	0	0

[1] RUPM=Roundup Powermax

[2] MSO=Methylated Seed Oil; AMS=Ammonium Sulfate; PO=Petroleum Oil

POST tankmixes with tolpyralate in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to POST herbicides. RR/LL corn was planted on June 1, 2015. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 3-5" at 1/yd2, cocb 4-8" at 2-3/yd2, yeft 3 lf at 2-3/ft2, rrpw 3-5" at 5-7/ft2, and vemo 4-6" at 1/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 pH. 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 through 11001 TT nozzles for POSTapplications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Tolypyralate alone gave good to excellent weed control on all weeds. The addition of atrazine at 0.56lb/A to treatments resulted in excellent weed control of all weeds. There was corn injury when Dual II Magnum and Surpass were added to treatments.

Table. POST tankmixes with Tolpyralate in corn (Zollinger, Wirth, Adams).

Treatment	Rate	14 DAA								28 & 42 DAA							
		Corn	Yeft	Wimu	Rrpw	Colq	Wibw	Corw	Cocb	Corn	Yeft	Wimu	Rrpw	Colq	Wibw	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------							-% inj-	----------% control----------						
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tolpyralate +MSO[1]+AMS	1floz 1.5pt+8.5lb/100gal	0	99	99	99	93	82	77	84	0	99	99	99	93	92	87	91
Tolpyralate +MSO+AMS	1.35floz 1.5pt+8.5lb/100gal	0	99	99	99	98	96	82	90	0	99	99	99	98	98	92	95
Tolpyralate+Atra[2] +MSO+AMS	1floz+0.56lb 1.5pt+8.5lb/100gal	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
Tolpyralate+Atra +MSO+AMS	1.35floz+0.56lb 1.5pt+8.5lb/100gal	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
Tolpyralate+Atra+D II M +MSO+AMS	1floz+0.56lb+1.5pt 1.5pt+8.5lb/100gal	10	99	99	99	99	99	99	99	10	99	99	99	99	99	99	99
Tolpyralate+Atra+Surpass +MSO+AMS	1.35floz+0.56lb+2pt 1.5pt+8.5lb/100gal	18	99	99	99	99	99	99	99	18	99	99	99	99	99	99	99
Tolpyralate+Atra+RUPM +MSO+AMS	1.35floz+0.56lb+22floz 1.5pt+8.5lb/100gal	12	99	99	99	99	99	99	99	12	99	99	99	99	99	99	99
Tolpyralate+Atra+Status +MSO+AMS	1.35floz+0.56lb+5oz 1.5pt+8.5lb/100gal	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
Tolpyralate+Atra+Diflexx +MSO+AMS	1.35floz+0.56lb+8floz 1.5pt+8.5lb/100gal	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
Laudis+Atrazine +MSO+AMS	3floz+0.56lb 1.5pt+8.5lb/100gal	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
Armezon+Atrazine +MSO+AMS	0.75floz+0.56lb 1.5pt+8.5lb/100gal	0	99	99	99	99	68	99	89	0	99	99	99	99	83	99	95
LSD (0.05)		2	0	0	0	2	5	2	3	2	0	0	0	2	3	2	3

[1] MSO=Methylated Seed Oil; AMS=Ammonium Sulfate

[2]Atra=Atrazine; D II M=Dual II Magnum; RUPM=Roundup Powermax

Weed control programs in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to PRE, EPOST, and LPOST herbicides. RR/LL corn was planted on June 1, 2015. PRE was applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. EPOST treatments were applied on June 24, 2015 at 10:00 AM with 81 F air, 69 F soil at a four inch depth, 60% RH, 15% cloud cover, 3-5 mph SE wind, and moist soil moisture. Weeds present at the time of EPOST application were cocb 1-4" at 1-2/yd2, yeft 0.5-3" at 1/yd2, rrpw 0-3" at 10/ft2, and corw 0-3" at 1-3/yd2. LPOST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of LPOST application were corw 3-4" at 1/yd2, cocb 3-5" at 1/yd2, and rrpw 1-3" at 1/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 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 through 11002 TT nozzles for PRE and 8.5 gpa through 11001 TT nozzles for the EPOST and LPOSTapplications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well. All treatments gave excellent weed control on all weeds except for Outlook (PRE) followed by Roundup Powermax (EPOST) which was weak on wild buckwheat, common ragweed, and common cocklebur. There was no corn injury from all treatments.

Table. Weed control programs in corn (Zollinger, Wirth, Adams).

		Prior to EPOST								14, 28 & 42 POST							
Treatment[1]	Rate	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb
	(Product/A)	-% inj-	-% control-							-% inj-	-% control-						
PRE/EPOST 2-4" weeds																	
(PRE) Anthem Maxx	5floz																
(EPOST) RUPM[2]	22floz	0	99	99	99	99	99	99	50	0	99	99	99	99	99	99	99
(PRE) Athem Maxx+Atrazine	5floz+0.56lb																
(EPOST) RUPM	22floz	0	99	99	99	99	99	99	35	0	99	99	99	99	99	99	99
(PRE) Anthem+Stanza	5floz+4oz																
(EPOST) RUPM	22floz	0	99	99	99	99	99	99	98	0	99	99	99	99	99	99	99
(PRE) Anthem Maxx	5floz																
(EPOST) Solstice+RUPM	3.15floz+22floz	0	99	99	99	99	99	99	93	0	99	99	99	99	99	99	99
(PRE) Outlook	16floz																
(EPOST) RUPM	22floz	0	95	98	88	77	22	22	0	0	99	99	99	93	72	65	83
(PRE) Zemax	2qt																
(EPOST) RUPM	22floz	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
(PRE) Verdict	16floz																
(EPOST) RUPM	22floz	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
(PRE) SureStart II	2pt																
(EPOST) Durango	1qt	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
(PRE) SureStart II	2pt																
(EPOST) Durango+Atrazine	1qt+0.56lb	0	99	99	99	99	99	99	93	0	99	99	99	99	99	99	99
(PRE) SureStart II	2pt																
(EPOST) SureStart II+Durango	1.5pt+1qt	0	99	99	99	99	99	99	85	0	99	99	99	99	99	99	99
(PRE) Surpass NXT	2pt																
(EPOST) Durango+WideMatch	1qt+1pt	0	99	99	99	99	99	99	45	0	99	99	99	99	99	99	99
(PRE) GF-3471	2.75qt																
(EPOST) Durango	1qt	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	99
POST V3 corn																	
(POST) Solstice+RUPM	3.15floz+22floz																
+Superb HC	+1pt	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(POST) Solstice+RUPM	3.15floz+22floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(POST) Solstice+RUPM	3.15floz+22floz																
+Atrazine+Superb HC	+0.56lb+1pt	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(POST) Solstice+Anthem Maxx	2.5floz+2floz																
+RUPM+Superb HC	+22floz+1pt	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(POST) Anthem Maxx+RUPM	4floz+22floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(POST) Status+RUPM	5floz+22floz	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
(POST) Surestart II+Durango	2pt+1qt	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	99
LSD (0.05)		0	0	1	1	1	1	1	7	0	0	0	0	2	1	0	1

[1]All POST and EPOST treatments contained Ammonium Sulfate at 8.5lb/100gal of water

[2]RUPM=Roundup Powermax

POST HPPD applications in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Hillsboro, ND to evaluate weed control and corn injury to HPPD herbicides with adjuvants. RR corn was planted on June 10, 2015. POST treatments were applied on July 12, 2015 at 1:00 PM with 84 F air, 69 F soil at a four inch depth, 44% RH, 10% cloud cover, 4-6 mph NW wind, and adequate soil moisture. Weeds present at the time of POST application were colq 4-6" at 1-10/ft2, rrpw 3-5" at 1-10/ft2, and copl 6" at 1-3/ft2. Soil characteristics were: 40.4% sand, 32.5% silt, 27.1% clay, Clay Loam, 4.9% OM, and 7.7 pH. 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 TT nozzles for the POST applications. The experiment had a randomized complete block design with three replicates per treatment.

There was no corn injury.

Table. POST HPPD applications in corn (Zollinger, Wirth, Adams).

Treatment	Rate	7 DAA				14 & 28 DAA			
		Rrpw	Colq	Copl	Corn	Rrpw	Colq	Copl	Corn
	(Product/A)	-----% control-----			-% inj-	-----% control-----			-% inj-
Impact +NIS[1]+28%N [2]	0.75floz +0.25%v/v+2.5%v/v	62	57	43	0	62	57	37	0
Impact +NIS+28%N	1floz +0.25%v/v+2.5%v/v	72	80	50	0	72	80	42	0
AMV5879 +NIS+28%N	1.14oz +0.25%v/v+2.5%v/v	58	58	35	0	62	62	38	0
AMV5879 +NIS+28%N	1.71oz +0.25%v/v+2.5%v/v	43	53	37	0	43	53	32	0
AMV5879 +NIS+28%N	3.43oz +0.25%v/v+2.5%v/v	90	80	73	0	75	77	58	0
Impact+AMV5879 +NIS+28%N	0.75oz+1.14oz +0.25%v/v+2.5%v/v	80	85	65	0	78	85	62	0
Impact+AMV5879 +NIS+28%N	0.75floz+1.71oz +0.25%v/v+2.5%v/v	87	88	63	0	78	84	52	0
Impact+AMV5879 +NIS+28%N	0.75floz+3.43oz +0.25%v/v+2.5%v/v	92	92	78	0	90	90	75	0
Impact+AMV5879 +NIS+28%N	1floz+1.14oz +0.25%v/v+2.5%v/v	94	94	68	0	93	92	62	0
Impact+Atrazine +NIS+28%N	1floz+0.56lb +0.25%v/v+2.5%v/v	87	89	80	0	87	89	72	0
RUPM[3] +NIS+AMS	32floz +0.25%v/v+8.5lb/gal	99	81	89	0	99	92	95	0
LSD (0.05)		10	8	15	0	8	6	8	0

[1] NIS=Nonionic Surfactant

[2] 28%N=28% Nitrogen liquid fertilizer

[3]RUPM=Roundup Powermax

Early POST application of Armezon Pro in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to EPOST herbicides. RR corn was planted on June 1, 2015. EPOST treatments were applied on June 24, 2015 at 9:30 AM with 81 F air, 69 F soil at a four inch depth, 60% RH, 15% cloud cover, 3-5 mph SE wind, and moist soil moisture. Weeds present at the time of EPOST application were cocb 1-4" at 1-3/yd2, rrpw 0-2" at 10/ft2, corw 0-2" at 5/ft2, and yeft 1-5" at 15-20/ft2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 pH.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 TT nozzles for the EPOST applications. The experiment had a randomized complete block design with three replicates per treatment.

All products gave excellent weed control on all weeds except common cocklebur where there was variability in control. There was no corn injury.

Table. Early POST application of Armezon Pro in corn (Zollinger, Wirth, Adams).

Treatment	Rate	14 DAA								28 & 42 DAA							
		Corn	Yeft	Wimu	Rrpw	Colq	Wibw	Corw	Cocb	Corn	Yeft	Wimu	Rrpw	Colq	Wibw	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------							-% inj-	----------% control----------						
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BAS 67703[1] +MSO[2]+AMS	14floz +1%v/v+8.5lb/100gal	0	99	99	99	99	99	99	90	0	99	99	99	99	99	99	92
BAS 67703 +MSO+AMS	16floz +1%v/v+8.5lb/100gal	0	99	99	99	99	99	99	78	0	99	99	99	99	99	99	82
Capreno +PO+AMS	3floz +1%v/v+8.5lb/100gal	0	83	99	99	99	99	99	82	0	83	99	99	99	99	99	80
BAS 67703+RUPM[3] +MSO+AMS	14floz+16floz +1%v/v+8.5lb/100gal	0	99	99	99	99	99	99	95	0	99	99	99	99	99	99	95
BAS 67703+RUPM +MSO+AMS	16floz+16floz +1%v/v+8.5lb/100gal	0	99	99	99	99	99	99	95	0	99	99	99	99	99	99	95
Halex GT +NIS+AMS	3.6pt +0.25%v/v+8.5lb/100gal	0	99	99	99	99	99	99	93	0	99	99	99	99	99	99	90
Halex GT +NIS+AMS	4pt +0.25%v/v+8.5lb/100gal	0	99	99	99	99	99	99	95	0	99	99	99	99	99	99	93
BAS 67703+RUPM+Atrazine +MSO+AMS	14floz+16floz+0.56lb +1%v/v+8.5lb/100gal	0	99	99	99	99	99	99	99	0	99	99	99	99	99	99	93
BAS 67703+RUPM+Atrazine +MSO+AMS	16floz+16floz+0.56lb +1%v/v+8.5lb/100gal	0	99	99	99	99	99	99	93	0	99	99	99	99	99	99	90
Halex GT+Atrazine +NIS+AMS	3.6pt+0.56lb +0.25%v/v+8.5lb/100gal	0	99	99	99	99	99	99	95	0	99	99	99	99	99	99	95
Halex GT+Atrazine +NIS+AMS	4pt+0.56lb +0.25%v/v+8.5lb/100gal	0	99	99	99	99	99	99	95	0	99	99	99	99	99	99	95
LSD (0.05)		0	4	0	0	0	0	0	5	0	4	0	0	0	0	0	3

[1]BAS 67703=Armezon Pro=topramezone+dimethenamid

[2]MSO=Methylated Seed Oil; AMS=Ammonium Sulfate; PO=Petroleum Oil; NIS=Nonionic Surfactant

[3]RUPM=Roundup Powermax

POST application of Armezon and Status in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to POST herbicides. RR corn was planted on June 1, 2015. A PRE application of Dual II Magnum was applied on June 4, 2015 at 8:30 AM to help suppress grass weed species. Conditions at the time of PRE were 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 2-4" at 1-2/yd2, cocb 3-6" at 1-2/yd2, yeft 2 lf at 5-7/ft2, rrpw 2-4" at 2-4/yd2, and colq 1-2" at 1-2/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.4% OM, and 7.5 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 through 11002 TT nozzles for PRE and 8.5 gpa through 11001 TT nozzles for the EPOST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE Dual II Magnum application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicide well. The addition of an HPPD (Armezon or Laudis) increased grass control. After 42 DAA all treatments resulted in excellent broadleaf weed control. There was no corn injury.

Table. POST application of Armezon and Status in corn (Zollinger, Wirth, Adams).

		14 DAA								28 & 42 DAA							
Treatment	Rate	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb	Corn	Yeft	Rrpw	Colq	Hans	Wibw	Corw	Cocb
	(Product/A)	-% inj-	-----% control-----							-% inj-	-----% control-----						
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Armezon +MSO[1]+AMS	0.75floz +1%v/v+2.5lb/100gal	0	99	99	99	99	55	78	63	0	99	99	99	99	95	95	95
Status +NIS+AMS	5oz +0.25%v/v+2.5lb/100gal	0	42	99	99	99	99	87	88	0	42	99	99	99	99	95	95
Armezon+Status +PO+AMS	0.5floz+2.5oz +1%v/v+2.5lb/100gal	0	99	99	99	99	99	99	93	0	99	99	99	99	99	99	96
Armezon+Status +PO+AMS	0.75floz+3.25oz +1%v/v+2.5lb/100gal	0	99	99	99	99	99	93	93	0	99	99	99	99	99	93	96
Armezon+Status +PO+AMS	0.75floz+3.75oz +1%v/v+2.5lb/100gal	0	99	99	99	99	99	95	96	0	99	99	99	99	99	95	99
Laudis +MSO+AMS	3floz +1%v/v+2.5lb/100gal	0	99	99	99	99	57	73	62	0	99	99	99	99	99	99	99
Diflexx +PO+AMS	8floz +1%v/v+2.5lb/100gal	0	22	99	99	99	99	95	95	0	22	99	99	99	99	96	96
Diflexx +PO+AMS	12floz +1%v/v+2.5lb/100gal	0	22	99	99	99	99	99	95	0	22	99	99	99	99	99	96
Diflexx +PO+AMS	16floz +1%v/v+2.5lb/100gal	0	22	99	99	99	99	92	92	0	22	99	99	99	99	92	93
LSD (0.05)		0	3	0	0	0	4	5	5	0	3	0	0	0	0	3	2

[1] MSO=Methylated Seed Oil; PO=Petroleum Oil; NIS=Nonionic Surfactant; AMS=Ammonium Sulfate

Stratego in corn. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and corn injury to POST herbicides with Stratego. RR/LL corn was planted in mid May. POST treatments were applied on June 12, 2015 at 10:30 AM with 76 F air, 67 F soil at a four inch depth, 47% RH, 0% cloud cover, 8-10 mph SSW wind, and adequate soil moisture. There were no weeds present at the time of POST application. Soil characteristics were: 40.4% sand, 32.5% silt, 27.1% clay, Clay Loam, 4.9% OM, and 7.7 pH. 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 through 11001 TT nozzles for POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Table. Stratego in corn (Zollinger, Wirth, Adams).

Treatment	Rate	7 DAA Corn	14 DAA Corn	Corn
	(Product/A)	-% inj-	-% inj-	-Yield (bu/A)-
Untreated		0	0	136
Laudis+MSO[1]+AMS	32floz+1%v/v+17lb/100gal	28	17	155
Diflexx+PO+AMS	8floz+1%v/v+17lb/100gal	5	2	134
Capreno+PO+AMS	3floz+1%v/v+17lb/100gal	10	10	159
Stratego+NIS	2floz+0.125%v/v	0	0	155
Laudis Flexx+Stratego+MSO+AMS	32floz+2floz+1%v/v+17lb/100gal	32	12	157
Diflexx+Stratego+PO+AMS	8floz+2floz+1%v/v+17lb/100gal	23	7	181
Capreno+Stratego+PO+AMS	3floz+2floz+1%v/v+17lb/100gal	17	13	159
LSD (0.05)				

[1]MSO=Methylated Seed Oil; AMS=Ammonium Sulfate; NIS=Nonionic Surfactant; PO=Petroleum Oil

Weed control in corn. (Minot). The objective of this study was to evaluate various corn herbicides for crop safety and general weed control. Corn was planted May 11. Preemergence herbicides were applied May 15 and POST herbicides were applied June 9 (V2) and June 15 (V4). All treatments provided greater than 80% control of all weeds through mid-July. However, foxtail control was not sustained through the season.

Table 1. Weed control in corn. (1524)

Treatment[a]	Rate	Timing	Corn Injury			Weed Control[f] Yeft		
			Jun-10	Jun-27	Jul-11	Jun-10	Jun-27	Jul-11
			----------%----------			----------%----------		
Untreated			0	0	0	0	0	0
Gly[b] / Gly[b]	22 oz / 22 oz	V2 / V4	0	0	0	0	89	83
Acet / Liberty + Atra[c]	1.75 pt / 22 oz + 0.375 lb ai	PRE / V4	0	0	0	94	97	91
Acet / Gly + Atra[b]	1.75 pt / 22 oz + 0.375 lb ai	PRE / V4	0	0	0	97	97	92
Balance Pro / Gly + Atra[b]	2.5 oz / 22 oz + 0.375 lb ai	PRE / V4	0	0	0	83	92	94
Acet / Steadfast + Clarity + Atra[d]	1.75 pt / 0.75 oz + 4 oz + 0.375 lb ai	PRE / V4	0	3	3	97	98	93
Acet / Option + Status[d]	1.75 pt / 1.5 oz + 5 oz	PRE / V4	0	11	9	98	97	92
Acet + Clarity / Gly + Atra[b]	1.25 pt + 0.5 pt / 22 oz + 0.375 lb ai	PRE / V4	0	0	0	91	97	89
Zidua / Gly + Atra[b]	3 oz / 22 oz + 0.375 lb ai	PRE / V4	0	0	0	87	98	97
Sharpen + Outlook / Gly + Atra[b]	3 oz + 12.5 oz / 22 oz + 0.375 lb ai	PRE / V4	0	0	0	92	96	91
Acet / Armezon + Atra[e]	1.75 pt / 0.75 oz + 0.375 lb ai	PRE / V4	0	0	0	97	96	93
Acet / Capreno + Atra[e]	1.75 pt / 3 oz + 0.375 lb ai	PRE / V4	0	16	14	97	98	98
LSD (0.05)			NS	3.9	3.0	5.4	5.7	3.9

[a] *Gly=Glyphosate; Acet=Acetochlor; Atra=Atrazine*

[b] *Applied with AMS at 2.5 gal/100 gal*

[c] *Applied with AMS at 8.82 gal/100 gal*

[d] *Applied with MSO + UAN at 1.5 pt + 2 qt*

[e] *Applied with MSO + AMS at 1% + 2.5 gal/100 gal*

[f] *Yeft=Yellow foxtail; Wibw=Wild buckwheat; Colq=Common lambsquarters; Rrpw=Redroot pigweed*

Table 2. Weed control in corn. (1524)

Treatment[a]	Rate	Timing	Wibw		Colq		Rrpw		
			Jun-10	Jul-11	Jun-10	Jul-11	Jun-10	Jun-27	Jul-11
Untreated			0	0	0	0	0	0	0
Gly[b] / Gly[b]	22 oz / 22 oz	V2 / V4	0	90	0	95	0	99	80
Acet / Liberty + Atra[c]	1.75 pt / 22 oz + 0.375 lb ai	PRE / V4	70	97	73	99	99	99	96
Acet / Gly + Atra[b]	1.75 pt / 22 oz + 0.375 lb ai	PRE / V4	72	94	72	99	99	99	95
Balance Pro / Gly + Atra[b]	2.5 oz / 22 oz + 0.375 lb ai	PRE / V4	27	93	99	99	98	99	97
Acet / Steadfast + Clarity + Atra[d]	1.75 pt / 0.75 oz + 4 oz + 0.375 lb ai	PRE / V4	72	98	77	99	99	99	99
Acet / Option + Status[d]	1.75 pt / 1.5 oz + 5 oz	PRE / V4	72	98	75	99	99	99	99
Acet + Clarity / Gly + Atra[b]	1.25 pt + 0.5 pt / 22 oz + 0.375 lb ai	PRE / V4	92	97	96	99	98	99	95
Zidua / Gly + Atra[b]	3 oz / 22 oz + 0.375 lb ai	PRE / V4	57	93	63	97	90	99	99
Sharpen + Outlook / Gly + Atra[b]	3 oz + 12.5 oz / 22 oz + 0.375 lb ai	PRE / V4	97	98	99	99	99	99	98
Acet / Armezon + Atra[e]	1.75 pt / 0.75 oz + 0.375 lb ai	PRE / V4	73	86	77	99	97	99	99
Acet / Capreno + Atra[e]	1.75 pt / 3 oz + 0.375 lb ai	PRE / V4	72	99	75	99	99	99	99
LSD (0.05)			7.5	8.1	7.9	2.6	3.4	0	3.4

[a] *Gly=Glyphosate; Acet=Acetochlor; Atra=Atrazine*

[b] *Applied with AMS at 2.5 gal/100 gal*

[c] *Applied with AMS at 8.82 gal/100 gal*

[d] *Applied with MSO + UAN at 1.5 pt + 2 qt*

[e] *Applied with MSO + AMS at 1% + 2.5 gal/100 gal*

[f] *Yeft=Yellow foxtail; Wibw=Wild buckwheat; Colq=Common lambsquarters; Rrpw=Redroot pigweed*

Demonstration of 2,4-D resistant Corn. Howatt, Roach, and Harrington. The trial was initiated near Fargo, North Dakota. Enlist corn was seeded and preemergence treatments were applied on June 24 with an air temperature of 83°F, 49% relative humidity and dew point at 62°, sky with approximately 15% smoke haze, 5 mph wind at 225°, and dry top soil with moist subsoil at a temperature of 70°F. Post treatments were applied to 4 leaf corn, 2 to 6 leaf yellow foxtail, 3 to 8 inch redroot pigweed, 3 to 5 inch Venice mallow, 3 to 6 inch common mallow, 3 to 8 inch wild buckwheat, and 3 to 5 inch common lambsquarters on July 17 with 87°F, 47% relative humidity and dew point at 61°, sky with cloud-cover of 30%, 0 to 2 mph wind at variable degrees, and moist soil at 83°F. Treatments were applied with a backpack sprayer delivering 17 gpa at 40 psi through AIXR 11002 nozzles to a 7 foot wild area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Stage	7/24 yeft	7/24 rrpw	7/24 vema	7/24 coma	7/24 wibw	7/24 colq	7/24 wimu	8/4 corn	8/4 all weeds
	oz ai/A		%	%	%	%	%	%	%	%	%
Acet&Clpy&Flum/Glyt-D+AMS-L	16.7/16+2.5%	PRE/V4	93	99	95	94	99	96	99	0	99
Acet&Clpy&Flum/Glyt&2,4-D+AMS-L	16.7/23.4+2.5%	PRE/V4	96	99	97	96	95	99	99	0	99
Acet&Clpy&Flum/Glyt&2,4-D+AMS-L	16.7/31.2+2.5%	PRE/V4	96	99	98	94	98	99	99	0	99
Saff&Dime/Glyt-D+AMS-L	12.5/16+2.5%	PRE/V4	92	99	95	98	98	99	99	0	99
Acet&Clpy&Flum+Glyt-D+AMS-L	12.5+16+2.5%	V4	95	99	99	99	99	99	99	0	99
Acet&Clpy&Flum+Glyt&2,4-D+AMS-L	12.5+23.4+2.5%	V4	97	99	99	98	99	99	99	0	99
Acet&Clpy&Flum+Glyt&2,4-D+AMS-L	12.5+31.2+2.5%	V4	96	99	97	98	99	99	99	0	99
Saff&Dime+Glyt-D+AMS-Ltreated	12.5+16+2.5	V4	95	98	99	99	99	99	99	7	99
Check	0		0	0	0	0	0	0	0	0	0
CV			2	1	2	2	2	2	0	80	0
LSD 0.05			3	1	3	3	2	2	.	1	.

Late establishment and dry weather after seedbed preparation greatly reduced the number of weeds emerging relative to typical seedling establishment. As a result, weed pressure in plots treated with PRE herbicides was not different from plots receiving treatment at V4 stage only or the untreated check on July 17.

Saflufenacil caused substantial injury to corn, 21% on July 24 (data not shown). This injury did not express on new tissue as the plants grew but damaged leaves were still present on August 4.

Weed control was exceptional with all herbicide treatments. Herbicide efficacy was at least 92% July 24, and weeds were not present August 4 in plots treated with herbicide. New weed emergence was observed in check plots but not in other treated areas. The soil active herbicides likely remained present and became available to weeds as rain events occurred that initiated mid-season weed emergence.

PRE control of volunteer canola. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Hillsboro, ND to evaluate volunteer RR canola control using PRE herbicides. RR canola was planted on June 10, 2015. PRE treatments were applied on June 12, 2015 at 9:50 AM with 76 F air, 66.5 F soil at a four inch depth, 47% RH, 0% cloud cover, 8-10 mph SSW wind, and adequate soil moisture. Soil characteristics were: 40.4% sand, 32.5% silt, 27.1% clay, Clay Loam, 4.9% OM, and 7.7 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 TT nozzles for the PRE applications. The experiment had a randomized complete block design with three replicates per treatment.

There was a good activating rain two days after PRE application with good amounts of rain falling in the following weeks. Using Authority products (products tank mixed with sulfentrazone) resulted in increased efficacy of canola compared to other products.

Table. PRE control of volunteer canola (Zollinger, Wirth, Adams).

Treatment	Rate	21 DAA Cano	35 DAA Cano	49 DAA Cano
	(Product/A)	----------% control----------		
Spartan Charge	6floz	43	35	33
Authority Assist	6floz	98	96	89
Authority Assist	8floz	97	95	95
Authority MTZ	14oz	94	93	95
Authority First	5oz	99	99	99
Anthem Maxx	4floz	58	52	58
Verdict	5floz	43	33	28
Prowl H2O	2.5pt	12	23	25
LSD (0.05)		6	10	7

PRE herbicides on glyphosate resistant common ragweed 2. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Mayville, ND to evaluate round up resistant common ragweed control using PRE herbicides. PRE was applied on May 26, 2015 at 10:00 AM with 87 F air, 70 F soil at a four inch depth, 23% RH, 30% cloud cover, 1-3 mph E wind, and adequate soil moisture. 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 through 11002 TT nozzles for PRE applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

There was little rain to effectively activate PRE herbicides which may have resulted in decreased weed control. There was no soybean injury.

Table. PRE herbicides on glyphosate resistant common ragweed 2 (Zollinger, Wirth, Adams).

Treatment	Rate	14 DAA		28 DAA		42 DAA	
		Colq	Corw	Colq	Corw	Colq	Corw
	(Product/A)	-% control-		-% control-		-% control-	
(PRE) Panther	2.5oz	73	70	53	67	38	62
(PRE) Pursuit	4floz	67	67	68	73	68	72
(PRE) Metribuzin	7.5oz	63	63	63	63	72	60
(PRE) NUP-15008	12floz	90	85	75	88	72	88
(PRE) NUP-15008	15floz	95	93	87	95	75	96
(PRE) Panther+Pursuit+Metribuzin	2oz+3.2floz+6oz	95	95	92	95	82	90
(PRE) Panther+Pursuit+Metribuzin	2.5oz+4floz+7.5oz	95	95	93	95	87	93
(PRE) Authority Assist	8floz	92	70	72	70	72	58
(PRE) Optill	1.5oz	95	95	80	95	77	92
LSD (0.05)		6	6	13	6	11	5

PRE herbicide applications. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Mayville, ND to evaluate round up resistant common ragweed control using PRE herbicides. PRE was applied on May 26, 2015 at 10:00 AM with 87 F air, 70 F soil at a four inch depth, 23% RH, 30% cloud cover, 1-3 mph E wind, and adequate soil moisture. 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 through 11002 TT nozzles for PRE applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

There was little rain to effectively activate PRE herbicides which may have resulted in decreased weed control. There was no soybean injury.

Table. PRE herbicide applications (Zollinger, Wirth, Adams).

Treatment	Rate	14 DAA			28 DAA		
		Soy	Colq	Corw	Soy	Colq	Corw
	(Product/A)	-% inj-	-% control-		-%inj-	-% control-	
(PRE) Stalwart	32floz	0	77	23	0	50	23
(PRE) SA-0070124	32floz	0	90	40	0	70	40
(PRE) Authority Elite	32floz	0	83	45	0	67	40
(PRE) Prefix	32floz	0	92	62	0	80	62
LSD (0.05)		0	15	29	0	12	18

PRE applications in soybean 1. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE herbicide applications. RR soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well.

Table. PRE applications in soybean 1 (Zollinger, Wirth, Adams).

		14 DAA	28 & 42 DAA					
Treatment	Rate	Soy	Soy	Yeft	Rrpw	Colq	Corw	Cocb
	(Product/A)	-% inj-	-% inj-	----------% control----------				
Ransom	10.7oz	0	0	99	99	99	99	38
Glory	8oz	0	0	99	99	99	77	22
Valor	2.7oz	0	0	32	80	80	20	20
Fierce	3.75oz	0	0	40	99	99	28	23
Authority MTZ	12oz	0	0	93	99	99	78	48
Pummel	2pt	0	0	96	99	99	99	96
Latir	4.25oz	0	0	99	99	99	99	85
Torment	1pt	0	0	99	99	99	99	86
Untreated		0	0	0	0	0	0	0
LSD (0.05)		0	0	6	5	5	5	5

PRE applications of soybean 2. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE herbicide applications. RR soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well.

Table. PRE applications in soybean 2 (Zollinger, Wirth, Adams).

		28, 42, and 56 DAA					
Treatment	Rate	Soy	Yeft	Rrpw	Colq	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------				
Authority MTZ	11oz	0	90	98	98	87	78
Authority MTZ	16oz	0	95	99	99	93	83
Fierce+Sencor	3oz+4oz	0	95	99	99	72	43
Fierce+Sencor	4.5oz+6oz	12	95	99	99	90	82
Fierce+First Rate	3oz+0.3oz	0	95	99	99	95	92
Valor SX+Sencor	2oz+4oz	0	88	78	78	20	20
Fierce	3oz	0	90	91	91	20	20
LSD (0.05)		2	4	5	5	4	4

PRE applications in soybean 3. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE herbicide applications. RR soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 10:20 AM with 77 F air, 62 F soil at a four inch depth, 57% RH, 0% cloud cover, 1-5 mph NW wind, and adequate soil moisture. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well.

Table. PRE applications in soybean 3 (Zollinger, Wirth, Adams).

		14 DAA							28, 42, and 56 DAA						
Treatment	Rate	Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb	Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------						-% inj-	----------% control----------					
Blanket	6floz	0	83	87	87	52	15	13	0	83	87	87	52	22	20
Sonic	4oz	0	20	99	99	99	92	92	0	72	99	99	99	93	92
Sonic	5oz	0	20	99	99	99	99	99	0	20	99	99	99	83	99
Blanket+First Rate	7.5floz+0.5oz	0	20	93	93	75	83	98	0	63	95	95	87	80	98
Blanket+First Rate	7floz+0.38oz	0	23	93	93	63	68	75	0	73	93	93	95	82	92
Blanket+Glory	6.4floz+6.4oz	0	87	99	93	95	35	77	0	73	99	93	95	35	77
Blanket+Glory	6floz+6oz	0	93	99	96	85	58	87	0	93	99	96	85	88	90
Blanket+Glory	6.45floz+4.3oz	0	85	99	82	73	25	72	0	87	99	96	93	40	82
Authority MTZ	14oz	0	77	99	99	99	73	88	0	92	99	99	99	77	96
First Rate	0.5oz	0	20	47	47	47	65	85	0	53	95	93	92	62	92
Glory	6oz	0	23	72	57	20	25	30	0	48	72	57	20	25	30
Sonic+Blanket	4oz+2floz	0	45	99	99	99	72	60	0	48	99	99	99	67	58
Authority Assist	7floz	0	37	99	99	92	28	15	0	43	99	99	92	28	22
Blanket+Thunder Master	6floz+2pt	0	20	99	99	88	32	25	0	85	99	99	92	32	25
Authority Elite	25floz	0	43	99	99	99	13	17	0	99	99	99	99	10	17
Blanket+Brawl	6floz+2pt	0	93	99	99	83	17	17	0	93	99	99	93	23	25
LSD (0.05)		0	9	4	4	4	12	12	0	5	2	4	4	7	7

PRE herbicides on glyphosate resistant common ragweed 1. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Mayville, ND to evaluate round up resistant common ragweed control using PRE herbicides. PRE was applied on May 26, 2015 at 10:00 AM with 87 F air, 70 F soil at a four inch depth, 23% RH, 30% cloud cover, 1-3 mph E wind, and adequate soil moisture. 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 through 11002 TT nozzles for PRE applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

There was little rain to effectively activate PRE herbicides which may have resulted in decreased weed control. There was no soybean injury.

Table. PRE herbicides on glyphosate resistant common ragweed 1 (Zollinger, Wirth, Adams).

Treatment	Rate	28 DAA				42 DAA				56 DAA			
		Soy	Rrpw	Colq	Corw	Soy	Rrpw	Colq	Corw	Soy	Rrpw	Colq	Corw
	(Product/A)	-% inj-	-----% control-----			-% inj-	-----% control-----			-% inj-	-----% control-----		
(PRE) Authority MTZ	11oz	0	82	51	37	0	82	57	37	0	82	57	37
(PRE) Authority MTZ	16oz	0	87	68	60	0	87	75	60	0	92	92	60
(PRE) Fierce+Sencor	3oz+4oz	0	99	72	65	0	99	78	67	0	99	77	67
(PRE) Fierce+Sencor	4.5oz+6oz	0	99	82	76	0	99	78	77	0	99	73	77
(PRE) Fierce+First Rate	3oz+0.3oz	0	99	78	73	0	99	82	73	0	99	99	73
(PRE) Valor SX+Sencor	2oz+4oz	0	99	65	65	0	99	70	67	0	99	67	67
(PRE) Fierce	3oz	0	99	67	65	0	99	58	67	0	99	58	67
LSD (0.05)		0	3	9	6	0	3	8	6	0	3	9	6

Fall vs. spring applications for control of emerged glyphosate-resistant kochia. (Minot). The objective of this study was to compare kochia control with herbicides applied in the fall vs. spring. Herbicide treatments were applied to 8-12 inch kochia on Oct 8, 2014 and 0.5-4 inch kochia on May 21, 2015. Note that ALL treatments were applied with glyphosate. No crop was planted.

Spring-applied glyphosate provided only 25% control at the July 3 evaluation. There were probably some kochia that emerged after the spring application, but not a lot. Thus, the ratings mostly reflect control of kochia that was emerged at application. Only Fierce + Metribuzin provided greater than 90% kochia control at the July 3 evaluation. Spartan-containing products provided 70-80% control, which is less than observed in previous years. It is possible that spring kochia control with these contact-type herbicides may have been affected by low temperatures prior to application. The treatments were applied soon after a period of 12 days where nighttime temperatures were primarily in the mid to low 30's and daytime temperatures were primarily in the 40's and 50's. Fall-applied metribuzin provided very poor kochia control, while Fierce, Valor, and Spartan provided only fair control.

Table. Fall vs. spring applications for control of emerged glyphosate-resistant kochia. (1537)

Treatment[a]	Rate	Timing[b]	Kochia control			
			May-29	Jun-13	Jun-22	Jul-3
			----------%----------			
Untreated			0	0	0	0
Fierce	3 oz	Fall	90	85	85	76
Valor	3 oz	Fall	91	90	89	79
Metribuzin	0.5 lb	Fall	30	40	40	28
Spartan	5 fl oz	Fall	55	69	70	63
Glyphosate	22 fl oz	Spring	50	50	48	25
Gramoxone + Metribuzin + NIS	2 pt + 0.5 lb + 0.25%	Spring	99	97	93	87
Spartan	4 oz	Spring	60	75	76	72
Spartan Charge	5 fl oz	Spring	73	82	86	79
Spartan + Sharpen	4 fl oz+ 1 fl oz	Spring	68	75	78	70
Authority MTZ	12 oz	Spring	68	84	85	80
Fierce	3 oz	Spring	55	75	70	60
Fierce + Metribuzin	3 oz + 0.5 lb	Spring	80	95	95	91
Verdict + Metribuzin	5 fl oz + 0.5 lb	Spring	78	79	76	59
Verdict + Zidua	5 fl oz + 2.5 oz	Spring	81	79	77	59
LSD (0.05)			5.4	11.8	12.0	19.8

[a] *All treatments applied with Glyphosate + AMS (22 oz + 2.5 gal/100 gal); Glyphosate = 4.5 lb ae formulation*

[b] *Applied Oct 8, 2014 (kochia 8-12 inches) and May 21, 2015 (kochia 0.5-4 inches)*

Control of emerged kochia in a spring burndown. (Minot). The objective of the study was to evaluate emerged kochia control in a spring burndown. Treatments were applied May 21 to 0.5-4 inch kochia. Kochia at this site is suspected to be glyphosate resistant as control has been poor.

In previous studies, products containing sulfentrazone (e.g., Spartan, Spartan Charge, Authority MTZ) provided excellent control of emerged kochia when applied with MSO. In this 2015 study, these products provided only poor to fair kochia control. However, other products did not perform as well as in other years either such as Sharpen and Gramoxone.

It is possible that kochia control with these contact-type herbicides may have been affected by low temperatures prior to application. The treatments were applied soon after a period of 12 days where nighttime temperatures were primarily in the mid to low 30's and daytime temperatures were primarily in the 40's and 50's.

Table. Control of emerged kochia in a spring burndown. (1507)

Treatment	Rate	Timing[e]	Kochia control			
			May-29	Jun-13	Jun-22	Jul-3
			----------%----------			
Untreated			0	0	0	0
Glyphosate[a]	22 oz	PRE	57	58	50	37
Sharpen[b]	2 oz	PRE	73	72	68	60
Gramoxone[c]	2 pt	PRE	83	77	72	63
Liberty[d]	29 oz	PRE	80	72	63	55
Spartan[b]	4 oz	PRE	60	67	68	60
Spartan Charge[b]	5 oz	PRE	76	81	81	73
Spartan + Sharpen[b]	4 oz + 1 oz	PRE	80	89	89	83
Authority MTZ[b]	8 oz	PRE	58	68	68	60
Authority MTZ[b]	10 oz	PRE	65	77	76	67
Metribuzin[b]	0.5 lb	PRE	50	60	62	53
Metribuzin + Aim[b]	4 oz + 1 oz	PRE	78	82	82	73
LSD (0.05)			6.7	10.7	13.7	15.4

[a] *Applied with AMS (2.5 gal/100 gal)*

[b] *Applied with AMS + MSO (2.5 gal/100 gal + 1%)*

[c] *Applied with NIS (0.25%)*

[d] *Applied with AMS (8.82 gal/100 gal)*

[e] *Applied May 21 to 0.5-4 inch kochia*

Employing Fall and Spring Herbicide Treatments to Combat Glyphosate Resistant Kochia in Central North Dakota in Soybeans.

Mike Ostlie, Brian Jenks, and Greg Endres

In the fall of 2014 a study was initiated to evaluate the effectiveness of fall-applied herbicides when compared to spring-applied herbicide programs. The main objective was to identify if there were any fall applications that would provide kochia control similar to a typical spring application in a no-till setting. While kochia can emerge throughout the growing season, the majority of the population emerges within the first few weeks. The idea with a fall application is that the weed suppression will remain through this critical time-period and through soybean establishment, while also guaranteeing that the product is applied prior to weed emergence. The problem is that most fall-applied products will not remain effective enough to avoid a second burn-down application in the spring.

The study was conducted near Minot and Carrington. Fall applications were Nov 3rd in Carrington and Oct 8th in Minot 2014 while spring applications were May 8th in Carrington and May 21 in Minot in 2015. Soybeans were planted no-till into the trial area. It should be noted that kochia had already emerged on May 1, so the weed control ratings for the spring treatments are considered post-emergence whereas the fall treatments would be pre-emergence control of kochia. All treatments had MSO added to increase efficacy. In Minot, all treatments also included AMS and glyphosate. Herbicide effectiveness was visually measured after soybean planting.

There were several products evaluated as a fall or spring application. In Carrington in 2014-15, no product provided equal control in the fall as in the spring (Table 1). Although the fall application of Spartan at 8 oz/a equaled the spring application of Spartan applied at 5 oz/a. Even though that wouldn't be an equivalent comparison by rate, it at least shows that there were effective fall treatments this year in Carrington. In Minot, both Spartan and Fierce were as effective or more as a fall treatment in 2014-15, which was more similar to Carrington in 2013-14 where Spartan, Fierce, and Valor were statistically similar as fall or spring treatments.

Several other products were utilized as a spring-only. These products were used in combinations to provide residual kochia control throughout the season and to help with burn-down of existing plants (Table 2). In Carrington and Minot, several product combinations were highly effective at killing and maintaining kochia control. The Minot study was placed in a location with glyphosate resistant kochia, resulting in fairly low control with glyphosate alone (Table 1). Products with a short residual, like Sharpen and Verdict did not provide effective control in Carrington (data not shown). This was because a second flush of kochia emerged after the initial herbicide application. So although the products did kill the first flush of kochia, the residual component wore off and a new flush emerged with little residual activity. This adds to the conclusion that a longer residual product needs to be included with these herbicides.

Metribuzin was a critical component in the spring applications in Carrington 2015. This product alone or in combination was highly effective. Metribuzin should be a common addition to a PRE program prior to soybeans, even if paired only with glyphosate. The low cost of metribuzin and its kochia activity would provide a great boost to soybean producers. If glyphosate-resistant populations are abundant, mixing metribuzin with another burn-down and/or residual product, like Fierce or Gramoxone, will really create an effective mixture while also maintaining multiple modes of action. Spartan is likely to remain the

most effective stand-alone option for kochia, particularly when looking at the length of residual, however the cost/a will tend to promote cut rates. Spartan is also in the same herbicide family as Valor, Flexstar, Cobra, and other soybean herbicide options. In either case, Spartan or metribuzin can cause soybean injury in lighter soil textures and there are variety differences in tolerance to these products. It is a good idea to visit with a seed dealer to see if they have information on herbicide tolerance before using higher rates of these products.

For ~$22/a a combination of glyphosate, metribuzin, and Gramoxone could be used to combat heavy kochia infestations, which is roughly the same cost as Spartan alone.

Fall herbicide applications for kochia control can be effective if the environmental conditions are right. No-till producers may be more inclined to consider this application method to ensure early-season control of kochia. In 2014 and 2015 the kochia was growing long before soybeans were being planted. By the time typical soybean burn-down occurred, many kochia plants would have been too large to effectively manage if they were glyphosate resistant. With tight application windows in the spring between corn and soybean planting, fall herbicide applications would be one way to lessen the workload in the spring, while also ensuring product activation, and also ensuring that the product will be applied prior to kochia emergence. But a well-timed spring herbicide application is often going to be the most effective option, as evidenced by this study.

Fall vs spring herbicides for kochia control in no-till soybeans

Table 1. Summary of products that were used as fall and spring treatments

Carrington 2014-2015[1]

Product	Fall Rate	Spring Rate	Control from Fall App	Control from Spring App
	oz/a	oz/a	%	%
Authority MTZ	18	14	72.5	89.8
Spartan	5	5	62.5	86
Spartan	8	5	87.3	86
Fierce	3	3	51.3	91
Valor	3	3	40	75
Metribuzin	0.5 lb/a	0.5 lb/a	56.3	95
Broadaxe	25	25	45	73.8
		LSD (0.05)	14.4	

Minot 2014-2015[2]

Fierce	3	3	85	70
Valor	3	-	89	-
metribuzin	0.5 lb/a	-	40	-
Spartan	5	4	70	76
glyphosate	-	22	-	48
		LSD (0.05)	12	

Carrington 2013-2014

Broadaxe	25	25	56	83
Fierce	3	3	67	55
metribuzin	0.5 lb/a	0.5 lb/a	18	84
Spartan	8	5	84	72
Valor	3	3	60	60
		LSD (0.05)	14	

[1]All spring products were applied with MSO

[2]All spring products were applied with AMS+MSO

Table 2. Effectiveness of spring pre-emergent treatment combinations for controlling kochia in soybeans

Product	Rates	Control
	oz/a	%
Verdict + Zidua	7.5 + 3	87.3
Metribuzin + Sharpen	0.5 lb/a + 1.5	96.8
Fierce + metribuzin	3 + 0.5 lb/a	98
Authority MTZ + Sharpen	14 + 1.5	96
Spartan Charge	5	86
Gramozone + metribuzin	32 + 0.5 lb/a	93
Spartan + Sharpen	4 + 1	78
Fierce + metribuzin	3 + 0.5 lb/a	95
Verdict + metribuzin	5 + 0.5 lb/a	76
Verdict + Zidua	5 + 2.5	77
Carrington Treatments		
Minot Treatments		

Early pre-plant application on emerged weeds on bare, no-till land. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Mayville, ND to evaluate glyphosate resistant common ragweed control using early pre-plant followed by POST herbicide applications on bare, no-till ground. EPP was applied on June 8, 2015 at 9:15 AM with 72 F air, 64 F soil at a four inch depth, 61% RH, 0% cloud cover, 0-2 mph W wind, and adequate soil moisture. Weeds present at the time of EPP were colq 2-8" at 10-15/ft2, corw 1-4" at 5-10/ft2, wibw 2-6" at 1-5/yd2, and yeft 1-3" at 10-15/ft2. POST treatments were applied on June 30, 2015 at 2:00 PM with 85 F air, 71 F soil at a four inch depth, 43% RH, 100% cloud cover, 2-4 mph SE wind, and adequate soil moisture. Weeds present at the time of POST application in treatments were colq 1-4" at 2-4/ft2, rrpw 1-3" at 1-2/yd2, and corw 3-5" at 2-4/yd2. Soil characteristics were: 76.6% sand, 14% silt, 9.4% clay, Sandy Loam, 4.9% OM, and 7.8 pH. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa through 11001 TT nozzles for EPP and POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

All treatments gave excellent weed control on all weeds at 28 DA POST.

Table. Early pre-plant application on emerged weeds on bare, no-till land (Zollinger, Wirth, Adams).

		14 DA POST					28 DA POST				
Treatment	Rate	Rrpw	Colq	Wibw	Corw	Yeft	Rrpw	Colq	Wibw	Corw	Yeft
(Early Pre-Plant fb[1] POST)	(Product/A)	----------% control----------					----------% control----------				
(EPP[2]) Valor+Classic +Harmony SG+RUPM[3] (POST) RUPM+Clarity	1.96oz+0.32oz +0.5oz+22floz 22floz+16floz	99	99	99	99	82	99	99	99	99	93
(EPP) Valor+Classic +Harmony SG+RUPM+Clarity (POST) RUPM+Clarity	1.96oz+0.32oz +0.5oz+22floz+16floz 22floz+16floz	99	99	99	99	99	99	99	99	99	99
(EPP) Valor+Classic +Harmony SG+RUPM+Clarity (POST) RUPM+Clarity+Cinch	1.96oz+0.32oz +0.5oz+22floz+16floz 22floz+16floz+1pt	99	99	99	99	99	99	99	99	99	99
(EPP) Valor+Classic +Harmony SG+RUPM+Clarity (POST) RUPM+Prefix	1.96oz+0.32oz +0.5oz+22floz+16floz 22floz+2pt	99	99	99	99	99	99	99	99	99	99
(EPP) Valor+Express SG +Harmony SG+RUPM (POST) RUPM+Clarity	1.96oz+0.25oz +0.25oz+22floz 22floz+16floz	99	99	99	99	84	99	99	99	99	95
(EPP) Valor+Express SG +Harmony SG+RUPM+Clarity (POST) RUPM+Clarity	1.96oz+0.25oz +0.25oz+22floz+16floz 22floz+16floz	99	99	99	99	99	99	99	99	99	99
(EPP) Valor+Express SG +Harmony SG+RUPM+Clarity (POST) RUPM+Clarity+Cinch	1.96oz+0.25oz +0.25oz+22floz+16floz 22floz+16floz+1pt	99	99	99	99	99	99	99	99	99	99
(EPP) Valor+Express SG +Harmony SG+RUPM+Clarity (POST) RUPM+Prefix	1.96oz+0.25oz +0.25oz+22floz+16floz 22floz+2pt	99	99	99	99	99	99	99	99	99	99
(EPP) Authority MTZ (POST) RUPM	15oz 22floz	99	99	99	48	45	99	99	99	60	53
LSD (0.05)		0	0	0	2	4	0	0	0	3	4

[1] fb=followed by

[2] EPP=Early Pre-Plant

[3] RUPM=Roundup Powermax

PRE tankmix followed by POST application. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control using POST herbicides on tilled, bare ground. PRE was applied on June 8, 2015 at 11:30 AM with 80 F air, 62 F soil at a four inch depth, 57% RH, 0% cloud cover, 1-5 mph NW wind, and adequate soil moisture. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 1-3" at 1/yd2, cocb 4-8" at 1-8/ft2, yeft 2 lf at 1/yd2, and rrpw 1-2" at 1/yd2. Soil characteristics were: 25.3% sand, 46.4% silt, 28.3% clay, Clay Loam, 4.4% OM, and 7.5 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 through 11002 TT nozzles for PRE and 8.5 gpa through 11001 TT nozzles for the POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

All treatments resulted in excellent control at 42 DA POST for all weeds except common cocklebur, which gave good to excellent control depending on the treatment.

Table. PRE tankmix followed by POST application (Zollinger, Wirth, Adams).

		Prior to POST							28 & 42 DA POST						
Treatment	Rate	Wimu	Rrpw	Colq	Hans	Wibw	Corw	Cocb	Wimu	Rrpw	Colq	Hans	Wibw	Corw	Cocb
(PRE fb[1] POST)	(Product/A)	----------% control----------							----------% control----------						
(PRE) Valor+Classic+Harmony SG	1.96oz+0.32oz+0.5oz														
(POST) RUPM[2]+Clarity	22floz+16floz	99	99	99	99	99	98	55	99	99	99	99	99	99	99
(PRE) Valor+Classic+Harmony SG	1.96oz+0.32oz+0.5oz														
(POST) RUPM+Clarity+Cinch	22floz+16floz+1pt	99	99	99	99	99	88	62	99	99	99	99	99	99	96
(PRE) Valor+Classic+Harmony SG	1.96oz+0.32oz+0.5oz														
(POST) RUPM+Prefix	22floz+2pt	99	99	99	99	99	72	63	99	99	99	99	99	99	88
(PRE) Valor+Express SG+Harmony SG	1.96oz+0.25oz+0.25oz														
(POST) RUPM+Clarity	22floz+16floz	99	99	82	82	77	65	20	99	99	99	99	99	99	99
(PRE) Valor+Express SG+Harmony SG	1.96oz+0.25oz+0.25oz														
(POST) RUPM+Clarity+Cinch	22floz+16floz+1pt	99	99	84	80	73	53	13	99	99	99	99	99	99	85
(PRE) Valor+Express SG+Harmony SG	1.96oz+0.25oz+0.25oz														
(POST) RUPM+Prefix	22floz+2pt	99	99	84	83	77	57	20	99	99	99	99	99	99	82
(PRE) Authority MTZ	15oz														
(POST) RUPM	22floz	99	99	99	99	99	99	77	99	99	99	99	99	99	78
LSD (0.05)		0	0	4	4	8	12	8	0	0	0	0	0	0	10

[1] fb=followed by

[2] RUPM=Roundup Powermax

Broadaxe XC used as a PRE in soybean. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE fb POST herbicide applications. RR soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 2-4" at 2-4/ft2, cocb 3-5" at 1-2/yd2, yeft 1-2 lf at 3-4/yd2, rrpw 1-2" at 1-2/yd2, and colq 1-2" at 1-2/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles for PRE applications and 8.5 gpa through 11001 TT nozzles for POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain fell two days after PRE application and an 1 ½" of rain fell10 days after PRE application to activate PRE herbicides well. Broadaxe XC is a combination of S-metolachlor and sulfentrazone. It performed well on all weeds except common ragweed and common cocklebur.

Table. Broadaxe XC used as a PRE in soybean (Zollinger, Wirth, Adams).

		Prior to POST							14 & 28 DA POST						
Treatment[1]	Rate	Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb	Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------						-% inj-	----------% control----------					
(PRE) Broadaxe XC	25floz														
(POST) Flexstar GT 3.5 +MSO[2]	3.5pt +1%v/v	0	92	99	85	96	27	25	18	96	99	99	99	99	99
(PRE) Boundary	1.8pt														
(POST) Flexstar GT 3.5 +MSO	3.5pt +1%v/v	0	92	93	93	93	87	43	22	99	99	99	99	99	99
(PRE) Broadaxe XC	25floz														
(POST) Touchdown Total	32floz	0	95	99	99	99	27	27	0	98	99	99	99	99	99
(PRE) Boundary	1.8pt														
(POST) Touchdown Total	32floz	0	85	93	93	95	73	45	0	99	99	99	99	95	99
(PRE) Prefix	2pt														
(POST) Touchdown Total	32floz	0	80	99	42	99	93	99	0	99	99	99	99	99	99
(PRE) Valor SX	2oz														
(POST) RUPM[3]	29floz	0	58	96	96	96	72	43	0	99	99	99	99	96	99
(PRE) Fierce	3oz														
(POST) RUPM	29floz	0	78	99	57	99	72	23	0	99	99	99	99	99	99
(PRE) Sonic	4oz														
(POST) RUPM	29floz	0	62	99	99	99	99	72	0	99	99	99	99	99	98
(PRE) Valor SX+Dual Magnum	2oz+1.25pt														
(POST) RUPM	29floz	0	99	99	99	99	58	20	0	99	99	99	99	99	99
(PRE) Authority MTZ	15oz														
(POST) RUPM	29floz	0	47	96	96	96	88	88	0	99	99	99	99	99	99
(PRE) Broadaxe XC+Tri-cor	25floz+4oz														
(POST) Touchdown Total	32floz	0	75	99	99	99	15	52	43	99	99	99	99	99	99
LSD (0.05)		0	7	4	7	4	9	7	3	3	0	0	0	1	1

[1]AMS was added to each POST treatment at a rate of 8.5lb/100gal
[2]MSO=Methylated Seed Oil; AMS=Ammonium Sulfate
[3]RUPM=Roundup Powermax

PRE applications of (sulfentrazone+cloransulam) and (flumioxazin+cloransulam) fb POST glyphosate applications. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE fb POST herbicide applications. RR soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 2-3" at 1/yd2 and yeft 1 lf at 8-10/ft2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles for PRE applications and 8.5 gpa through 11001 TT nozzles for POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well. All treatments resulted in excellent weed control at all timings. There was no soybean injury with any treatments.

Table. PRE applications of (sulfentrazone+cloransulam) and (flumioxazin+cloransulam) followed by POST glyphosate applications (Zollinger, Wirth, Adams).

Treatment	Rate	14 and 28 DAA						
		Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------					
(PRE) Sonic	3oz							
(POST) Durango+AMS	24floz+2.5%v/v	0	99	99	99	99	99	99
(PRE) Sonic	4.5oz							
(POST) Durango+AMS	24floz+2.5%v/v	0	99	99	99	99	99	99
(PRE) Sonic	3oz							
(POST) Durango+First Rate+AMS	24floz+0.3oz+2.5%v/v	0	99	99	99	99	99	99
(PRE) Surveil V+Surveil FR	2.5oz+0.3oz							
(POST) Durango+AMS	24floz+2.5%v/v	0	99	99	99	99	99	99
(PRE) Surveil V+Surveil FR	3.75oz+0.45oz							
(POST) Durango+AMS	24floz+2.5%v/v	0	99	99	99	99	99	99
LSD (0.05)		0	0	0	0	0	0	0

PRE and POST applications in soybean. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE and POST herbicide applications. RR soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 2-4" at 2-3/yd2, cocb 4-6" at 1/yd2, yeft 1 lf at 3-5/yd2, rrpw 1-2" at 2-3/yd2, and colq 1-2" at 2-3/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles for PRE applications and 8.5 gpa through 11001 TT nozzles for POST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well.

Table. PRE and POST applications in soybean (Zollinger, Wirth, Adams).

Treatment[1]	Rate	Prior to POST						28 & 56 DAA					
		Soy	Yeft	Rrpw	Colq	Corw	Cocb	Soy	Yeft	Rrpw	Colq	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------					-% inj-	----------% control----------				
PRE/POST													
(PRE) Spartan	8floz												
(POST) Select+PO	9floz+1pt	0	42	99	99	23	20	0	99	99	99	43	20
(PRE) Authority Assist	9floz												
(POST) Select+PO	9floz+1pt	0	68	99	99	38	57	0	99	99	99	53	57
(PRE) Authority First	6.4oz												
(POST) Select+PO	9floz+1pt	0	75	99	99	95	99	0	99	99	99	92	99
(PRE) Verdict	5floz												
(POST) Select+PO	9floz+1pt	0	55	99	99	55	55	10	99	99	99	55	55
(PRE) Fierce	3.75oz												
(POST) RUPM+AMS	22floz+8.5lb/100gal	0	83	99	93	20	20	0	99	99	99	99	99
(PRE) Authority Elite	28floz												
(POST) RUPM+AMS	22floz+8.5lb/100gal	0	92	99	99	20	20	0	99	99	99	99	99
(PRE) Authority Elite	28floz												
(POST) Anthem Maxx +RUPM+AMS	2.5floz +22floz+8.5lb/100gal	0	92	99	99	20	20	10	99	99	99	99	99
(PRE) Authority Assist	9floz												
(POST) RUPM+AMS	22floz+8.5lb/100gal	0	67	99	99	30	32	8	99	99	99	99	99
(PRE) Authority Assist	9floz												
(POST) Anthem Maxx +RUPM+AMS	2.5floz +22floz+8.5lb/100gal	0	67	99	99	30	30	10	99	99	99	99	99
(PRE) Authority Elite +Authority MTZ	28floz +12oz	0	92	99	99	30	20	8	99	99	99	99	99
(POST) RUPM+AMS	22floz+8.5lb/100gal												
(PRE) Optill+Outlook	2oz+10floz												
(POST) RUPM+AMS	22floz+8.5lb/100gal	0	93	99	99	92	85	22	99	99	99	99	99
POST													
(POST) Anthem Maxx +RUPM+AMS	3.5floz +22floz+8.5lb/100gal	0	0	0	0	0	0	23	99	99	99	92	95
(POST) RUPM+AMS	22floz+8.5lb/100gal	0	0	0	0	0	0	0	99	99	52	72	92
(POST) Marvel +RUPM+AMS	6floz +22floz+8.5lb/100gal	0	0	0	0	0	0	23	99	99	99	87	99
(POST) Cobra +RUPM+AMS	10floz +22floz+8.5lb/100gal	0	0	0	0	0	0	27	99	99	72	92	99
LSD (0.05)		0	5	0	1	9	4	3	0	0	17	5	3

[1]AMS was added to each POST treatment at a rate of 8.5lb/100gal
[2]MSO=Methylated Seed Oil; AMS=Ammonium Sulfate
[3]RUPM=Roundup Powermax

Liberty programs in Liberty-Link soybeans. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to PRE, EPOST and MPOST herbicide applications. LL soybean was planted on June 1, 2015. PRE treatments were applied on June 4, 2015 at 8:30 AM with 64 F air, 55 F soil at a four inch depth, 51% RH, 0% cloud cover, 7-9 mph N wind, and adequate soil moisture. EPOST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of EPOST application were corw 2-3" at 3-4/ft2, cocb 3-8" at 3-4/yd2, yeft 2 lf at 4-6/ft2, rrpw 3-5" at 3-4/ft2, and colq 3-5" at 3-4/ft2. MPOST treatments were applied on July 23, 2015 at 10:00 AM with 79 F air, 71 F soil at a four inch dept, 61% RH, 0% cloud cover, 6-8 mph SSE winds, and moist soil moisture. Weeds present at the time of MPOST application were corw 6-12" at 1/yd2, colq 2-6" at 2-3/yd2, vemo 2-6" at 1/yd2, cocb 12-18" at 1-9/yd2, and yeft 6" at 1/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 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 through 11002 TT nozzles for PRE applications and 8.5 gpa through 11001 TT nozzles for EPOST and MPOST applications at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Half inch of rain came two days after PRE application and an 1 ½" of rain came 10 days after PRE application to activate PRE herbicides well.

Table. Liberty programs in Liberty-Link soybeans(Zollinger, Wirth, Adams).

		28 DA PRE							28 DA POST						
Treatment[1]	Rate	Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb	Soy	Yeft	Rrpw	Colq	Hans	Corw	Cocb
	(Product/A)	-% inj-	----------% control----------						-% inj-	----------% control----------					
EPOST/MPOST															
(EPOST) Liberty+Prefix	29floz+32floz														
(MPOST) Liberty+Warant +Select Max	29floz+3pt +6floz	0	0	0	0	0	0	0	15	99	99	99	99	99	99
(EPOST) Liberty+Dual II Magnum +Select Max	36floz+1.33pt +6floz	0	0	0	0	0	0	0	28	99	99	99	99	99	99
(MPOST) Liberty	36floz														
(EPOST) Liberty+Warrant +Select Max	36floz+3pt +6floz	0	0	0	0	0	0	0	15	99	99	99	99	99	99
(MPOST) Liberty	36floz														
PRE/EPOST/Pre-Bloom															
(PRE) Valor XLT	3.5oz														
(EPOST) Liberty+Zidua	29floz+2oz	0	83	99	99	99	73	32	0	99	99	99	99	99	99
(Pre-Bloom) Liberty	29floz														
PRE/MPOST/Pre-Bloom															
(PRE) Authority First	6.5oz														
(MPOST) Liberty	29floz	0	80	99	99	99	95	95	0	99	99	99	99	99	99
(Pre-Bloom) Liberty	29floz														
(PRE) Fierce	3.5oz														
(MPOST) Liberty	29floz	0	93	99	99	96	20	20	0	82	99	99	98	93	90
(Pre-Bloom) Liberty	29floz														
(PRE) Authority Assist	7.5floz														
(MPOST) Liberty+Select Max	36floz+6floz	0	93	99	99	99	45	92	0	93	99	99	99	99	99
(Pre-Bloom) Liberty	36floz														
(PRE) Authority MTZ	10oz														
(MPOST) Liberty+Dual II Magnum +Select Max	36floz+1.33pt +6floz	0	93	99	99	99	93	77	0	96	99	99	99	96	85
(Pre-Bloom) Liberty	36floz														
(PRE) Valor	3oz														
(MPOST) Liberty+Dual II Magnum +Select Max	36floz+1.33pt +6floz	0	43	99	99	99	20	20	0	73	99	99	99	42	20
(Pre-Bloom) Liberty	36floz														
(PRE) Sharpen+Zidua	1floz+2oz														
(MPOST) Liberty+Select Max	36floz+6floz	0	72	99	99	72	55	33	30	88	99	96	93	88	62
(Pre-Bloom) Liberty	36floz														
LSD (0.05)		0	3	0	0	2	5	8	3	3	0	3	2	3	3

[1]AMS was added to each EPOST, MPOST, and Pre-Bloom treatment at a rate of 8.5lb/100gal

Soybean tolerance to Permit. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Hillsboro, ND to evaluate injury of soybean to permit. Soybean was planted on June 10, 2015. PRE treatments were applied on June 12, 2015 at 76 F, 67 F soil at a four inch depth, 47% RH, 0% cloud cover, 8-10 mph SSW winds, and adequate soil moisture. EPOST treatments were applied on July 2, 2015 at 2:00 PM with 78 F air, 73 F soil at a four inch depth, 49% RH, 25% cloud cover, 6-10 mph SSW wind, and adequate soil moisture. MPOST treatments were applied on July 9, 2015 at 9:00 AM with 70 F air, 64 F soil and a 4 inch depth, 77% RH, 75% cloud cover, 1-2 mph W wind, and adequate soil moisture. Soil characteristics were: 31.9% sand, 36.4% silt, 31.7% clay, Clay Loam, 4.6% OM, and 7.5 pH. 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 through 11001 TT nozzles at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

Soybeans were severely injured whether the application was made as a PRE, EPOST, or MPOST. The addition of oil adjuvants in the POST treatments resulted in the most injury.

Table. Soybean tolerance to Permit (Zollinger, Wirth, Adams).

		14 DA MPOST	28 DA MPOST
Treatment	Rate	Soybean	Soybean
	(Product/A)	----------% injury----------	
PRE			
Permit	0.5oz	47	62
Permit	0.65oz	62	68
EPOST			
Permit+NIS+AMS	0.5oz+0.25%v/v+8.5lb/100gal	43	58
Permit+PO+AMS	0.5oz+2pt+8.5lb/100gal	72	78
Permit+MSO+AMS	0.5oz+1pt+8.5lb/100gal	68	73
Permit+NIS+AMS	0.67oz+0.25%v/v+8.5lb/100gal	72	70
Permit+PO+AMS	0.67oz+2pt+8.5lb/100gal	87	88
Permit+MSO+AMS	0.67oz+1pt+8.5lb/100gal	87	91
MPOST			
Permit+NIS+AMS	0.5oz+0.25%v/v+8.5lb/100gal	78	83
Permit+PO+AMS	0.5oz+2pt+8.5lb/100gal	87	98
Permit+MSO+AMS	0.5oz+1pt+8.5lb/100gal	68	81
Permit+NIS+AMS	0.67oz+0.25%v/v+8.5lb/100gal	87	85
Permit+PO+AMS	0.67oz+2pt+8.5lb/100gal	87	98
Permit+MSO+AMS	0.67oz+1pt+8.5lb/100gal	87	85
LSD (0.05)		36	39

Glufosinate formulations in Liberty-Link soybeans. Zollinger, Richard K., Devin A. Wirth, Jason W. Adams. An experiment was conducted near Prosper, ND to evaluate weed control and soybean injury to POST herbicide applications. L soybean was planted on June 1, 2015. POST treatments were applied on July 1, 2015 at 12:30 PM with 79 F air, 75 F soil at a four inch depth, 55% RH, 100% cloud cover, 5-7 mph SSW wind, and moist soil moisture. Weeds present at the time of POST application were corw 4-6" at 1-2/yd2, cocb 3-8" at 2-3/ft2, yeft 3 lf at 8-10/ft2, rrpw 4-6" at 3-4/ft2, colq 2-3" at 1-2/yd2, and wibw 1-3" at 1/yd2. Soil characteristics were: 25.2% sand, 43.9% silt, 30.9% clay, Clay Loam, 4.9% OM, and 8.0 pH. 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 through 11001 TT nozzles at 40 psi. The experiment had a randomized complete block design with three replicates per treatment.

All glufosinate formulations performed excellent on all broadleaf weeds. The addition of different adjuvants influenced yellow foxtail control.

Table. Glufosinate formulations in Liberty-Link soybeans (Zollinger, Wirth, Adams).

Treatment	Rate	7 DAA								14 and 28 DAA							
		Soy	Cano	Yeft	Rrpw	Colq	Hans	Corw	Cocb	Soy	Cano	Yeft	Rrpw	Colq	Hans	Corw	Cocb
	(Product/A)	----% inj----		----------% control----------						----% inj----		----------% control----------					
Liberty+AMS	22floz+3lb	0	0	62	99	99	99	99	99	0	0	70	99	99	99	99	99
Interline+AMS	22floz+3lb	0	0	68	99	99	99	99	99	0	0	78	99	99	99	99	99
Ignite+AMS	22floz+3lb	0	0	68	99	99	99	99	99	0	0	78	99	99	99	99	99
Liberty+ET-4000	22floz+1%v/v	0	0	73	99	99	99	99	99	0	0	83	99	99	99	99	99
Liberty+AMS	29floz+3lb	0	0	88	99	99	99	99	99	0	0	95	99	99	99	99	99
Interline+AMS	29floz+3lb	0	0	85	99	99	99	99	99	0	0	99	99	99	99	99	99
Ignite+AMS	29floz+3lb	0	0	72	99	99	99	99	99	0	0	99	99	99	99	99	99
Liberty+ET-4000	29floz+1%v/v	0	0	78	99	99	99	99	99	0	0	90	99	99	99	99	99
Liberty+Select +AMS+PO	22floz+6floz +3lb+1.5pt	0	0	58	99	99	99	99	99	0	0	73	99	99	99	99	99
Interline+Select +AMS+PO	22floz+6floz +3lb+1.5pt	0	0	68	99	99	99	99	99	0	0	99	99	99	99	99	99
Liberty+Select +ET-4000	22floz+6floz +1%v/v	0	0	72	99	99	99	99	99	0	0	99	99	99	99	99	99
Liberty+Select +AMS+PO	29floz+6floz +3lb+1.5pt	0	0	70	99	99	99	99	99	0	0	99	99	99	99	99	99
Interline+Select +AMS+PO	29floz+6floz +3lb+1.5pt	0	0	75	99	99	99	99	99	0	0	99	99	99	99	99	99
Liberty+Select +ET-4000	29floz+6floz +1%v/v	0	0	80	99	99	99	99	99	0	0	99	99	99	99	99	99
LSD (0.05)		0	0	6	0	0	0	0	0	0	0	11	0	0	0	0	0

Demonstration of 2,4-D resistant Soybean. Howatt, Roach, and Harrington. The trial was initiated near Fargo, North Dakota. Enlist Soybean was seeded and preemergence treatments were applied on June 24 with an air temperature of 83°F, 49% relative humidity and dew point at 62°, sky with approximately 15% smoke haze, 5 mph wind at 225°, and dry top soil with moist subsoil at a temperature of 70°F. Post treatments were applied to 2 trifoliolate soybean, 2 to 5 leaf yellow foxtail, 3 to 8 inch redroot pigweed, 3 to 5 inch Venice mallow, 3 to 6 inch common mallow, 3 to 8 inch wild buckwheat, and 3 to 5 inch common lambsquarters on July 17 with 87°F, 47% relative humidity and dew point at 61°, sky with cloud-cover of 30%, 0 to 2 mph wind at variable degrees, and moist soil at 83°F. Treatments were applied with a backpack sprayer delivering 17 gpa at 40 psi through AIXR 11002 nozzles to a 7 foot wild area the length of 10 by 30 foot plots. The experiment was a randomized complete block design with four replicates

Treatment	Rate	Stage	7/17 soy	7/17 yeft	7/17 rrpw	7/17 wibw	7/17 wimu	7/17 colq	7/24 soy	7/24 yeft	7/24 rrpw
	oz ai/A		%	%	%	%	%	%	%	%	%
Clsm&Suen/Glyt-D+AMS-L	3.15/16+2.5%	Pre/4"	0	0	0	0	0	0	1	97	99
Clsm&Suen/Glyt&2,4-D+AMS-L	3.15/23.4+2.5%	Pre/4"	0	0	0	0	0	0	15	97	98
Clsm&Suen/Glyt&2,4-D+AMS-L	3.15/31.2+2.5%	Pre/4"	0	0	0	0	0	0	5	98	99
Clsm&Suen/Gluf+AMS-L	3.15/7.8+2.5%	Pre/4"	0	0	0	0	0	0	0	86	91
Clsm&Suen/2,4-D-CH+Gluf+AMS-L	3.15/11.4+7.8+2.5%	Pre/4"	0	0	0	0	0	0	7	89	91
Clsm&Suen/2,4-D-CH+Gluf+AMS-L	3.15/15.2+7.8+2.5%	Pre/4"	0	0	0	0	0	0	9	88	86
Flum+Clsm/2,4-D-CH+AMS-L	1.2+0.4/23.5+2.5%	Pre/4"	0	0	0	0	0	0	7	0	69
Untreated Check	0		0	0	0	0	0	0	0	0	0
CV			0.0	0.0	0.0	0.0	0.0	0.0	32	3	4
LSD 0.05			.	.	.	.	.	.	2	3	5

Treatment	Rate	Stage	7/24 vema	7/24 coma	7/24 wimu	8/4 yeft	8/4 rrpw	8/4 vema	8/4 coma	8/4 wimu
	oz ai/A		%	%	%	%	%	%	%	%
Clsm&Suen/Glyt-D+AMS-L	3.15/16+2.5%	Pre/4"	90	91	99	97	99	94	93	99
Clsm&Suen/Glyt&2,4-D+AMS-L	3.15/23.4+2.5%	Pre/4"	92	94	99	90	99	97	95	99
Clsm&Suen/Glyt&2,4-D+AMS-L	3.15/31.2+2.5%	Pre/4"	94	93	99	92	99	98	96	99
Clsm&Suen/Gluf+AMS-L	3.15/7.8+2.5%	Pre/4"	85	86	88	78	75	83	76	99
Clsm&Suen/2,4-D-CH+Gluf+AMS-L	3.15/11.4+7.8+2.5%	Pre/4"	88	89	93	75	89	88	86	99
Clsm&Suen/2,4-D-CH+Gluf+AMS-L	3.15/15.2+7.8+2.5%	Pre/4"	87	90	99	75	90	85	88	99
Flum+Clsm/2,4-D-CH+AMS-L	1.2+0.4/23.5+2.5%	Pre/4"	74	69	88	0	93	94	94	99
Untreated Check	0		0	0	0	0	0	0	0	0
CV			4	4	2	5	3	3	4	0.0
LSD 0.05			5	4	4	5	4	4	4	.

Late establishment and dry weather after seedbed preparation greatly reduced the number of weeds emerging relative to typical seedling establishment. As a result, weed pressure in plots treated with PRE herbicides was not different from the untreated check on July 17. Soybean aphid was found in moderate numbers which might have influenced crop injury ratings. Soybean injury was as high as 15% 1 week after treatment. Injury was more severe in areas of the study with more aphid presence.

Control of yellow foxtail and redroot pigweed was better with glyphosate than glufosinate. This difference widened as the season progressed. Wild mustard control was exceptional regardless of herbicide with complete control before August. Control of Venice mallow and common mallow also was better with glyphosate treatments than glufosinate treatments but control differences remained relatinely similar at evaluations. 2,4-D improved control of common mallow with glufosinate by 10 percentage points at the August evaluation.

Weed control was good with glufosinate treatments and exceptional with glyphosate treatments. New weed emergence was observed in check plots but not in treated areas. The soil active herbicides likely remained present and became available to weeds as rain events occurred that initiated mid-season weed emergence.