Yellow foxtail control with Accent in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Chaffee and Galchutt, ND, to evaluate weed control in corn from herbicides applied early postemergence (EPOST) and POST. At Chaffee, Pioneer '38P06' corn was planted on May 4, 2001. EPOST treatments were applied June 4 at 4:00 pm with 71 F air, 71 F soil surface, 40% relative humidity, 85% clouds, 9 mph E wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 3 to 5 inch tall (3 collar) corn. Weed species present were: 1 to 4 inch tall (75-150/ft^2) yellow foxtail; and 0.5 to 3 inch (1-3/yd^2) common lambsquarters. POST treatments were applied June 12, 2001 at 12:30 pm with 83 F air, 84 F soil surface, 42% relative humidity, 5% clouds, 4 mph NE wind, moist soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 10 inch (4 collar) corn.

At Galchutt, Pioneer '39D81' corn was planted on May 24, 2001. EPOST treatments were applied June 25 at 7:00 pm with 93 F air, 93 F soil surface, 46% relative humidity, 10% clouds, 7 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (3 to 4 collar) corn. Weed species present were: 1 to 6 inch (30-100/ft^2) yellow foxtail; 1 to 6 inch (5-15/ft^2) common lambsquarters; 1 to 3 inch (1/yd^2) redroot pigweed; and 1 to 2 inch, vining, (1/yd^2) wild buckwheat. POST treatments were applied July 1 at 1:00 pm with 72 F air, 82 F soil surface, 51% relative humidity, 100% clouds, 5 mph SW wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 16 to 24 inch (4 to 5 collar) corn.

Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles for EPOST and POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table 1. Yellow foxtail control with accent in corn, Chaffee (Zollinger and Ries).

Treatment[1]	Rate	July 9 Yeft	July 23 Yeft
	(product/A)	------ % control ------	
EPOST			
Accent+Atrazine+Dicamba+Quad 7	0.67oz+0.42lb+4fl oz	80	75
Accent+Atrazine+Dicamba+PO+28-0-0	0.67oz+0.42lb+4fl oz	95	83
Accent +Atrazine+Dicamba+MSO	0.67oz+0.42lb+4fl oz	99	93
Accent+Atrazine+Dicamba+Quad 7	0.5oz+0.42lb+4fl oz	73	68
Accent+Atrazine+Dicamba+PO+28-0-0	0.5oz+0.42lb+4fl oz	90	85
Accent+Atrazine+Dicamba+MSO	0.5oz+0.42lb+4fl oz	95	88
Steadfast+Atrazine+Dicamba+Quad 7	0.75oz+0.72lb+4fl oz	96	92
Steadfast+Atrazine+Dicamba+PO+28-0-0	0.75oz+0.42lb+4fl oz	94	88
Steadfast+Atrazine+Dicamba+MSO	0.75oz+0.42lb+4fl oz	97	92
EPOST/POST			
Accent+Atrazine+Quad 7/Dicamba	0.67oz+0.42lb/4fl oz	92	87
Accent+Atrazine+PO+28-0-0/Dicamba	0.67oz+0.42lb/4fl oz	94	88
Accent+Atrazine+MSO/Dicamba	0.67oz+0.42lb/4fl oz	94	93
Accent+Atrazine+Quad 7/Dicamba	0.5oz+0.42lb/4fl oz	77	73
Accent+Atrazine+PO+28-0-0/Dicamba	0.5oz+0.42lb/4fl oz	90	88
Accent+Atrazine+MSO/Dicamba	0.5oz+0.42lb/4fl oz	93	92
Steadfast+Atrazine+Quad 7/Dicamba	0.75oz+0.42lb/4fl oz	98	93
Steadfast+Atrazine+PO+28-0-0/Dicamba	0.75oz+0.42lb/4fl oz	98	90
Steadfast+Atrazine+MSO/Dicamba	0.75oz+0.42lb/4fl oz	99	95
LSD (0.05)		9	8

[1]Quad 7 = basic blend adjuvant at 1% v/v; PO = petroleum oil concentrate = Herbimax at 1% v/v; 28-0-0 = urea ammonium nitrate at 2 qt/A; MSO = methylated seed oil = Scoil at 1% v/v.

Blue

Table 2. Yellow foxtail control with Accent in corn, Galchutt (Zollinger and Ries).

Treatment[1]	Rate	July 9 Yeft	July 23 Yeft
	(product/A)	----- % control -----	
EPOST			
Accent+Atrazine+Dicamba+Quad 7	0.67oz+0.42lb+4fl oz	52	77
Accent+Atrazine+Dicamba+PO+28-0-0	0.67oz+0.42lb+4fl oz	53	67
Accent +Atrazine+Dicamba+MSO	0.67oz+0.42lb+4fl oz	65	75
Accent+Atrazine+Dicamba+Quad 7	0.5oz+0.42lb+4fl oz	63	60
Accent+Atrazine+Dicamba+PO+28-0-0	0.5oz+0.42lb+4fl oz	57	60
Accent+Atrazine+Dicamba+MSO	0.5oz+0.42lb+4fl oz	42	75
Steadfast+Atrazine+Dicamba+Quad 7	0.75oz+0.72lb+4fl oz	60	67
Steadfast+Atrazine+Dicamba+PO+28-0-0	0.75oz+0.42lb+4fl oz	60	70
Steadfast+Atrazine+Dicamba+MSO	0.75oz+0.42lb+4fl oz	63	82
EPOST/POST			
Accent+Atrazine+Quad 7/Dicamba	0.67oz+0.42lb/4fl oz	68	75
Accent+Atrazine+PO+28-0-0/Dicamba	0.67oz+0.42lb/4fl oz	63	67
Accent+Atrazine+MSO/Dicamba	0.67oz+0.42lb/4fl oz	67	77
Accent+Atrazine+Quad 7/Dicamba	0.5oz+0.42lb/4fl oz	63	60
Accent+Atrazine+PO+28-0-0/Dicamba	0.5oz+0.42lb/4fl oz	57	60
Accent+Atrazine+MSO/Dicamba	0.5oz+0.42lb/4fl oz	53	75
Steadfast+Atrazine+Quad 7/Dicamba	0.75oz+0.42lb/4fl oz	60	72
Steadfast+Atrazine+PO+28-0-0/Dicamba	0.75oz+0.42lb/4fl oz	53	70
Steadfast+Atrazine+MSO/Dicamba	0.75oz+0.42lb/4fl oz	60	87
LSD (0.05)		7	7

[1]Quad 7 = basic blend adjuvant at 1% v/v; PO = petroleum oil concentrate = Herbimax at 1% v/v; 28-0-0 = urea ammonium nitrate at 2 qt/A; MSO = methylated seed oil = Scoil at 1% v/v.

The objective was to determine the effect of adjuvants and dicamba applied with or not with Accent and Steadfast applied at different rates on yellow foxtail control. No crop injury occurred. All treatments completely controlled common lambsquarters. Treatments were applied to 1 to 4 inch yellow foxtail at Chaffee and 1 to 6 inch yellow foxtail at Galchutt resulting in lower yellow foxtail control at Galchutt. Accent with Quad 7 gave less foxtail control than with oil adjuvants and MSO type adjuvant generally overcame yellow foxtail antagonism from dicamba.

Yellow foxtail control with Option in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Chaffee and Galchutt, ND, to evaluate weed control in corn from herbicides applied early postemergence (EPOST) and POST. At Chaffee, Pioneer '38P06' was planted on May 4, 2001. EPOST treatments were applied June 4 at 4:20 pm with 71 F air, 71 F soil surface, 40% relative humidity, 85% clouds, 9 mph E wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 3 to 5 inch (3 collar) corn. Weed species present were: 1 to 4 inch (75-150/ft^2) yellow foxtail; and 0.5 to 3 inch (1-3/yd^2) common lambsquarters. POST treatments were applied June 12, 2001 at 12:30 pm with 83 F air, 84 F soil surface, 42% relative humidity, 5% clouds, 4 mph NE wind, moist soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 10 inch (4 collar) corn.

At Galchutt, Pioneer '39D81' corn was planted on May 24, 2001. EPOST treatments were applied June 25 at 7:00 pm with 93 F air, 93 F soil surface, 46% relative humidity, 10% clouds, 7 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (3 to 4 collar) corn. Weed species present were: 1 to 6 inch (30-100/ft^2) yellow foxtail; 1 to 6 inch (5-15/ft^2) common lambsquarters; 1 to 3 inch (1/yd^2) redroot pigweed; and 1 to 2 inch, vining, (1/yd^2) wild buckwheat. POST treatments were applied July 1 at 1:30 pm with 72 F air, 82 F soil surface, 51% relative humidity, 100% clouds, 5 mph SW wind, dry soil surface, moist subsoil, good crop vigor, and no dew to 16 to 24 inch (4 to 5 collar) corn.

Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles for EPOST and POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

The objective was to determine the effect of adjuvants and dicamba applied with or not with Option on yellow foxtail control. No crop injury occurred. All treatments completely controlled common lambsquarters. Treatments were applied to 1 to 4 inch yellow foxtail at Chaffee and 1 to 6 inch yellow foxtail at Galchutt resulting in lower yellow foxtail control at Galchutt. At Chaffee, Option with MSO type adjuvant gave greater foxtail control than with PO or Quad 7 adjuvants and generally overcame yellow foxtail antagonism from dicamba. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table 1. Yellow foxtail control with Option in corn, Chaffee (Zollinger and Ries).

		June 18	July 2
Treatment[1]	Rate	Yeft	Yeft
	(product/A)	------ % control ------	
EPOST			
Option+Atrazine+Dicamba+Quad 7	1.5oz+0.42lb+4fl oz	62	60
Option+Atrazine+Dicamba+PO+28-0-0	1.5oz+0.42lb+4fl oz	70	70
Option+Atrazine+Dicamba+MSO	1.5oz+0.42lb+4fl oz	77	83
Option+Atrazine+Dicamba+Quad 7	1.25oz+0.42lb+4fl oz	67	60
Option+Atrazine+Dicamba+PO+28-0-0	1.25oz+0.42lb+4fl oz	75	75
Option+Atrazine+Dicamba+MSO	1.25oz+0.42lb+4fl oz	82	83
EPOST/POST			
Option+Atrazine+Quad 7/Dicamba	1.5oz+0.42lb/4fl oz	75	75
Option+Atrazine+PO+28-0-0/Dicamba	1.5oz+0.42lb/4fl oz	83	86
Option+Atrazine+MSO/Dicamba	1.5oz+0.42lb/4fl oz	94	95
Option+Atrazine+Quad 7/Dicamba	1.25oz+0.42lb/4fl oz	72	70
Option+Atrazine+PO+28-0-0/Dicamba	1.25oz+0.42lb/4fl oz	78	82
Option+Atrazine+MSO/Dicamba	1.25oz+0.42lb/4fl oz	78	88
LSD (0.05)		8	9

[1]Quad 7 = basic blend adjuvant at 1% v/v; PO = petroleum oil concentrate = Herbimax at 1% v/v; 28-0-0 = urea ammonium nitrate at 2 qt/A; MSO = methylated seed oil = Scoil at 1% v/v.

Table 2. Yellow foxtail control with Option in corn, Galchutt (Zollinger and Ries).

Treatment[1]	Rate	June 9 Yeft	July 23 Yeft
	(product/A)	------ % control ------	
EPOST			
Option+Atrazine+Dicamba+Quad 7	1.5oz+0.42lb+4fl oz	50	43
Option+Atrazine+Dicamba+PO+28-0-0	1.5oz+0.42lb+4fl oz	50	37
Option+Atrazine+Dicamba+MSO	1.5oz+0.42lb+4fl oz	57	50
Option+Atrazine+Dicamba+Quad 7	1.25oz+0.42lb+4fl oz	40	30
Option+Atrazine+Dicamba+PO+28-0-0	1.25oz+0.42lb+4fl oz	43	30
Option+Atrazine+Dicamba+MSO	1.25oz+0.42lb+4fl oz	50	37
EPOST/POST			
Option+Atrazine+Quad 7/Dicamba	1.5oz+0.42lb/4fl oz	60	47
Option+Atrazine+PO+28-0-0/Dicamba	1.5oz+0.42lb/4fl oz	50	43
Option+Atrazine+MSO/Dicamba	1.5oz+0.42lb/4fl oz	60	47
Option+Atrazine+Quad 7/Dicamba	1.25oz+0.42lb/4fl oz	60	30
Option+Atrazine+PO+28-0-0/Dicamba	1.25oz+0.42lb/4fl oz	50	33
Option+Atrazine+MSO/Dicamba	1.25oz+0.42lb/4fl oz	57	30
LSD (0.05)		10	9

[1]Quad 7 = basic blend adjuvant at 1% v/v; PO = petroleum oil concentrate = Herbimax at 1% v/v; 28-0-0 = urea ammonium nitrate at 2 qt/A; MSO = methylated seed oil = Scoil at 1% v/v.

Yellow foxtail control with sulfonylurea herbicide tank-mixes in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Chaffee and Galchutt, ND, to evaluate weed control in corn from herbicides applied early postemergence (EPOST). At Chaffee, Pioneer '38P06' was planted on May 4, 2001. POST treatments were applied June 4 at 4:30 pm with 71 F air, 74 F soil surface, 40% relative humidity, 85% clouds, 9 mph E wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 3 to 5 inch (3 collar) corn. Weed species present were: 1 to 4 inch tall (75-150/ft^2) yellow foxtail; and 0.5 to 3 inch (1-3/yd^2) common lambsquarters.

At Galchutt, Pioneer '39D81' corn was planted on May 24, 2001. EPOST treatments were applied June 25 at 7:00 pm with 93 F air, 93 F soil surface, 46% relative humidity, 10% clouds, 7 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (3 to 4 collar) corn. Weed species present were: 1 to 6 inch tall (30-100/ft^2) foxtail; 1 to 6 inch (5-15/ft^2) common lambsquarters; 1 to 3 inch (1/yd^2) redroot pigweed; and 1 to 2 inch vining (1/yd^2) wild buckwheat.

Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles. The experiment had a randomized complete block design with three replicates per treatment.

The objective was to determine the effect of broadleaf herbicide tank-mixes with POST grass herbicides on yellow foxtail control. No crop injury occurred. All treatments completely controlled common lambsquarters. Treatments were applied to 1 to 4 inch yellow foxtail at Chaffee and 1 to 6 inch yellow foxtail at Galchutt resulting in lower yellow foxtail control at Galchutt. At Chaffee, tank-mixes excluding Callisto gave less than 80%. Tank-mixes containing Callisto gave 98% to 99% control. Similar results were observed at Galchutt except yellow foxtail control was greatly reduced from all tank-mixes with Option except Callisto. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table 1. Yellow foxtail control with sulfonylurea herbicide tank-mixes in corn, Chaffee (Zollinger and Ries).

		June 18	July 2
Treatment[1]	Rate	Yeft	Yeft
	(product/A)	------ % control ------	
Accent+Hornet+Aim+Quad 7	0.67oz+1.6oz+0.33oz	58	60
Accent+Atrazine+Quad 7	0.67oz+0.42lb+0.33oz	78	73
Accent+Northstar+Quad 7	0.67oz+5oz	58	78
Accent+Callisto+Atrazine+MSO	0.67oz+3oz+0.42lb	95	99
Steadfast+Hornet+Aim+Quad7	0.75oz+1.6oz+0.33oz	67	77
Steadfast+Atrazine+Aim+Quad7	0.75oz+0.42lb+0.33oz	82	78
Steadfast+Northstar+Quad 7	0.75oz+5oz	70	80
Steadfast+Callisto+Atrazine+MSO	0.75oz+3oz+0.42lb	98	99
Option+Hornet+Aim+Quad7	1.25oz+1.6oz+0.33oz	58	57
Option+Atrazine+Aim+Quad7	1.5oz+0.42lb+0.33oz	67	62
Option+Northstar+Quad7	0.75+5oz	53	67
Option+Callisto+Atrazine+MSO	0.75oz+3oz+0.42lb	97	98
LSD (0.05)		10	11

[1]Quad 7 = basic blend adjuvant at 1% v/v; MSO = methylated seed oil = Scoil at 1.5 pt/A.

Table 2. Yellow foxtail control with sulfonylurea herbicide tank-mixes in corn, Galchutt (Zollinger and Ries).

Treatment[1]	Rate	July 9 SETLU	July 23 SETLU
	(product/A)	------ % control ------	
Accent+Hornet+Aim+Quad 7	0.67oz+1.6oz+0.33oz	72	63
Accent+Atrazine+Quad 7	0.67oz+0.42lb+0.33oz	47	50
Accent+Northstar+Quad 7	0.67oz+5oz	77	68
Accent+Callisto+Atrazine+MSO	0.67oz+3oz+0.42lb	92	90
Steadfast+Hornet+Aim+Quad7	0.75oz+1.6oz+0.33oz	70	67
Steadfast+Atrazine+Aim+Quad7	0.75oz+0.42lb+0.33oz	67	70
Steadfast+Northstar+Quad 7	0.75oz+5oz	77	57
Steadfast+Callisto+Atrazine+MSO	0.75oz+3oz+0.42lb	92	93
Option+Hornet+Aim+Quad7	1.25oz+1.6oz+0.33oz	50	50
Option+Atrazine+Aim+Quad7	1.5oz+0.42lb+0.33oz	57	53
Option+Northstar+Quad7	0.75+5oz	67	57
Option+Callisto+Atrazine+MSO	0.75oz+3oz+0.42lb	78	73
LSD (0.05)		9	15

[1]Quad 7 = basic blend adjuvant at 1% v/v; MSO = methylated seed oil = Scoil at 1.5 pt/A.

Weed control in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Casselton and Chaffee, ND, to evaluate weed control in corn from herbicides applied PRE and POST. Pioneer '39D81' corn was planted on May 31, 2001. PRE treatments were applied June 6 at 11:00 am with 62 F air, 56 F soil at a depth of 4 inches, 67% relative humidity, 50% clouds, 8 mph E wind, dry soil surface, and moist subsoil. POST treatments were applied July 7 at 9:00 am with 69 F air, 72 F soil surface, 35% relative humidity, 0% clouds, 3 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (4 collar) corn. Weed species present were: 2 to 5 inch (10-50/ft^2) foxtail spp.; rosette, 2 to 8 inch diameter (1-3/yd^2) wild mustard; 1 to 3 inch (1-5/yd^2) redroot pigweed; 1 to 3 inch (1-5/yd^2) common lambsquarters; and 2 to 6 inch (1-10/yd^2) common cocklebur.

At Chaffee, Pioneer '38P06' corn was planted on May 4, 2001. PRE treatments were applied May 11 at 5:00 pm with 70 F air, 71 F soil at a depth of 4 inches, 22% relative humidity, 0% clouds, 4 mph SW wind, dry soil surface, and moist subsoil. POST treatments were applied June 4 at 4:00 pm with 71 F air, 72 F soil surface, 40% relative humidity, 85% clouds, 9 mph E wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 3 to 5 inch (3 collar) corn. Weed species present were: 1 to 4 inch (75-150/ft^2) foxtail, 5:1 yellow:green foxtail ratio; and 0.5 to 3 inch (1-3/yd^2) common lambsquarters.

Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Weed control in corn, Casselton (Zollinger and Ries).

		July 5		July 19		August 2		August 30	
Treatment[1]	Rate	Yeft	Cocb	Fxtl	Cocb	Fxtl	Cocb	Fxtl	Cocb
	(prodcut/A)	% control							
PRE									
Balance Pro	1.88fl oz	70	47	82	80	78	73	85	66
Balance Pro+Atrazine	1.88fl oz+0.56lb	90	73	93	96	99	99	99	99
PRE/POST									
Balance Pro/Option+MSO+28-0-0	1.88fl oz/1.5oz	70	50	94	96	96	99	99	99
Balance Pro+Atrazine/Option+ MSO+28-0-0	1.88fl oz+0.56lb/1.5oz	90	80	95	99	96	99	99	99
Balance Pro+Atrazine/Option+ Adjuvant Liquid 10+28-0-0	1..88fl oz+0.56lb/1.5oz	90	70	96	98	99	99	99	99
Balance Pro+Atrazine/Tribute+ MSO+28-0-0	1.88fl oz+0.56lb/1.75oz	90	70	95	98	99	99	99	99
Define/Option+MSO+ 28-0-0	12oz/1.5oz	67	0	92	70	96	89	99	93
Define/Tribute+MSO+28-0-0	12oz/1.75oz	57	0	92	72	96	99	99	99
Leadoff/Basis Gold+PO+28-0-0	24fl oz/14oz	73	47	95	94	96	99	99	99
Dual II Magnum/Callisto+ PO+28-0-0	21fl oz/3fl oz	83	0	93	73	63	99	72	99
POST									
Option+Clarity+MSO+28-0-0	1.5oz+4fl oz			67	85	57	89	57	89
Steadfast+Clarity+PO+ 28-0-0	0.75oz+4fl oz			68	99	63	96	63	99
Option+Callisto+ Atrazine+PO+28-0-0	1.25oz+3fl oz+ 0.56lb/100gal			70	91	73	99	72	99
Untreated		0	0	0	0	0	0	0	0
LSD (0.05)		10	7	9	8	9	9	11	8

[1]MSO = methylated seed oil = Scoil at 1.5 pt/A; Adjuvant Liquid 10 = proprietary adjuvant from Aventis at 1% v/v; PO = petroleum oil concentrate = Herbimax at 2 pt/A; 28-0-0 = urea ammonium nitrate at 2 qt/A.

Table. Weed control in corn, Chaffee (Zollinger and Ries).

Treatment[1]	Rate	May 25	June 4				June 18		July 2	July 30
		Fxtl	Corn	Grft	Yeft	Colq	Yeft	Colq	Yeft	Yeft
	(prodcut/A)	% control	% injury	% control						
PRE										
Balance Pro	1.88fl oz	52	10	94	73	99	69	99	68	50
Balance Pro+Atrazine	1.88fl oz+0.56lb	53	7	98	88	99	75	99	70	70
PRE/POST										
Balance Pro/Option+MSO+28-0-0	1.88fl oz/1.5oz	65	10	98	80	99	97	99	92	99
Balance Pro+Atrazine/Option+ MSO+28-0-0	1.88fl oz+0.56lb/1.5oz	52	10	98	85	99	92	99	87	96
Balance Pro+Atrazine/Option+ Adjuvant Liquid 10+28-0-0	1..88fl oz+0.56lb/1.5oz	73	7	97	88	99	93	99	90	96
Balance Pro+Atrazine/Tribute+ MSO+28-0-0	1.88fl oz+0.56lb/1.75oz	73	8	96	90	99	94	99	88	81
Define/Option+MSO+ 28-0-0	12oz/1.5oz	47	3	50	30	33	68	81	83	93
Define/Tribute+MSO+28-0-0	12oz/1.75oz	52	0	60	40	47	84	73	85	90
Leadoff/Basis Gold+PO+28-0-0	24fl oz/14oz	99	0	98	96	99	99	99	95	99
Dual II Magnum/Callisto+ PO+28-0-0	21fl oz/3fl oz	62	0	90	77	33	97	99	85	86
POST										
Option+Clarity+MSO+28-0-0	1.5oz+4fl oz						62	53	72	70
Steadfast+Clarity+PO+ 28-0-0	0.75oz+4fl oz						76	72	82	86
Option+Callisto+ Atrazine+PO+28-0-0	1.25oz+3fl oz+ 0.56lb/100gal						65	99	77	80
Untreated										
LSD (0.05)		14	10	2	9	17	15	12	13	18

[1]MSO = methylated seed oil = Scoil at 1.5 pt/A; Adjuvant Liquid 10 = proprietary adjuvant from Aventis at 1% v/v; PO = petroleum oil concentrate = Herbimax at 2 pt/A; 28-0-0 = urea ammonium nitrate at 2 qt/A.

At Casselton, no corn injury occurred. Evaluations on July 5 were only for PRE treatments. Foxtail species was primarily 75% yellow and 25% green foxtail. All treatments controlled wild mustard, redroot pigweed, and common lambsquarters.

At Chaffee, 14 DAT PRE ratings were May 25 and no corn injury was observed. However, frost damage had occurred to many plants. For POST evaluations, corn injury was observed mainly on Balance treatments at June 4 but did not exceed 10%. Injury was greater on up-hill, lighter soil. Common lambsquarters was controlled at July 2 and July 30. Option does not control yellow foxtail as well as Steadfast.

Distinct timing in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Casselton, ND, to evaluate weed control in corn from herbicides applied EPOST and POST. Pioneer '39D81' corn was planted on May 31, 2001. EPOST treatments were applied June 26 at 2:30 pm with 82 F air, 89 F soil surface, 30% relative humidity, 95% clouds, 3 mph NE wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 3 inch (1 collar) corn. Weed species present were: 1 to 3 inch (10-50/ft^2) foxtail; 0.5 to 2 inch (1-3/ft^2) wild mustard; and 1 to 3 inch (1-10/yd^2) common cocklebur. POST treatments were applied July 7, at 8:00 am with 68 F air, 71 F soil surface, 35% relative humidity, 0% clouds, 3 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch corn. Weed species present were: 2 to 5 inch (10-50/ft^2) foxtail; rosette 2 to 8 inch diameter (1-3/yd^2) wild mustard; 1 to 3 inch (1-3/yd^2) redroot pigweed; and 2 to 6 inch (1-10/yd^2) common cocklebur. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles for EPOST and POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Distinct timing in corn (Zollinger and Ries).

		July 19				August 2		August 30	
Treatment[1]	Rate	Yeft	Rrpw	Colq	Cocb	Yeft	Rrpw	Yeft	Rrpw
	(product/A)	% control							
EPOST									
Distinct+Quad 7	4oz+1% v/v	50	99	99	99	37	99	40	99
Distinct+Quad 7	6oz+1% v/v	52	99	93	83	33	96	20	99
POST									
Distinct+Quad 7	4oz+1% v/v	33	63	99	99	13	73	7	80
Distinct+Quad 7	6oz+1% v/v	40	89	99	96	23	99	18	99
Distinct+PO	4oz+1qt	37	93	99	96	20	99	8	83
Distinct+PO	6oz+1qt	37	98	99	96	17	83	8	99
Celebrity Plus+NIS+28-0-0	4.67oz+0.25% v/v+1qt	53	99	99	88	33	99	32	99
Celebrity Plus+Quad 7	4.67oz+1% v/v	68	99	99	94	37	99	30	99
Celebrity Plus+Soy-Stik+ 28-0-0	4.67oz+1% v/v+ 1qt	72	99	86	98	80	99	83	99
Celebrity Plus+Premium COC+ 28-0-0	4.67oz+1% v/v 1qt	62	94	99	99	33	99	27	99
Celebrity Plus+Premier 90+ 28-0-0	4.67oz+0.5% v/v 1qt	63	93	99	99	47	96	37	99
Celebrity Plus+Linkage	4.67oz+1% v/v	63	89	99	93	40	99	30	99
Celebrity Plus+WC010	4.67oz+1% v/v	65	99	99	96	43	99	43	99
Celebrity Plus+WC013	4.67oz+1% v/v	62	99	96	96	50	99	40	99
Celebrity Plus+Dispatch 111	4.67oz+1% v/v	62	83	99	83	43	99	43	99
Celebrity Plus+LI-222	4.67oz+1% v/v	53	93	99	92	33	99	37	99
Celebrity Plus+LI-227	4.67oz+1% v/v	68	99	86	96	57	99	60	99
LSD (0.05)		6	10	6	6	11	6	12	6

[1]Quad 7 = basic blend adjuvant; PO = petroleum oil = Herbimax; NIS = nonionic surfactant = Activator 90; 28-0-0 = urea ammonium nitrate; Soy-Stik = methylated seed oil; Premium COC = petroleum oil concentrate; Premier 90 = nonionic surfactant; Linkage = basic blend adjuvant; WC010 = basic blend adjuvant; WC013 = methylated seed oil based basic blend adjuvant; Dispatch 111 = basic blend adjuvant; LI-222 and LI-227 = proprietary adjuvants from Loveland Industries.

Corn was planted late due to continuous rain. No corn injury was observed. At August 2 and 30, wild mustard, redroot pigweed, and common cocklebur was controlled. Celebrity Plus + Soy-Stik (MSO type adjuvant) gave much greater yellow foxtail control than Celebrity Plus with other adjuvants. All treatments controlled redroot pigweed except Distinct applied at the lower rate of 4 oz/A rather than 6 oz/A

Callisto in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Carrington, ND, to evaluate weed control in corn using Callisto herbicide applied PRE and POST. Pioneer '39D81' corn was planted on May 10, 2001. PRE treatments were applied May 11 at 12:00 pm with 70 F air, 55 F soil at a depth of 4 inches, 22% relative humidity, 50% clouds, 4 mph SW wind, dry soil surface, and moist subsoil. POST treatments were applied June 11 at 3:30 pm with 70 F air, 78 F soil surface, 85% relative humidity, 0% clouds, 6 mph W wind, moist soil surface, wet subsoil, excellent crop vigor, and no dew present to 5 to 7 inch (2 collar) corn. Weed species present were: 2 to 4 inch (2-5/yd^2) foxtail; 4 to 6 inch rosette to bolting (1/yd^2) wild mustard; 1 to 5 inch diameter (5-10/ft^2) prostrate pigweed; 1 to 3 inch (1-5/ft^2) redroot pigweed; 1 to 6 inch (5-10/ft^2) common lambsquarters; 1 to 6 inch diameter (1-2/yd^2) wild buckwheat; 3 to 6 inch (4-8/yd^2) volunteer wheat; and 3 to 5 inch (1-2/yd^2) flax. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table 1. Callisto in corn (Zollinger and Ries).

		June 11						June 25				
Treatment[1]	Rate	Fxtl	Wimu	Prpw	Rrpw	Colq	Wibw	Fxtl	Wimu	Prpw	Colq	Wibw
	(product/A)	% control						% control				
PRE												
Dual II Magnum+Callisto	1.67pt+6fl oz	33	99	70	87	70	0					
Dual II Magnum+Callisto+Atrazine	1.67pt+6fl oz+0.56lb	72	99	78	93	87	20					
Bicep II Magnum	2.1 qt	80	99	95	97	93	23					
PRE/POST												
Dual II Magnum/Callisto+ PO+28-0-0	1.67/3fl oz	50	0	30	30	20	0	67	99	98	92	65
Bicep II Magnum/Callisto+ PO+28-0-0	2.1qt/3fl oz	63	99	90	95	90	0	65	99	99	99	99
Dual II Magnum/Callisto+Atrazine+ PO+28-0-0	1.67pt/3fl oz+0.28lb	53	0	30	30	20	0	78	99	99	99	90
Dual II Magnum/Northstar+ PO+28-0-0	1.67pt/5oz	50	0	30	30	20	0	83	99	95	70	77
Outlook/Distinct	21fl oz/6oz	92	0	80	88	20	0	77	88	73	63	86
Outlook/Dicamba	21fl oz/12fl oz	93	0	73	83	23	0	90	95	70	65	85
Outlook/Celebrity Plus+Distinct+ Quad 7	15fl oz/3.5oz+1oz	67	0	30	63	23	0	85	98	88	68	83
Surpass/Hornet+NIS+28-0-0	1.5pt/2.4oz	96	50	80	88	33	0	87	97	97	63	65
Untreated		0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)		13	0	12	11	25	21	15	6	12	9	17

[1]PO = petroleum oil = Herbimax at 1% v/v; 28-0-0 = urea ammonium nitrate at 2.5% v/v; Quad 7 = basic blend adjuvant at 1% v/v; NIS = nonionic surfactant = Activator 90 at 0.25% v/v.

Table 1. cont. Callisto in corn (Zollinger and Ries).

Treatment[1]	Rate	July 9						July 23						Yield
		Corn	Fxtl	Rrpw	Prpw	Colq	Wibw	Corn	Fxtl	Rrpw	Prpw	Colq	Wibw	Corn
	(product/A)	% injury	% control					% injury	% control					--bu/A --
PRE														
Dual II Magnum+Callisto	1.67pt+6fl oz	0	50	73	73	7	60	0	47	67	67	67	30	77
Dual II Magnum+Callisto+Atrazine	1.67pt+6fl oz+0.56lb	0	67	73	70	80	56	0	60	70	70	83	37	90
Bicep II Magnum	2.1 qt	0	87	99	99	99	99	0	98	99	99	99	99	95
PRE/POST														
Dual II Magnum/Callisto+ PO+28-0-0	1.67/3fl oz	0	89	99	99	99	50	0	89	99	99	99	47	94
Bicep II Magnum/Callisto+ PO+28-0-0	2.1qt/3fl oz	0	92	99	99	99	99	0	99	99	99	99	99	103
Dual II Magnum/Callisto+Atrazine+ PO+28-0-0	1.67pt/3fl oz+0.28lb	0	90	99	99	99	83	0	99	99	99	99	86	101
Dual II Magnum/Northstar+ PO+28-0-0	1.67pt/5oz	25	99	99	99	96	66	13	99	99	99	99	56	102
Outlook/Distinct	21fl oz/6oz	23	99	99	99	99	99	12	99	99	99	99	99	104
Outlook/Dicamba	21fl oz/12fl oz	13	99	99	99	99	99	7	99	99	99	99	99	107
Outlook/Celebrity Plus+Distinct+ Quad 7	15fl oz/3.5oz+1oz	18	99	99	99	99	99	10	99	99	99	99	99	103
Surpass/Hornet+NIS+28-0-0	1.5pt/2.4oz	3	99	99	99	99	99	0	99	99	99	99	99	106
Untreated		0	0	0	0	0	0	0	0	0	0	0	0	47
LSD (0.05)		10	9	16	15	17	45	7	10	17	17	18	26	7

[1]PO = petroleum oil = Herbimax at 1% v/v; 28-0-0 = urea ammonium nitrate at 2.5% v/v; Quad 7 = basic blend adjuvant at 1% v/v; NIS = nonionic surfactant = Activator 90 at 0.25% v/v.

Treatments containing dicamba injured corn. Bicep II Magnum was the only PRE treatment to control foxtail and broadleaf weeds. All PRE/POST treatments control foxtail and broadleaf weeds. Yield loss directly correlated with amount of weed control. Most PRE treatments and Callisto did not control wild buckwheat. Of the PRE treatments only with high atrazine rates controlled wild buckwheat.

POST weed control in corn from grass herbicides. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Casselton, ND, to evaluate weed control in corn from herbicides applied POST. Pioneer '39D81' corn was planted on May 31, 2001. POST treatments were applied July 7 at 10:30 am with 71 F air, 75 F soil surface, 35% relative humidity, 0% clouds, 3 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (4 collar) corn. Weed species present were: 2 to 5 inch (10-50/ft^2) foxtail; rosette 2 to 8 inch diameter (1-3/yd^2) wild mustard; 1 to 3 inch (1-3/yd^2) redroot pigweed; and 2 to 6 inch (1-5/ft^2) common cocklebur. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. POST weed control in corn (Zollinger and Ries).

		July 19					August 2			
Treatment [1]	Rate	Fxtl	Rrpw	Colq	Cocb	Wimu	Fxtl	Rrpw	Colq	Cocb
	(product/A)	---------- % control ---------					--- % control -----			
Accent+Quad 7	0.67oz	63	96	33	33	99	67	76	40	23
Accent+Hornet+Aim+Quad 7	0.67oz+2.4oz+0.33oz	70	76	48	63	99	57	99	66	96
Accent+Atrazine+Aim+Quad 7	0.67oz+0.42lb+0.33oz	65	99	99	47	99	57	99	99	33
Accent+Atrazine+Dicamba+Quad 7	0.67oz+0.42lb+4fl oz	62	99	99	68	99	43	99	99	80
Steadfast+Quad 7	0.75oz	70	99	89	53	99	70	99	89	27
Steadfast+Aim+Quad 7	0.75oz+0.33oz	73	99	50	40	99	63	99	50	20
Steadfast+Aim+Atrazine+Quad 7	0.75oz+0.33oz+0.42lb	67	99	99	40	99	57	99	99	17
Steadfast+Hornet+Aim+Quad 7	0.75oz+2.4oz+0.33oz	75	99	86	70	99	68	99	83	96
Accent+Starane+Liberate	0.67oz+0.5pt	60	99	23	68	89	33	99	33	90
Accent+PCC 196+Liberate	0.67oz+2pt	65	96	99	98	99	52	99	99	99
Basis Gold+Starane+Liberate	10oz+0.5pt	43	56	83	85	99	7	40	73	99
Accent+AGH 01005+Class Act NG	0.67oz+16oz	40	99	99	70	99	13	99	99	63
Accent+AGH 01005+Sterling+ Class Act NG	0.67oz+16oz+3fl oz	47	99	99	94	99	23	99	99	99
Accent+AGH 01005+ Sterling+Preference+AMS	0.67oz+16oz+3fl oz	57	99	99	86	99	27	99	99	99
LSD (0.05)		6	13	10	11	8	8	15	16	15

[1]Quad 7 = basic blend adjuvant at 1% v/v; Liberate = nonionic surfactant at 0.25% v/v; Class Act NG = Class Act Next Generation = surfactants + fertilizer at 2.5% v/v; Preference = nonionic surfactant at 0.25% v/v.

7 DAT ratings were taken July 12 in which corn leaves in all treatments containing Aim showed speckling and all treatments containing AGH 01005 caused a chlorotic/necrotic band in center of V4-V6 leaves. V-4-V-6 leaves were wrapped together showed onion leafing on many plants applied with AGH 01005. No injury was observed at later evaluation dates. The foxtail species was predominately yellow foxtail. There is no explanation for lack of total redroot pigweed control except ALS has been reported at this site. Only treatments containing atrazine controlled common lambsquarters. Treatments containing either Starane or dicamba (Sterling) controlled common cocklebur. Wild mustard was controlled by all treatments at August 2.

POST weed control in corn from broadleaf herbicides. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Casselton, ND, to evaluate weed control in corn from herbicides applied PRE and POST. Pioneer '39D81' corn was planted on May 31, 2001. Dual II Magnum at 1 pt/A was applied broadcast over the entire plot area June 6 at 11:00 am with 62 F air, 56 F soil at a depth of 4 inches, 67% relative humidity, 50% clouds, 8 mph E wind, dry soil surface, and moist subsoil to remove grass weeds. POST treatments were applied July 7 at 10:00 am with 71 F air, 75 F soil surface, 35% relative humidity, 0% clouds, 3 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (collar 4) corn. Weed species present were: 2 to 5 inch (10-50/ft^2) foxtail; rosette 2 to 8 inch diameter (1-3/yd^2) wild mustard; 1 to 3 inch (1-3/yd^2) redroot pigweed; and 2 to 6 inch (1-5/ft^2) common cocklebur. Dual II Magnum PRE treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. POST weed control in corn (Zollinger and Ries).

Treatment[1]	Rate	July 19				August 2			
		Rrpw	Colq	Cocb	Wimu	Rrpw	Colq	Cocb	Wimu
	(product/A)	% control							
POST									
Starane+Aim+LI-700	0.67pt+0.33oz	89	89	86	83	89	89	93	83
Starane+Atrazine+LI-700	0.5pt+0.42lb	76	83	88	93	84	83	96	93
Starane+Hornet+LI-700	0.5pt+3oz	96	73	82	93	86	83	93	99
PCC 196+LI-700	2pt	99	99	91	98	99	99	99	99
Starane+Callisto+LI-700	0.5pt+3oz	99	99	98	99	99	99	99	99
Aim+Atrazine+Class Act NG	0.33oz+0.56 lb/100gal	80	80	37	47	73	73	23	33
Aim+Atrazine+ Dicamba+Class Act NG	0.33oz+0.56lb/100gal+ 3fl oz	99	99	67	96	99	99	85	73
Aim+Hornet+NIS	0.33oz+2.4oz	89	89	63	50	89	89	87	83
Aim+Dicamba+NIS	0.33oz+4fl oz	99	99	80	95	99	99	99	83
Aim+Northstar+NIS	0.33oz+5oz	99	99	81	99	99	99	95	99
AGH 01005+Class Act NG	16oz	99	99	88	98	99	99	93	89
AGH 01005+Sterling+Class Act NG	16oz+3fl oz	99	99	89	99	99	99	99	99
LSD(.05)		10	12	11	8	12	12	7	11

[1]LI-700 = nonionic surfactant at 0.25% v/v; Class Act NG = Class Act Next Generation = surfactants + fertilizer at 2.5% v/v; NIS = non-ionic surfactant = Activator 90 at 0.25% v/v.

7 DAT corn injury ratings were taken on July 12. At July 12, all treatments containing Aim or AGH 01005 caused a chlorotic/necrotic band in the middle of V4-V6 leaves. No corn injury or evidence of the band was observed at July 19 or August 2. 28DAT ratings at August 2 show most treatments controlled broadleaf weeds. Aim + Atrazine did not control weeds present in study.

Liberty Link corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Casselton, ND, to evaluate weed control in corn from herbicides applied PRE and POST. NK 'N17-R3' (Liberty Link) corn was planted on May 31, 2001. PRE treatments were applied June 6 at 11:00 am with 62 F air, 56 F soil at a depth of 4 inches, 67% relative humidity, 50% clouds, 8 mph E wind, dry soil surface, and moist subsoil. POST treatments were applied July 7 at 9:00 am with 68 F air, 70 F soil surface, 35% relative humidity, 0% clouds, 3 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 inch (4 collar) corn. Weed species present were: 1 to 5 inch pre-tillering (10-30/ft^2) foxtail; rosette 2 to 8 inch diameter (1-3/yd^2) wild mustard; 1 to 3 inch (1-3/yd^2) redroot pigweed; and 2 to 6 inch (1-10/yd^2) common cocklebur. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept of Plant Sciences, North Dakota State University, Fargo).

Table. Liberty Link corn (Zollinger and Ries).

		July 5			July 19		August 2		August 30	
Treatment[1]	Rate	Yeft	Wimu	Cocb	Fxtl	Cocb	Fxtl	Cocb	Fxtl	Cocb
	(product/A)	% control			% control		% control			
PRE										
Balance Pro+Surpass+Atrazine	2.25fl oz+1pt+0.56lb	90	99	70	93	99	99	99	96	99
PRE/POST										
Define/Liberty+Atrazine+AMS	12oz/24fl oz+0.56lb	67	50	13	92	99	95	99	99	99
Balance Pro/Liberty+AMS	1.88fl oz/28fl oz	40	99	30	90	99	93	99	96	99
Surpass/Liberty+Atrazine+AMS	1.5pt/24fl oz+0.56lb	60	20	0	90	99	90	99	98	99
Dual II Magnum/Northstar+PO+28%N	1.67pt/5oz	90	30	0	99	99	99	99	99	99
POST										
Liberty+AMS	34fl oz				72	89	65	83	73	91
Liberty	22fl oz				47	47	40	33	33	37
Liberty	11fl oz				30	23	27	10	17	17
Liberty+AMS	11fl oz+3lb				37	27	30	17	33	17
Liberty+Coral AMS Liquid	11fl oz+2.5% v/v				47	37	40	17	33	33
Liberty+Class Act NG	11fl oz+2.5% v/v				96	99	96	99	99	99
Liberty+AG 01021	11 fl oz+1.5% v/v				99	99	99	99	99	99
Liberty+Placement Propak	11fl oz+1% v/v				70	45	63	28	66	43
Liberty+AG 01020	11fl oz+1% v/v				30	23	17	10	17	17
Option+Dicamba+MSO+28%N	1.5oz+4fl oz				88	96	92	98	96	76
Steadfast+Dicamba+PO+28%N	0.75oz+4fl oz				65	81	82	73	60	76
LSD (0.05)		7	22	9	13	13	9	7	18	16

[1]AMS = ammonium sulfate at 3 lb/A; Dicamba = Clarity; MSO = methylated seed oil = Scoil at 1.5 pt/A; 28-0-0 = urea ammonium nitrate at 2 qt/A; PO = petroleum oil concentrate = Herbimax at 1% v/v; Coral AMS Liquid = AMS fertilizer + drift retardant; Class Act NG = Class Act Next Generation = surfactants + fertilizer; AG 01021 and AG 01020 = proprietary adjuvants from Agriliance; Placement Propak = fertilizer + drift retardant.

No crop injury was observed. All herbicide treatments controlled wild mustard (except at July 5), redroot pigweed, and common lambsquarters except at August 30 Liberty at 11 fl oz/A gave less than 20% control. Herbicides applied PRE and PRE/POST gave excellent control of all weed species. Class Act and AG 01021 adjuvant added to Liberty at the reduced rate of 11 fl oz/A greatly enhanced weed control.

Roundup Ready corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Carrington, ND, to evaluate weed control in corn using herbicides applied PRE and POST. Pioneer '39D81' corn was planted on May 10, 2001. PRE treatments were applied May 11 at 1:00 pm with 70 F air, 65 F soil at a depth of 4 inches, 22% relative humidity, 50% clouds, 4 mph SW wind, dry soil surface, and moist subsoil. POST treatments were applied June 11 at 3:00 pm with 70 F air, 78 F soil surface, 85% relative humidity, 0% clouds, 6 mph W wind, moist soil surface, wet subsoil, excellent crop vigor, and no dew present to 5 to 7 inch (2 collar) corn. Weed species present were: 2 to 4 inch (2-5/yd^2) foxtail; 4 to 6 inch rosette to bolting (1/yd^2) wild mustard; 1 to 5 inch diameter (5-10/ft^2) prostrate pigweed; 1 to 3 inch (1-5/ft^2) redroot pigweed; 1 to 6 inch (5-10/ft^2) common lambsquarters; 1 to 6 inch diameter (1-2/yd^2) wild buckwheat; 3 to 6 inch (4-8/yd^2) volunteer wheat; and 3 to 5 inch (1-2/yd^2) flax. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Rating at 7 and 14 DAT PRE treatments were not taken because weeds had not yet emerged. No corn injury occurred. 30 DAT ratings for PRE treatments were made June 11. All treatments controlled wild mustard and volunteer wheat (except treatments containing Permit = <40% control) . Wild buckwheat was evaluated but data was not presented (except at July 9) in the table. No herbicide treatment gave greater than 40% wild buckwheat control. All treatments controlled redroot pigweed at June 25 and July 9. Degree or Harness + atrazine PRE controlled foxtail, prostrate and redroot pigweed but not common lambsquarters or wild buckwheat. Treatments containing glyphosate controlled all weeds except wild buckwheat by June 25. Improved buckwheat control at July 9 may be due to competition from corn. Basis PRE injury corn at June 25 but not at July 9. Weed control from Basis PRE followed by Accent or Accent + Atrazine controlled weeds except common lambsquarters and wild buckwheat. Permit + dicamba caused significant corn injury.

Table. Roundup Ready corn (Zollinger and Ries).

Treatment[1]	Rate	June 11				June 25					July 9		
		Fxtl	Prpw	Rrpw	Colq	Corn	Fxtl	Prpw	Colq	Wibw	Fxtl	Colq	Wibw
	(product/A)	% control				% injury	% control				% control		
PRE													
Degree+Atrazine	3.25pt+0.56lb	77	77	93	50						99	30	30
Degree+Atrazine	3.75pt+0.56lb	90	88	95	63						70	43	30
Degree+Atrazine	4.25pt+0.56lb	92	92	96	77						93	40	40
Harness+Atrazine	1.25pt+0.56lb	93	95	99	70						90	47	47
Harness+Atrazine	2pt+0.56lb	99	99	99	78						96	50	30
Harness+Atrazine	2.75pt+0.56lb	99	99	99	90						99	70	30
Basis	1oz	50	50	90	40						99	20	20
Basis+Atrazine	1oz+0.42lb	60	70	95	53						99	20	20
Basis+Atrazine	1oz+0.56lb	70	82	98	53						99	20	20
PRE/POST													
Degree/Roundup Ultramax	3.25pt/26fl oz	97	70	90	50	0	99	99	98	63	99	99	99
Basis/Callisto	1oz/6oz	50	63	90	53	10	70	92	87	52	96	99	99
Harness/Roundup Ultramax	1.25pt/26fl oz	93	77	95	53	0	99	99	99	86	99	99	99
Basis/Glyphosate+NIS+ AMS	1oz/1.5pt+0.25% v/v+ 8.5lb/100gal	50	50	90	27	0	99	99	99	88	99	99	99
Basis+atrazine/Glyphosate+ NIS+AMS	1oz+0.42lb/1.5pt+ 0.25% v/v+8.5lb/100gal	63	90	96	47	0	99	99	99	98	99	99	99
Basis+atrazine/Glyphosate+ NIS+AMS	1oz+0.56lb/1.5pt+ 0.25% v/v+8.5lb/100gal	70	85	82	40	0	99	99	99	92	99	99	99
Basis/Accent+Quad 7	1oz/0.67oz+1% v/v	57	50	93	30	8	83	83	47	47	99	70	20
Basis+Atrazine/Accent+ Quad 7	1oz+0.42lb/0.67oz+ 1% v/v	63	50	88	30	40	91	96	57	48	99	70	40
Basis+Atrazine/Accent+ Quad 7	1oz+0.56lb/0.67oz+ 1% v/v	77	70	92	37	18	96	99	62	58	99	73	63
POST													
Permit+Dicamba+ NIS+28-0-0	0.67oz+4fl oz+ 0.25% v/v+2qt					48	43	43	55	25	70	93	93
Permit+Dicamba+ NIS+28-0-0	1oz+4fl oz 0.25% v/v+2qt					22	48	65	55	53	80	80	86
LSD (0.05)		13	12	10	13	15	15	18	9	20	10	8	12

[1]Glyphosate = 3 lb/gal; NIS = nonionic surfactant = Activator 90; AMS = ammonium sulfate; Quad 7 = basic blend adjuvant; 28-0-0 = urea ammonium nitrate.

Volunteer RUR wheat control in RUR corn-Carrington. Oltmans and Zollinger. An experiment was conducted near Carrington, ND to evaluate Roundup Ready wheat control from POST applied herbicides. Dekalb '35-50' corn was planted May 30, 2001. 'Oxen' Roundup Ready wheat was planted at 55 lb/Acre, in 4 rows across each replicate May 30, 2001. EPOST treatments were applied June 22, 2001 at 12:45 to 1:15 pm with 76 F air, 65 F soil at a 2 to 4 inch soil depth, 41% relative humidity, 30% clouds, 4 to 8 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 2 to 3 collar corn. Weed species present were: 1 to 6 inch, (10-20 plants/ft^2) foxtail; 1 to 5 inch, (10-15 plants/ft^2) redroot pigweed; 1 to 5 inch, (1-5 plants/ft^2) common lambsquarters; 1 to 4 inch, (1-5 plants/m^2) wild buckwheat; 3 to 12 inch, (1-5 plants/ft^2) wild mustard; and 4 to 6 inch volunteer wheat. POST treatments were applied July 10, 2001 at 9:45 to 10:00 am with 75 F air, 75 F soil at a 2 to 4 inch soil depth, 51% relative humidity, 15% clouds, 2 to 4 mph E wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 collar corn. Weed species present were: 1 to 3 inch, (5-10 plants/ft^2) foxtail; 1 to 3 inch, (5-10 plants/m^2) wild buckwheat; and 7 to 9 inch volunteer wheat. Treatments were applied to the center 6.67 feet of the 10 by 40 ft plots. Treatments were applied delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles using a bicycle-wheel-type plot sprayer equipped with a wind shield. The experiment had a randomized complete block design with four replicates per treatment.

At 7 days after application (DAA), most treatments had corn injury, ranging from 4 to 9%. At 28 DAA, injury was minimal, ranging from 0 to 8%. Treatments with Accent+Banvel+MSO generally had the greatest corn injury. At 14 DAA, all treatments had greater than 90% wild buckwheat, redroot pigweed, common lambsquarters, and wild mustard (not shown) control. Foxtail control ranged from 45 to 99%. All treatment had 99% foxtail control, except Accent+Banvel+MSO treatments. Volunteer wheat control ranged from 3 to 99%. Only split-applied treatments with Accent had greater than 98% foxtail control, the remaining had less than 76% control. At 28 DAA, all treatments had greater than 97% redroot pigweed, common lambsquarters and wild mustard control (not shown). Foxtail control ranged from 72 to 98%. Split-applied treatments had greater than 95% foxtail control, the remaining had less than 85% control. Volunteer wheat control ranged from 5 to 99%. Only five treatments had greater than 92% volunteer wheat control, the remaining had less than 81% control. On August 8, all treatments had 99% redroot pigweed, common lambsquarters, and wild mustard control (not shown). Foxtail control ranged from 65 to 98%. Split-applied treatments provided the greatest foxtail control. Treatments with one herbicide application had reduced foxtail control due to new flushes. All treatments had greater than 90% volunteer wheat control, except atrazine at 0.47lb/A. Higher rates of atrazine are not recommended due to carry-over problems. Wild buckwheat control ranged from 84 to 99%. Roundup UltraMax treatments generally provided the greatest wild buckwheat control. Split-applied treatments with Accent were the most effective, having greater than 95% weed control.

Treatment[a]	Rate[b]	Applic. Stage[c]	Corn		14 DAA						28 DAA			August 8		
			7 DAA	28 DAA	Fxtl[d]	Vwht	Wibw	Rrpw	Colq	Wimu	Fxtl	Vwht	Wibw	Fxtl	Vwht	Wibw
	(product/Acre)		% injury		% control											
RUM+AMS+Atrazine+PO/ RUM+AMS	26floz+0.47lb+1qt/ 26floz	E/P	4	0	99	3	99	99	99	99	98	5	99	98	5	99
RUM+AMS+Accent/ RUM+AMS	26floz+0.33oz/ 26floz	E/P	7	0	99	99	99	99	99	99	96	99	99	96	96	99
RUM+AMS+Accent/ RUM+AMS	26floz+0.50oz/ 26floz	E/P	4	3	99	98	97	99	99	99	95	99	98	95	99	98
RUM+AMS+Basis	26floz+0.33oz	E	9	1	99	36	98	99	99	99	76	92	88	68	96	92
RUM+AMS+Basis Gold+MSO	26floz+14oz+1.5pt	E	4	1	99	57	91	99	99	99	80	80	89	72	90	94
RUM+AMS+Basis Gold+MSO	26floz+10oz+1.5pt	E	6	5	99	34	93	99	99	99	72	79	87	74	93	97
RUM+AMS+Basis Gold+MSO	26floz+7oz+1.5pt	E	4	3	99	50	95	99	99	99	85	81	92	70	97	86
Accent+Banvel+MSO	0.66oz+4floz+1.5pt	E	8	8	46	76	90	97	97	97	75	97	90	66	97	89
Accent+Banvel+MSO	0.50oz+4floz+1.5pt	E	8	6	45	51	90	93	94	92	72	96	90	65	99	84
Untreated			0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)			5	4	3	14	6	3	3	4	10	6	7	10	5	6

[a]RUM = Roundup UltraMax; PO = Herbimax; MSO = Scoil
[b]AMS = ammonium sulfate at 8.5lb/100gal
[c]E = EPOST; P = POST
[d]Fxtl = Grft and Yeft; Vwht = volunteer wheat

Volunteer RUR wheat control in RUR corn-Prosper. Oltmans and Zollinger. An experiment was conducted near Prosper, ND to evaluate Roundup Ready wheat control from POST applied herbicides. Dekalb '35-50' corn was planted May 29, 2001. 'Oxen' Roundup Ready wheat was planted at 55 lb/Acre, in 4 rows across each replicate May 29, 2001. EPOST treatments were applied June 20, 2001 at 1:30 to 2:30 pm with 69 F air, 66 F soil at a 2 to 4 inch soil depth, 52% relative humidity, 100% clouds, 2 to 4 mph W wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 2 to 3 collar corn. Weed species present were: 1 to 4 inch, (15-25 plants/ft^2) foxtail; 1 to 3 inch, (25-40 plants/ft^2) redroot pigweed; 1 to 3 inch, (1-5 plants/m^2) common lambsquarters; and 4 to 6 inch volunteer wheat. POST treatments were applied July 10, 2001 at 1:30 to 1:45 pm with 83 F air, 75 F soil at a 2 to 4 inch soil depth, 41% relative humidity, 5% clouds, 2 to 6 mph N wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 6 to 8 collar corn. Weed species present were: 1 to 2 inch, (5-10 plants/ft^2) foxtail; 1 to 2 inch, (1-5 plants/ft^2) redroot pigweed; 1 to 2 inch, (1-5 plants/m^2) common lambsquarters; and 7 to 9 inch volunteer wheat. Treatments were applied to the center 6.67 feet of the 10 by 40 ft plots. Treatments were applied delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles using a bicycle-wheel-type plot sprayer. The experiment had a randomized complete block design with four replicates per treatment.

At 7 days after application (DAA), all treatments had corn injury, ranging from 3 to 8%. At 28 DAA, corn injury was minimal, ranging from 1 to 8%. At 14 DAA, all treatments had greater than 91% common lambsquarters and redroot pigweed control. Foxtail control ranged from 44 to 98%. All treatments had greater than 91% foxtail control, except Accent+Banvel+MSO treatments. Volunteer wheat control ranged from 0 to 90%. Only one treatment, Accent at 0.50 oz/A, had 90% volunteer wheat control, the remaining had less than 78% control. At 28 DAA, all treatments had greater than 93% common lambsquarters control. Volunteer wheat control ranged from 5 to 99%. All treatments had greater than 90% volunteer wheat control, except atrazine at 0.47lb/A. Foxtail control ranged from 38 to 97%. Only three treatments had greater than 97% control, the remaining had less than 66% control. Split-applied treatments provided the greatest foxtail control. Redroot pigweed control ranged from 83 to 99%. All treatments had greater than 89% redroot pigweed control, except Roundup UltraMax+AMS+Basis. On August 7, all treatments had greater than 91% common lambsquarters control. Foxtail control ranged from 45 to 97%. Split-applied treatments had 97% foxtail control, the remaining had less than 66% control. Treatments with one herbicide application had reduced foxtail control due to new flushes. All treatments had greater than 97% volunteer wheat control, except atrazine at 0.47 lb/A. Higher rates of atrazine are not recommended due to carry-over problems. Redroot pigweed control ranged from 85 to 99%. All treatments had greater than 90% redroot pigweed control, except Roundup UltraMax+AMS+Basis. Split-applied treatments with Accent were the most effective, having greater than 97% weed control.

Treatment[a]	Rate[b]	Applic. Stage[c]	Corn		14 DAA				28 DAA				August 7, 2001			
			7 DAA	28 DAA	Fxtl[d]	Vwht	Colq	Rrpw	Fxtl	Vwht	Colq	Rrpw	Fxtl	Vwht	Colq	Rrpw
	(product/Acre)		% injury		% control											
RUM+AMS+Atrazine+PO/ RUM+AMS	26floz+0.47lb+1qt/ 26floz	E/P	3	3	94	0	99	99	97	5	99	99	97	5	99	99
RUM+AMS+Accent/ RUM+AMS	26floz+0.33oz/ 26floz	E/P	3	4	96	58	99	99	97	97	99	98	97	97	99	98
RUM+AMS+Accent/ RUM+AMS	26floz+0.50oz/ 26floz	E/P	3	4	98	90	99	99	97	99	99	99	97	99	99	99
RUM+AMS+Basis	26floz+0.33oz	E	5	1	94	68	98	99	66	97	93	83	56	99	91	85
RUM+AMS+Basis Gold+MSO	26floz+14oz+1.5pt	E	6	4	91	50	99	99	63	93	97	89	63	99	97	93
RUM+AMS+Basis Gold+MSO	26floz+10oz+1.5pt	E	6	4	95	50	99	99	60	90	97	89	66	99	94	94
RUM+AMS+Basis Gold+MSO	26floz+7oz+1.5pt	E	8	8	91	56	99	99	46	90	96	91	49	99	95	90
Accent+Banvel+MSO	0.66oz+4floz+1.5pt	E	5	4	73	68	91	91	61	99	95	90	53	99	98	95
Accent+Banvel+MSO	0.50oz+4floz+1.5pt	E	4	3	44	78	98	97	38	97	94	90	45	98	97	94
Untreated			0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)			5	5	11	8	5	5	9	6	4	6	8	2	4	4

[a]RUM = Roundup UltraMax; PO = Herbimax; MSO = Scoil
[b]AMS = ammonium sulfate at 8.5lb/100gal
[c]E = EPOST; P = POST
[d]Fxtl = Grft and Yeft; Vwht = volunteer wheat

2001 Corn Herbicide Trial at Hettinger. (Eriksmoen) Pre-plant incorporated treatments were applied on May 17 and then planted on the same day. Post applied treatments were applied to 4 leaf corn and to 1 to 5 leaf wild oats and to 1 inch to 6 inch field bindweed on June 12 with 57 deg. F, 74% RH, cloudy sky and 6 mph wind. Treatments were applied with a tractor mounted CO2 propelled plot sprayer delivering 17 gpa at 40 psi through 8001 flat fan nozzles to a 5 foot wide by 20 foot long area. The experiment was a randomized complete block design with four replications. The trial sustained severe hail damage on June 18. Evaluations were on July 3 and on July 18 for weed control. The trial was not harvested.

Application Timing	Treatment	Product Rate	July 3		July 18	
			Wioa	Fibw	Wioa	Fibw
		oz/acre	---------- % Control ----------			
PPI	DoublePlay	96	76	0	90	1
PPI	Define	18	80	0	75	0
PPI	Balance Pro	2.25	45	0	65	6
POST	Accent+Banvel+Quad 7	0.67 + 8 + 1%	99	85	99	81
POST	Basis+Callisto+Quad 7	0.33 + 3 + 1%	98	61	98	35
POST	Outlook+MVO	11 + 1%	0	2	12	0
POST	Steadfast+Quad 7	0.75 + 1%	99	18	99	4
POST	Accent Gold+MVO	2.9 + 1%	99	50	99	28
POST	Hornet+Accent+NIS	2 + 0.67 + 0.25%	96	61	90	28
POST	Callisto+Accent+MSO+AMS	3 + 0.67 + 1% + 1%	99	52	99	32
POST	Distinct+Accent+NIS+AMS	6 + 0.67 + 0.25% + 1%	94	89	88	86
POST	Permit+Accent+NIS+AMS	0.67 + 0.67 + 0.25% + 1%	99	1	99	2
POST	Starane+Accent+NIS+AMS	10.7 + 0.67 + 0.25% + 1%	99	58	99	70
	Untreated		0	0	0	0
C.V. %			10.2	35.7	11.9	56.3
LSD 5%			11	17	14	21
# of Reps			4	4	4	4

Summary

Crop injury was not observed on any treatment (data not shown). DoublePlay, Basis, Steadfast, Accent and Accent Gold treatments had very good season long wild oat control. Outlook and Balance Pro treatments provided poor wild oat control. Treatments containing Banvel, Distinct and Starane provided good season long control of field bindweed.

Soybean population effects on weed control-Mooreton. Oltmans and Zollinger. An experiment was conducted near Mooreton, ND to evaluate weed control from PRE and POST herbicides applied to soybean planted in 7.5 inch, (225,000 plants/A) and 30 inch, (175,000 plants/A) rows. Asgrow '0801' soybean was planted May 14, 2001. PRE treatments were applied May 15, 2001 at 8:00 to 8:15 am with 83 F air, 64 F soil at a 2 to 4 inch depth, 52% relative humidity, 80% clouds, 1 to 3 mph S wind, dry soil surface, moist subsoil. MPOST treatments were applied June 21, 2001 at 11:00 to 11:30 am with 64 F air, 62 F soil at a 2 to 4 inch depth, 52% relative humidity, no clouds, 4 to 10 mph N wind, moist soil surface, moist subsoil, good crop vigor, and no dew present to 3 to 4 trifoliate soybean. Weed species present were: 1 to 6 inch, (5-15 plants/ft^2) redroot pigweed; and 1 to 6 inch, (1-5 plants/m^2) common lambsquarters. LPOST treatments were applied July 8, 2001 at 10:45 to 11:00 am with 92 F air, 78 F soil at a 2 to 4 inch depth, 57% relative humidity, 5% clouds, 3 to 6 mph W wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 10 trifoliate soybean. Weed species present were: 1 to 4 inch, (15-20 plants/ft^2) redroot pigweed. Treatments were applied to the center 6.67 feet of the 10 by 40 ft plots. PRE treatments were applied with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles. POST treatments were applied with a bicycle-wheel-type plot sprayer equipped with a wind shield delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles. The experiment had a randomized complete block design with four replicates per treatment.

Treatment[a]	Rate	Applic. Stage[b]	14 DAA		28 DAA		August 7	
			Colq	Rrpw	Colq	Rrpw	Colq	Rrpw
	(product/A)		% control					
30" row/175,000 seeds/A								
Roundup UltraMax+AMS	26floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	13floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	6.5floz	M	91	78	90	79	93	87
RUM+AMS/RUM+AMS	6.5floz/6.5floz	M/L	99	99	99	99	99	99
Authority/RUM+AMS	4oz/13floz	PRE/M	99	99	99	99	99	99
Raptor+Quad 7	4floz	M	99	73	97	83	99	92
Untreated			0	0	0	0	0	0
7.5" row/225,000 seeds/A								
Roundup UltraMax+AMS	26floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	13floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	6.5floz	M	99	99	99	99	99	99
RUM+AMS/RUM+AMS	6.5floz/6.5floz	M/L	98	99	99	99	99	99
Authority/RUM+AMS	4oz/13floz	PRE/M	99	99	99	99	99	99
Raptor+Quad 7	4floz	M	98	97	98	97	99	99
Untreated			0	0	0	0	0	0
LSD (0.05)			1	5	2	3	1	3

[a]RUM = Roundup UltraMax; Quad 7 = basic blend at 1% v/v; AMS = ammonium sulfate at 8.5lb/100gal
[b]M = MPOST; L = LPOST

At 14 days after application (DAA), all treatments had greater than 91% common lambsquarters control. Redroot pigweed control ranged from 73 to 99% in wide rows and 97 to 99% in narrow rows. At 28 DAA, weed control was similar to 14 DAA evaluation, most likely due to lack of rainfall which limited weed seed germination and/or weed seedling growth. Common lambsquarters control ranged from 90 to 99% in wide rows and 98 to 99% in narrow rows. All treatments had greater than 97% common lambsquarters control, except 6.5 floz/A Roundup UltraMax applied to wide rows. Redroot pigweed control ranged from 79 to 99% in wide rows and 97 to 99% in narrow rows. All treatments had greater than 97% redroot pigweed control, except 6.5 floz/A Roundup UltraMax and Raptor+Quad 7, when applied to wide rows. On August 7, all treatments had greater than 93% common lambsquarters control. Redroot pigweed control ranged from 87 to 99% in wide rows and was 99% in narrow rows. There was no additional weed control gained from applying a PRE herbicide. The reduced rate, i.e., 6.5 floz/A, was not effective for redroot pigweed control, but the half-rate of 13 floz/A Roundup UltraMax was equally as effective as the full rate.

Soybean population effects on weed control-Oakes. Oltmans and Zollinger. An experiment was conducted near Oakes, ND to evaluate weed control from PRE and POST herbicides applied to soybean planted in 7.5 inch, (225,000 plants/A) and 30 inch, (175,000 plants/A) rows. Asgrow '0801' soybean was planted May 16, 2001. PRE treatments were applied May 16, 2001 at 5:30 to 5:45 pm with 70 F air, 64 F soil at a 2 to 4 inch depth, 40% relative humidity, 75% clouds, 9 to 11 mph S wind, dry soil surface, moist subsoil. MPOST treatments were applied June 20, 2001 at 10:15 to 11:00 am with 70 F air, 59 F soil at a 2 to 4 inch depth, 48% relative humidity, no clouds, 4 to 6 mph W wind, dry soil surface, moist subsoil, poor (hail damage) crop vigor, and no dew present to second trifoliate soybean. Weed species present were: 1 to 4 inch, (15-25 plants/plot) wild oat; and 1 to 3 inch, (15-25 plants/plot) marshelder. LPOST treatments were applied July 9, 2001 at 1:30 to 1:45 pm with 94 F air, 78 F soil at a 2 to 4 inch depth, 39% relative humidity, no clouds, 2 to 4 mph N wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to 9 trifoliate soybean. Weed species present were: 1 to 4 inch, (5-10 plants/plot) marshelder. Treatments were applied to the center 6.67 feet of the 10 by 40 ft plots. PRE treatments were applied with a bicycle-wheel-type plot sprayer equipped with a wind shield delivering 17 gpa at 40 psi through 8002 flat fan nozzles. POST treatments were applied with a bicycle-wheel-type plot sprayer equipped with a wind shield delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles. The experiment had a randomized complete block design with four replicates per treatment.

Treatment[a]	Rate	Applic. Stage[b]	14 DAA		28 DAA		August 7	
			Mael[c]	Wioa	Mael	Wioa	Mael	Wioa
	(product/A)		% control					
30" row/175,000 seeds/A								
Roundup UltraMax+AMS	26floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	13floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	6.5floz	M	98	99	98	99	98	99
RUM+AMS/RUM+AMS	6.5floz/6.5floz	M/L	99	99	99	99	99	99
Authority/RUM+AMS	4oz/13floz	PRE/M	99	99	99	99	99	99
Raptor+Quad 7	4floz	M	98	99	98	99	98	99
Untreated			0	0	0	0	0	0
7.5" row/225,000 seeds/A								
Roundup UltraMax+AMS	26floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	13floz	M	99	99	99	99	99	99
Roundup UltraMax+AMS	6.5floz	M	98	99	98	99	98	99
RUM+AMS/RUM+AMS	6.5floz/6.5floz	M/L	99	99	99	99	99	99
Authority/RUM+AMS	4oz/13floz	PRE/M	98	99	98	99	98	99
Raptor+Quad 7	4floz	M	99	99	99	99	99	99
Untreated			0	0	0	0	0	0
LSD (0.05)			2	1	1	0	1	0

[a]RUM = Roundup UltraMax; Quad 7 = basic blend at 1% v/v; AMS = ammonium sulfate at 8.5lb/100gal
[b]M = MPOST; L = LPOST
[c]Mael = marshelder

At 14 and 28 days after application (DAA) and on August 7, all treatments had greater than 98% marshelder and wild oat control. There was little rainfall throughout the growing season, which limited weed seed germination and/or weed seedling growth. There was no additional weed control gained from applying a PRE herbicide. Weed control with one application of Roundup UltraMax at 6.5 and 13 floz/A provided weed control similar to Roundup UltraMax at 26 floz/A.

Weed control from Valor in soybean. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Glyndon, MN, to evaluate weed control from herbicides applied PRE. DeKalb 'DKB03-51' soybean was planted on May 15, 2001. PRE treatments were applied May 17 at 2:30 pm with 72 F air, 70 F soil at a depth of 4 inches, 32% relative humidity, 30% clouds, 7 mph NW wind, dry soil surface, and moist subsoil. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles. The experiment had a randomized complete block design with three replicates per treatment.

The objective of the study was determine optimal rate for redroot pigweed control from Valor and determine possible antagonism between Valor and Prowl. The study was established in a silty loam soil, 3.8% organic matter, and where potatoes are grown in rotation. Rate according to label is 1.25 oz/A. Results show that optimal rate is 1 oz/A for soil type indicated. No soybean injury was observed at either evaluation. Antagonism was not observed between Valor and Prowl. The common lambsquarters infestation was not high enough to evaluate at May 31. Green foxtail infestation was very low (1-2 plants/yd^2). (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Weed control from Valor in soybean (Zollinger and Ries).

		May 31			June 14		
Treatment	Rate	Fxtl	Rrpw	Kochia	Rrpw	Colq	Kochia
	(product/A)	--------- % control ---------			-------- % control --------		
Valor	1oz	93	90	70	80	98	67
Valor	1.5oz	77	77	83	89	98	86
Valor	2oz	80	87	83	93	99	95
Valor	2.5oz	73	80	77	94	98	96
Valor	3oz	83	87	90	97	98	96
Valor	4oz	90	90	90	99	99	98
Prowl	2.4pt	87	80	60	58	92	80
Prowl	3.6pt	90	90	83	77	96	80
Valor+Prowl	1.5oz+2.4pt	87	80	67	82	96	80
Valor+Prowl	1.5oz+3.6pt	87	90	90	96	99	96
Valor+Prowl	3oz+2.4pt	90	87	90	98	99	97
Valor+Prowl	3oz+3.6pt	83	83	87	99	99	98
Outlook	14fl oz	88	80	0	95	96	0
Valor+Outlook	3oz+14fl oz	93	88	92	97	96	89
Dual Magnum	1pt	90	90	47	98	94	76
Sencor+Dual Magnum	0.67lb+1pt	90	90	77	98	99	70
Matrix+Dual Magnum	1.5oz+1pt	90	87	13	98	99	20
Untreated		0	0	0	0	0	0
LSD (0.05)		13	13	12	14	7	13

Soil-applied weed control in soybean. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Wahpeton, ND, to evaluate weed control in soybean using herbicides applied PPI, PRE, and POST. On May 16, 2001, PPI applications were made and incorporated with a rototiller operating at a 2 inch depth at 9:30 am followed by seeding of Pioneer '90B93' soybean on May 17, 2001. Weather conditions at PPI incorporations were 61 F air, 52 F soil at a depth of 4 inches, 58% relative humidity, 0% clouds, 7 mph NW wind, dry soil surface, and moist subsoil. PRE treatments were applied May 25 at 10:30 am with 62 F air, 53 F soil at a depth of 4 inches, 63% relative humidity, 0% clouds, 13 mph NW wind, dry soil surface, and moist subsoil. POST treatments were applied June 29 at 10:30 am with 81 F air, 88 F soil surface, 62% relative humidity, 10% clouds, 4 mph SW wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V-2 soybean. Weed species present were: 3 to 6 inch (1-5/yd^2) foxtail; 3 to 8 inch (1/yd^2) common cocklebur; and 1 to 5 inch (5-10/ft^2) common ragweed. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PPI and PRE treatments (hooded for PRE), and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Soil-applied weed control in soybean (Zollinger and Ries).

		June 18			June 29			July 6			
Treatment[1]	Rate	Fxtl	Corw	Cocb	Fxtl	Corw	Cocb	Fxtl	Colq	Corw	Cocb
	(product/A)	---- % control ----			---- % control ----			---------- % control ----------			
PPI/POST											
Prowl/Rezult+Pursuit+PO	3.5pt/1.6pt+1.6pt+0.72oz	89	23	7	86	23	13	99	99	47	53
Prowl/Rezult+Raptor+PO	3.5pt/1.6pt+1.6pt+2fl oz	99	30	10	92	30	10	99	99	50	63
Prowl/Pursuit+Ultra Blazer	3.5pt/1.08oz+12fl oz	89	28	0	96	28	0	99	99	43	67
Prowl/Raptor+Ultra Blazer	3.5pt/4fl oz+12fl oz	90	20	0	88	20	7	99	99	30	63
PRE											
Valor	2oz	72	72	28	75	68	20	27	90	20	20
Sencor	0.25lb	57	32	17	67	33	17	13	50	20	20
Valor+Sencor	2oz+0.25lb	93	85	43	95	80	23	83	79	63	50
FirstRate	0.6oz	71	96	66	89	98	95	50	60	99	89
Valor+FirstRate	2oz+0.6oz	99	89	53	99	98	45	70	99	99	99
Python	0.8oz	75	60	53	77	60	48	53	99	57	57
Valor+Python	2oz+0.8oz	88	95	78	91	91	75	96	99	83	67
Boundary	1.5pt	99	68	13	99	67	15	99	99	53	20
Boundary	2pt	99	86	73	99	85	65	99	99	70	40
PRE/POST											
Valor/Assure II+PO	2oz/8fl oz	68	68	20	68	65	20	75	99	47	30
Valor/Assure II+PO	3oz/8fl oz	85	86	42	88	86	23	99	99	53	30
Authority/Assure II+PO	4oz/8fl oz	84	48	17	83	43	17	83	99	20	30
FirstRate+Authority/Assure II+PO	0.4oz+3.5oz/8fl oz	63	96	79	99	96	43	89	99	89	96
FirstRate+Authority/Assure II+PO	0.5oz+4.5oz/8fl oz	70	99	76	98	99	71	89	99	99	83
FirstRate+Authority/Assure II+PO	0.6oz+5.33oz/8fl oz	83	98	53	81	95	67	99	99	76	66
Untreated		0	0	0	0	0	0	0	0	0	0
LSD (0.05)		7	8	12	8	7	11	7	8	7	10

[1]PO = petroleum oil concentrate = Herbimax at 1 qt/A in PPI/POST treatments and at 1% v/v in PRE/POST treatments.

Table cont. Soil-applied weed control in soybean (Zollinger and Ries).

Treatment[1]	Rate	July 28					August 24				
		Fxtl	Rrpw	Colq	Corw	Cocb	Fxtl	Rrpw	Colq	Corw	Cocb
	(product/A)	% control					% control				
PPI/POST											
Prowl/Rezult+Pursuit+PO	3.5pt/1.6pt+1.6pt+0.72oz	99	99	99	27	99	99	99	99	0	99
Prowl/Rezult+Raptor+PO	3.5pt/1.6pt+1.6pt+2fl oz	99	99	99	33	99	99	99	99	0	99
Prowl/Pursuit+Ultra Blazer	3.5pt/1.08oz+12fl oz	99	99	99	37	99	99	99	99	17	99
Prowl/Raptor+Ultra Blazer	3.5pt/4fl oz+12fl oz	99	99	99	30	70	99	99	99	0	60
PRE											
Valor	2oz	30	99	99	10	0	0	99	99	0	0
Sencor	0.25lb	17	50	50	7	0	10	27	27	0	0
Valor+Sencor	2oz+0.25lb	99	99	83	50	23	99	99	99	30	0
FirstRate	0.6oz	0	50	50	80	83	0	27	23	96	96
Valor+FirstRate	2oz+0.6oz	89	99	99	99	86	96	99	99	99	99
Python	0.8oz	0	90	99	33	50	0	99	99	10	27
Valor+Python	2oz+0.8oz	50	99	99	83	23	53	99	99	83	0
Boundary	1.5pt	99	99	99	50	20	99	99	99	30	0
Boundary	2pt	99	66	99	57	33	99	53	53	37	20
PRE/POST											
Valor/Assure II+PO	2oz/8fl oz	99	99	99	50	0	99	99	99	30	0
Valor/Assure II+PO	3oz/8fl oz	99	99	99	70	0	99	99	99	63	0
Authority/Assure II+PO	4oz/8fl oz	89	99	99	17	57	99	99	99	0	33
FirstRate+Authority/Assure II+PO	0.4oz+3.5oz/8fl oz	89	89	99	99	99	99	99	99	99	99
FirstRate+Authority/Assure II+PO	0.5oz+4.5oz/8fl oz	99	99	99	99	99	99	99	99	99	99
FirstRate+Authority/Assure II+PO	0.6oz+5.33oz/8fl oz	99	99	99	99	98	99	99	99	99	99
Untreated		0	0	0	0	0	0	0	0	0	0
LSD (0.05)		8	6	8	9	12	8	7	7	8	9

[1]PO = petroleum oil concentrate = Herbimax 1 qt/A in PPI/POST treatments and at 1% v/v in PRE/POST treatments.

No soybean was observed at any evaluation. 14 DAT evaluation for crop injury and weed control was taken June 8 for PPI and PRE treatments. Soybean was 75% emerged and in cotyledon stage; foxtail, common lambsquarters, common ragweed, common cocklebur, and kochia were emerging and less than 0.5 inch tall. No ratings were taken June 18 (28 DAT) for PPI and PRE. All treatments gave 99% redroot pigweed control (except Senor 92%), and common lambsquarters control (except Valor @ 2 oz 89% and Sencor 80%). 35DAT ratings were taken June June 29 for PPI and PRE. All treatments gave 99% redroot pigweed control and common lambsquarters control (except Valor @ 2 oz 89%, Sencor 81%, Valor + Sencor 94%). 7 DAT ratings for POST treatments were made July 6. 14 DAT ratings for POST treatments were made July 13 and ratings were similar to July 6. Slight speckling was occurred just on Ultra Blazer treatments but did not stunt the soybean. 28 DAT ratings for POST treatments were made July 28. 56 DAT ratings for POST treatments were made August 24. PPI/POST treatments controlled most weeds except common ragweed. PRE treatments did not control all weeds present. Only FirstRate + Authority/Assure II controlled all weeds in study.

Diphenyl ether + ACCase with adjuvants in soybean. Zollinger, Richard K. and Jerry L Ries. An experiment was conducted near Colfax, ND, to evaluate POST weed control in soybean. Pioneer '91B33' soybean was planted on May 24, 2001. POST treatments were applied June 27 at 2:30 pm with 89 F air, 90 F soil surface, 53% relative humidity, 50% clouds, 8 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V-2 soybean. Weed species present were: 1 to 6 inch tillering (5-15/ft^2) foxtail; 2 inch to vining (1-3/yd^2) wild buckwheat; 1 to 6 inch (1/yd^2) common cocklebur; 3 to 6 inch (1-3/yd^2) redroot pigweed; 1 to 6 inch (3-10/ft^2) common lambsquarters; 1 to 5 inch (2-5/yd^2) eastern black nightshade; and 1 to 6 inch (2-5/yd^2) marshelder. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Diphenyl ether + ACCase with adjuvants in soybean (Zollinger and Ries).

		July 5	July 11	July 11		July 25				
Treatment[1]	Rate	Soybean		Fxtl	Colq	Fxtl	Rrpw	Colq	Smwe	Wibw
	(product/A)	-- % injury --		---------- % control ----------						
Flexstar+Fusion+	0.75pt+6fl oz+									
Soy-Stik+28-0-0	1% v/v+2.5% v/v	17	5	77	47	67	99	72	99	73
WC00	1% v/v	14	5	73	37	50	57	50	50	30
WC013	1% v/v	18	5	83	50	70	80	37	60	40
Cobra+Select+	8fl oz+6fl oz+									
Premium COC+28-0-0	1% v/v+1qt	28	17	99	30	90	70	10	50	20
WC00	1% v/v	25	10	99	33	90	50	30	50	37
WC013	1% v/v	27	13	99	30	90	90	30	20	27
Premier 90	0.25% v/v	23	8	99	27	90	90	20	20	30
Linkage	1% v/v	22	13	93	30	87	90	20	20	30
Ultra Blazer+Poast+	1pt+0.75pt+									
Soy-Stik+28-0-0	1% v/v+2qt	28	13	86	37	70	99	50	70	50
Poast+WC00	1% v/v	10	3	47	20	30	99	60	70	50
Poast+WC013	1% v/v	27	12	77	20	50	99	50	70	50
Premium COC+28-0-0	1% v/v+2qt	32	15	88	33	77	99	57	70	50
Linkage	1% v/v	23	10	60	20	40	99	50	70	50
Reflex+Assure II+	0.75pt+7fl oz+									
Premium COC+ 28-0-0	1% v/v+2qt	18	7	77	33	50	99	50	70	50
Premier 90+28-0-0	0.25% v/v+2qt	5	2	43	7	20	99	57	57	30
WC00	1% v/v	8	5	53	23	30	99	57	63	30
Linkage	0.75pt+7fl oz+1% v/v	7	3	68	33	37	99	57	30	20
LSD (0.05)		8	7	9	10	9	5	6	12	7

[1]Soy-Stik = methylated seed oil; 28-0-0 = urea ammonium nitrate; WC00 = proprietary adjuvant from West Central Inc.; WC013 = methylated seed oil based basic blend adjuvant; Premium COC = premium oil concentrate; Premier 90 = surfactant; Linkage = basic blend adjuvant.

Redroot pigweed and marshelder was completely controlled July 11 and marshelder was completely control July 25. Select was the only POST grass herbicide with Cobra control foxtail. Phoenix did not control redroot pigweed. Common lambsquarters, annual smartweed (except Flexstar + Soy-Stik), or wild buckwheat was not controlled with any herbicide treatment. Generally, Ultra Blazer gave the greatest annual smartweed and wild buckwheat control.

Kochia control in soybean. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Glyndon, MN, to evaluate kochia control in soybean from herbicides applied PRE, POST, and late postemergence (LPOST). DeKalb 'DKB03-51' soybean was planted on May 15, 2001. PRE treatments were applied May 17 at 3:00 pm with 72 F air, 70 F soil at a depth of 4 inches, 32% relative humidity, 30% clouds, 7 mph NW wind, dry soil surface, and moist subsoil. POST treatments were applied June 19 at 1:30 pm with 72 F air, 78 F soil surface, 39% relative humidity, 80% clouds, 5-10 mph W wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V1 soybean. Weed species present were: 1 to 4 inch (1-5/yd^2) common lambsquarters; 1 to 3 inch (1-5/ft^2) redroot pigweed; 1 to 4 inch (5-20/ft^2) kochia; and 2 to 4 inch (1-3/yd^2) common cocklebur. LPOST treatments were applied June 26 at 4:00 pm with 85 F air, 90 F soil surface, 32% relative humidity, 55% clouds, 8 mph NE wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V3 soybean. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST and LPOST treatments. The experiment had a randomized complete block design with three replicates per treatment.

The target weed was kochia. Soybean showed minimal injury of stunting and chlorosis after July 3. Application in higher spray volume increased weed control. Except for kochia, Flexstar applied at reduced rates in sequential applications gave similar weed control than at higher rates in one application. Weed control was generally greater using MSO type adjuvants over petroleum oil and using 17 gpa as compared to 8.5 gpa. Several treatments initially gave greater than 85% kochia control. However, at July 17 kochia control was not greater than 78%. This is due to kochia regrowth from the contact nature of Ultra Blazer, Flexstar, and Basagran. Basagran applied in sequential applications at 17 gpa gave better or similar kochia control than Flexstar. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Kochia control in soybean (Zollinger and Ries).

Treatment[1]	Rate	Spray Volume	Soybean		July 3				July 17				August 14			
			June 26	July 3	Rrpw	Colq	Kochia	Cocb	Rrpw	Colq	Kochia	Cocb	Rrpw	Colq	Kochia	Cocb
	(product/A)	(gpa)	--% injury --		---------- % control ----------				---------- % control ----------				---------- % control ----------			
PRE/POST																
Prowl/Pursuit+Ultra Blazer+Quad 7	3.5pt/1.08oz+12oz	17/8.5	37	7	96	89	96	99	96	99	83	96	99	99	83	99
Prowl/Raptor+Ultra Blazer+Quad 7	3.5pt/4fl oz+12oz	17/8.5	27	5	99	99	89	99	96	99	72	96	99	99	66	99
POST																
Basagran+PO	1.6pt	8.5	6	0	37	47	33	99	20	43	33	77	17	43	23	80
Basagran+PO	1.6pt	17	3	0	60	76	67	99	43	73	60	83	37	79	60	76
Ultra Blazer+Quad 7	12fl oz	8.5	33	0	93	99	57	70	70	89	30	63	77	93	33	53
Ultra Blazer+Quad 7	16fl oz	8.5	35	0	93	96	78	83	77	99	40	72	86	96	43	77
Ultra Blazer+PO	12fl oz	8.5	33	0	96	99	43	43	89	89	33	43	89	73	27	23
Flexstar+PO	0.75pt	17	32	2	73	71	70	99	77	77	65	58	73	79	37	43
Flexstar+PO	1pt	17	45	0	91	73	86	96	80	99	77	89	80	99	86	89
Flexstar+MSO	0.75+0.5pt	17	30	0	86	83	90	83	90	90	70	89	76	89	82	86
Flexstar+MSO	1pt+1.5pt	17	43	0	98	89	93	99	93	99	78	99	89	99	90	99
POST/LPOST																
Basagran+PO/Basagran+PO	1.6pt/1.6pt	8.5/8.5	7	2	53	66	63	99	63	83	67	96	63	79	70	99
Basagran+PO/Basagran+PO	1.6pt/1.6pt	17/17	3	0	77	80	92	99	73	99	78	99	67	99	86	99
Flexstar+PO/Flexstar+PO	0.25pt/0.25pt	17/17	30	4	96	67	67	93	93	83	70	73	86	89	40	60
Flexstar+PO/Flexstar+PO	0.375pt/0.375pt	17/17	32	7	96	83	73	99	99	93	73	96	99	98	60	96
LSD (0.05)			13	4	12	20	15	16	16	13	19	10	16	17	13	19

[1]PO = petroleum oil concentrate = Herbimax at 1qt/A; Quad 7 = basic blend adjuvant at 1% v/v; MSO = methylated seed oil = Scoil.

Kochia control in glyphosate-resistant soybean. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Glyndon, MN, to evaluate weed control in soybeans from herbicides applied PPI, early post emergence (EPOST), middle post emergence (MPOST), and late postemergence (LPOST). On May 15, 2001, PPI treatments were applied and incorporated with a rototiller operating at 2 inches deep at 3:30 pm followed by seeding of DeKalb 'DKB03-51' soybean. Weather conditions at PPI incorporations were 72 F air, 70 F soil at a depth of 4 inches, 32% relative humidity, 30% clouds, 7 mph NW wind, dry soil surface, and moist subsoil. EPOST treatments were applied June 19, at 1:00 pm with 72 F air, 78 F soil surface, 39% relative humidity, 80% clouds, 5-10 mph W wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V1 soybean. Weed species present were: 1 to 3 inch (1-5/yd^2) green foxtail; 1 to 4 inch (1-5/yd^2) common lambsquarters; 1 to 3 inch (1-5/ft^2) redroot pigweed; 1 to 4 inch (5-20/ft^2) kochia; and 2 to 4 inch (1-3/yd^2) common cocklebur. MPOST treatments were applied June 26 at 4:30 pm with 85 F air, 90 F soil surface, 32% relative humidity, 55% clouds, 8 mph NE wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V3 soybean. LPOST treatments were applied July 2 at 9:30 am with 76 F air, 83 F soil surface, 53% relative humidity, 0% clouds, 4 mph SW wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V3 to V4 stage soybeans. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PPI treatments and 8.5 gpa at 40 psi through 8001 flat fan nozzles for all POST treatments. The experiment had a randomized complete block design with three replicates per treatment.

The target weed species was kochia. Soybean injury was slight yellowing and stunting. All treatments completely controlled green foxtail, redroot pigweed and common lambsquarters was controlled after July 3 (data not shown). All treatments containing glyphosate gave 76 to 99% control of kochia and common cocklebur at July 17 and August 14. Weed control from glyphosate applied once at MPOST gave 63 to 80% at July 3 but resulted in complete control at July 17 and August 14. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Kochia control in glyphosate-resistant soybean (Zollinger and Ries).

		Soybean		July 3			July 17		August 14	
Treatment[1]	Rate	Jun 26	Jul 3	Colq	Kochia	Cocb	Kochia	Cocb	Kochia	Cocb
	(product/A)	--% injury --		% control						
PPI/EPOST										
Prowl/Raptor+NIS+AMS	3pt/4fl oz	5	2	99	86	89	80	89	76	83
Prowl/Raptor+Acquire+NIS+AMS	3pt/4fl oz+1.5pt	7	3	99	99	99	99	99	96	96
EPOST										
Raptor+Acquire+NIS+AMS	4fl oz+1.5pt	5	3	99	95	99	98	99	99	99
Raptor+Acquire+NIS+AMS	5fl oz+1.5pt	5	4	99	99	99	99	99	99	99
Outlook+Acquire+NIS+AMS	12fl oz+1.5pt	7	3	99	96	99	92	99	99	99
Amplify+Roundup Ultra+AMS	0.3oz+2pt	4	0	99	93	96	99	99	99	99
MPOST										
Roundup Ultra+AMS	2pt	0	0	80	63	77	99	99	99	99
EPOST/LPOST										
Roundup Ultra+AMS/Roundup Ultra+AMS	1.5pt/1.5pt	4	0	99	90	99	98	99	99	99
LSD (0.05)		6	3	10	11	12	2	10	9	8

[1]NIS = nonionic surfactant = Activator 90 at 0.25% v/v; AMS = ammonium sulfate at 12 lb/100 gallons.

Harmony + glyphosate in Roundup Ready soybean. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Colfax and Wahpeton, ND, to evaluate weed control in soybean using herbicides applied POST. At Colfax, Pioneer '91B33' soybean was planted on May 24, 2001. POST treatments were applied June 27 at 2:00 pm with 89 F air, 90 F soil surface, 53% relative humidity, 50% clouds, 8 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V-2 to V-3 soybean. Weed species present were: 2 to 6 inch tillering (20-75/ft^2) foxtail; 2 inch to vining (1-4/yd^2) wild buckwheat; 1 to 6 inch (1/yd^2) smartweed; 3 to 6 inch (1-3/yd^2) redroot pigweed; 1 to 6 inch (2-10/ft^2) common lambsquarters; 1 to 5 inch (1/yd^2) eastern black nightshade; and 3 to 5 inch (3-5/yd^2) marshelder.

At Wahpeton, Pioneer '90B93' soybean was planted on May 17, 2001. POST treatments were applied June 29 at 9:00 am with 76 F air, 85 F soil surface, 60% relative humidity, 25% clouds, 3 mph SW wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V-2 soybean. Weed species present were: 1 to 6 inch (5-20/ft^2) foxtail; 1 to 4 inch (5-40/yd^2) redroot pigweed; 1 to 4 inch (1/yd^2) common lambsquarters; 1 to 5 inch (2-5/ft^2) common cocklebur; and 1 to 5 inch (10-40/ft^2) common ragweed.

Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table 1. Harmony + Glyphosate in Roundup Ready soybean, Colfax (Zollinger and Ries).

		Soybean		
Treatment[1]	Rate	July 5	July 11	July 25
	(product/A)	% injury		
Roundup UltraMax+AMS	20fl oz	0	0	0
Roundup UltraMax+AMS	26fl oz	0	0	0
Harmony GT+Roundup Ultra Max+AMS	1/12oz+20fl oz	23	25	10
Harmony GT+Roundup Ultra Max+AMS	1/12oz+26fl oz	30	25	12
Touchdown+AMS	1.5pt	0	0	0
Touchdown+AMS	2pt	0	0	2
Harmony GT+Touchdown+AMS	1/12oz+1.5pt	20	18	3
Harmony GT+Touchdown+AMS	1/12oz+2pt	20	20	7
Flexstar+Select+PO+AMS	1pt+6fl oz	15	8	0
Flexstar+FirstRate+Select+PO+AMS	1pt+0.3oz+6fl oz	17	5	0
Roundup UltraMax+FirstRate+AMS	20fl oz+0.3oz	3	8	0
Roundup UltraMax+FirstRate+AMS	26fl oz+0.3oz	13	10	0
Extreme+Quad 7+AMS	2.25pt	17	5	0
Extreme+NIS	3pt	23	15	0
LSD (0.05)		5	6	9

[1]AMS = ammonium sulfate at 2 lb/A; Touchdown = 3SL; PO = petroleum oil concentrate = Herbimax at 1% v/v; Quad 7 = basic blend adjuvant at 1% v/v; NIS = nonionic surfactant = Activator 90 at 0.25% v/v.

At July 11 and July 25, all treatments completely controlled foxtail, redroot pigweed, annual smartweed, wild buckwheat, and marshelder. All treatments controlled common lambsquarters except Flexstar + Select and Flexstar + FirstRate + Select. Injury was observed primarily in glyphosate + Harmony GT treatments.

Table 2. Harmony + Glyohosate in Roundup Ready soybean, Wahpeton (Zollinger and Ries).

Treatment[1]	Rate	July 6	July 28			August 24		
		Corw	Colq	Corw	Cocb	Colq	Corw	Cocb
	(product/A)	% control						
Roundup UltraMax+AMS	20fl oz	70	99	99	99	99	99	99
Roundup UltraMax+AMS	26fl oz	77	99	99	99	99	99	99
Harmony GT+Roundup Ultra Max+AMS	1/12oz+20fl oz	60	99	99	99	99	99	99
Harmony GT+Roundup Ultra Max+AMS	1/12oz+26fl oz	57	99	99	99	99	99	99
Touchdown+AMS	1.5pt	63	99	99	99	99	99	99
Touchdown+AMS	2pt	80	99	99	99	99	99	99
Harmony GT+Touchdown+AMS	1/12oz+1.5pt	70	99	99	99	99	99	99
Harmony GT+Touchdown+AMS	1/12oz+2pt	77	99	99	99	99	99	99
Flexstar+Select+PO+AMS	1pt+6fl oz	99	30	83	70	0	73	57
Flexstar+FirstRate+Select+ PO+AMS	1pt+0.3oz+6fl oz	99	50	99	99	30	99	99
Roundup UltraMax+FirstRate+AMS	20fl oz+0.3oz	96	99	99	99	99	99	99
Roundup UltraMax+FirstRate+AMS	26fl oz+0.3oz	83	99	99	99	99	99	99
Extreme+Quad 7+AMS	2.25pt	53	99	99	99	99	99	99
Extreme+NIS	3pt	70	99	99	99	99	99	99
LSD (0.05)		12	-	5	-	-	11	5

[1]AMS = ammonium sulfate at 2 lb/A; Touchdown = 3SL; PO = petroleum oil concentrate = Herbimax at 1% v/v; Quad 7 = basic blend adjuvant at 1% v/v; NIS = nonionic surfactant = Activator 90 at 0.25% v/v.

No injury occurred at any evaluation. At July 6, no injury was all treatments controlled foxtail and common cocklebur. Evaluation was also taken at July 13 but ratings were similar to those taken at July 6.
At July 28 and August 24, all treatments completely controlled foxtail and redroot pigweed. All treatments controlled common lambsquarters except Flexstar + Select and Flexstar + FirstRate + Select. Flexstar + Select did not control common ragweed or common cocklebur.

Residual herbicides in Roundup Ready soybean . Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Wahpeton, ND, to evaluate weed control in soybean using residual herbicide applied PPI, PRE, and POST. On May 16, 2001 PPI applications were made and incorporated with a rototiller operating at a 2 inch depth at 10:00 am followed by seeding of Pioneer '90B93' soybean on May 17. Weather conditions at PPI incorporations were 62 F air, 52 F soil at a depth of 4 inches, 57% relative humidity, 0% clouds, 7 mph NW wind, dry soil surface, and moist subsoil. PRE treatments were applied May 25 at 11:00 am with 62 F air, 53 F soil at a depth of 4 inches, 63% relative humidity, 0% clouds, 13 mph NW wind, dry soil surface, and moist subsoil. POST treatments were applied June 29 at 11:00 am with 83 F air, 88 F soil surface, 62% relative humidity, 10% clouds, 4 mph SW wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to V-2 soybean. Weed species present were: 1 to 6 inch (15-40/ft^2) foxtail; 1 to 6 inch (2-10/ft^2) common cocklebur; and 1 to 4 inch (5-15/ft^2) common ragweed. Treatments were applied to the center 6.67 feet of the 10 by 40 foot plots with a bicycle-wheel-type plot sprayer delivering 17 gpa at 40 psi through 8002 flat fan nozzles for PPI and PRE treatments (hooded for PRE), and 8.5 gpa at 40 psi through 8001 flat fan nozzles for POST treatments. The experiment had a randomized complete block design with three replicates per treatment. (Dept. of Plant Sciences, North Dakota State University, Fargo).

		June 29				July 6			July 28			August 24		
Treatment[1]	Rate	Fxtl	Rrpw	Corw	Cocb	Fxtl	Corw	Cocb	Fxtl	Corw	Cocb	Fxtl	Corw	Cocb
	(product/A)	% control							% control					
Valor														
PPI - single incorporation	2.5oz	68	98	68	3	57	50	20	20	63	20	0	50	0
PPI - double incorporation	2.5oz	79	99	70	3	50	67	37	43	63	37	20	43	13
PRE	2.5oz	57	98	42	0	50	50	20	0	50	0	0	30	0
PRE/POST														
Valor/Roundup UltraMax+AMS	1.5oz/26fl oz	75	99	67	23	99	99	99	99	99	99	99	99	99
Valor/Roundup UltraMax+AMS	2oz/26fl oz	65	91	57	13	99	99	99	50	99	99	30	99	99
FirstRate+Authority/Assure II+PO	0.6oz+5.33oz/8fl oz	85	99	98	82	99	99	99	50	99	99	30	99	99
FirstRate+Authority/Roundup UltraMax+AMS	0.6oz+5.33oz/12fl oz	87	99	99	66	99	99	99	99	99	99	99	99	99
FirstRate+Authority/Roundup UltraMax+AMS	0.5oz+4.44oz/12fl oz	80	99	99	95	99	99	99	50	99	99	30	99	99
FirstRate+Authority/Roundup UltraMax+AMS	0.4oz+3.55oz/20fl oz	55	99	80	83	99	99	99	50	99	99	30	99	99
Valor/Roundup UltraMax+AMS	2oz/20fl oz	67	99	67	3	99	99	99	50	99	99	30	99	99
Valor/Roundup UltraMax+AMS	3oz/20fl oz	78	99	70	3	99	99	99	50	99	99	30	99	99
Authority/Roundup UltraMax+AMS	4oz/20fl oz	60	99	33	0	99	99	99	80	99	99	70	99	99
Domain/Roundup UltraMax+AMS	10oz/20fl oz	78	98	55	30	99	99	99	73	99	99	66	99	99
POST														
Roundup UltraMax+AMS	26fl oz					99	99	99	99	99	99	99	99	99
Extreme+NIS+AMS	2.25pt					99	67	99	80	99	99	77	99	99
LSD (0.05)		12	4	14	22	2	10	9	12	7	8	10	10	5

[1]AMS = ammonium sulfate at 2 lb/A ; PO = petroleum oil concentrate = Herbimax at 1% v/v; NIS = nonionic surfactant = Activator 90 at 0.25% v/v.

FirstRate + Authority at 0.6+5.33, 0.5 + 4.44, and 0.4 + 3.5 oz/A = Gauntlet at 5, 6, and 7 acres/copack. No crop injury occurred and complete redroot pigweed and common lambsquarters control were observed. 14 DAT (PRE) ratings were made June 8 but soybean and weeds were still emerging. No ratings were taken. 35 DAT (PRE) ratings were taken June 18. 7, 14, 28, and 56 DAT (POST) ratings were taken July 6, 13, 28, and August 24, respectively.

Volunteer RUR wheat control in RUR soybean-Carrington. Oltmans and Zollinger. An experiment was conducted near Carrington, ND to evaluate Roundup Ready wheat control from POST applied herbicides. Dekalb 'B03-51' soybean was planted May 30, 2001. 'Oxen' Roundup Ready wheat was planted at 55 lb/Acre, in 4 rows across each replicate May 30, 2001. EPOST treatments were applied June 22, 2001 at 12:15 to 12:45 pm with 76 F air, 65 F soil at a 2 to 4 inch soil depth, 41% relative humidity, 30% clouds, 4 to 8 mph S wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to unifoliate soybean. Weed species present were: 1 to 6 inch, (15-25 plants/ft^2) foxtail; 1 to 5 inch, (10-20 plants/ft^2) redroot pigweed; 1 to 5 inch, (1-5 plants/ft^2) common lambsquarters; 1 to 5 inch, (5-10 plants/m^2) wild buckwheat; 3 to 12 inch, (1-5 plants/ft^2) wild mustard; and 4 to 6 inch volunteer wheat. POST treatments were applied July 10, 2001 at 10:00 to 10:15 am with 75 F air, 75 F soil at a 2 to 4 inch soil depth, 51% relative humidity, 15% clouds, 2 to 4 mph E wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to five trifoliate soybean. Weed species present were: 1 to 3 inch, (5-10 plants/ft^2) foxtail; 1 to 3 inch, (5-10 plants/m^2) wild buckwheat; and 7 to 9 inch volunteer wheat. Treatments were applied to the center 6.67 feet of the 10 by 40 ft plots. Treatments were applied delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles using a bicycle-wheel-type plot sprayer equipped with a wind shield. The experiment had a randomized complete block design with four replicates per treatment.

At 14 days after application (DAA), all treatments had greater than 94% wild mustard (not shown) and redroot pigweed control. Most treatments had greater than 95% foxtail and common lambsquarters control. Volunteer wheat control ranged from 38 to 99%. Six treatments had greater then 88% volunteer wheat control, the remaining had less than 65% control. Roundup UltraMax applied with Assure II provided the greatest volunteer wheat control. Wild buckwheat control ranged from 0 to 99%. Six treatments had greater than 96% wild buckwheat control, the remaining had no control. Roundup UltraMax applied with Assure II or Select provided the greatest wild buckwheat control. At 28 DAA, all treatments had greater than 95% wild mustard (not shown) and redroot pigweed control. Most treatments had greater than 96% volunteer wheat and common lambsquarters control. Foxtail control ranged from 66 to 99%. Split-applied treatments had greater than 97% foxtail control, the remaining had less than 87% control. Wild buckwheat control ranged from 4 to 99%. Six treatments had greater than 90% control, the remaining had less than 48% control. Roundup UltraMax applied with Assure II or Select had the greatest wild buckwheat control. On August 8, all treatments had greater than 94% wild mustard (not shown), volunteer wheat, and redroot pigweed control. Common lambsquarters control ranged from 77 to 99%. All treatments had greater than 91% common lambsquarters control, except Raptor+Quad 7 and Flexstar+Fusion+PO. Foxtail control ranged from 60 to 99%. Split-applied treatments provided the greatest foxtail control. Treatments with one herbicide application had reduced foxtail control due to new flushes. Wild buckwheat control ranged from 28 to 99%. All treatments had greater than 89% wild buckwheat control, except conventional herbicide treatments. Split-applied treatments were the most effective, having greater than 94% weed control.

Treatment[a]	Rate[b]	Applic. Stage[c]	14 DAA					28 DAA					August 8, 2001				
			Fxtl[d]	Vwht	Rrpw	Colq	Wibw	Fxtl	Vwht	Rrpw	Colq	Wibw	Fxtl	Vwht	Rrpw	Colq	Wibw
	(product/Acre)		% control														
RUM+AMS+Assure II	26floz+8floz	E	99	99	99	99	99	87	99	99	99	95	79	99	99	99	89
RUM+AMS+Assure II	26floz+6floz	E	99	99	99	99	99	83	98	99	99	94	81	99	98	97	94
RUM+AMS+Assure II/ RUM+AMS+Assure II	26floz+4floz/ 26floz+4floz	E/P	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
RUM+AMS+Assure II/ RUM+AMS+Assure II	26floz+3floz/ 26floz+3floz	E/P	96	97	99	99	96	97	99	99	99	99	97	99	99	99	99
RUM+AMS+Select	26floz+6floz	E	99	38	99	99	99	86	88	99	99	92	84	95	99	98	95
RUM+AMS+Select	26floz+4floz	E	99	63	99	99	99	83	96	99	99	90	81	96	99	99	92
Raptor+Quad 7	4floz+1%v/v	E	96	88	97	88	0	66	98	96	96	4	60	99	96	89	49
Raptor+Cobra+Quad 7	4floz+4floz+1%v/v	E	70	65	96	87	0	66	97	97	97	48	65	99	98	91	78
Flexstar+Fusion+PO	0.75pt+8floz+1qt	E	95	98	95	89	0	68	98	95	79	10	70	99	94	77	28
Untreated			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)			4	6	3	7	0	6	4	3	3	7	11	4	3	8	16

[a]RUM = Roundup UltraMax; PO = Herbimax
[b]AMS = ammonium sulfate at 8.5lb/100gal
[c]E = EPOST; P = POST
[d]Fxtl = Grft and Yeft; Vwht = volunteer wheat

Volunteer RUR wheat control in RUR soybean-Prosper. Oltmans and Zollinger. An experiment was conducted near Prosper, ND to evaluate Roundup Ready wheat control from POST applied herbicides. Asgrow '0801' soybean was planted May 29, 2001. 'Oxen' Roundup Ready wheat was planted at 55 lb/Acre, in 4 rows across each replicate May 29, 2001. EPOST treatments were applied June 20, 2001 at 1:00 to 1:30 pm with 69 F air, 66 F soil at a 2 to 4 inch soil depth, 52% relative humidity, 100% clouds, 2 to 4 mph W wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to first and second trifoliate soybean. Weed species present were: 1 to 5 inch, (30-50 plants/ft^2) foxtail; 1 to 3 inch, (20-30 plants/ft^2) redroot pigweed; 1 to 4 inch, (15-25 plants/ft^2) common lambsquarters; and 4 to 6 inch volunteer wheat. POST treatments were applied July 10, 2001 at 1:45 to 2:00 pm with 83 F air, 75 F soil at a 2 to 4 inch soil depth, 41% relative humidity, 5% clouds, 2 to 6 mph N wind, dry soil surface, moist subsoil, good crop vigor, and no dew present to six trifoliate soybean. Weed species present were: 1 to 2 inch, (5-10 plants/ft^2) foxtail; 1 to 2 inch, (1-5 plants/ft^2) redroot pigweed; 1 to 2 inch, (1-5 plants/ft^2) common lambsquarters; and 7 to 9 inch volunteer wheat. Treatments were applied to the center 6.67 feet of the 10 by 40 ft plots. Treatments were applied delivering 8.5 gpa at 40 psi through 8001 flat fan nozzles using a bicycle-wheel-type plot sprayer. The experiment had a randomized complete block design with four replicates per treatment.

At 14 days after application (DAA), all treatments had greater than 93% foxtail, redroot pigweed, and common lambsquarters control, except Raptor+Quad 7 and Raptor+Cobra+Quad 7. Volunteer wheat control ranged from 61 to 98%. Only five treatments had greater than 92% volunteer wheat control, the remaining had less than 79% control. Roundup UltraMax applied with Assure II provided the greatest volunteer wheat control. At 28 DAA, all treatments had greater than 87% volunteer wheat, redroot pigweed, and common lambsquarters control. Foxtail control ranged from 49 to 97%. All treatments had greater than 86% foxtail control, except Raptor+Quad 7 and Raptor+Cobra+Quad 7. On August 7, all treatments had greater than 98% volunteer wheat control. Foxtail control ranged form 44 to 97%. Split-applied treatments provided the greatest foxtail control. Treatments with one herbicide application had reduced foxtail control due to new flushes. Redroot pigweed control ranged from 85 to 99%. Seven treatments had greater than 91% redroot pigweed control, the remaining had less than 89% control. Common lambsquarters control ranged from 89 to 99%. All treatments had greater than 91% common lambsquarters control, except Flexstar+Fusion+PO. Split-applied treatments were the most effective, having greater than 97% weed control.

Treatment[a]	Rate[b]	Application Stage[c]	14 DAA				28 DAA				August 7			
			Fxtl[d]	Vwht	Rrpw	Colq	Fxtl	Vwht	Rrpw	Colq	Fxtl	Vwht	Rrpw	Colq
	(product/Acre)		% control											
RUM+AMS+Assure II	26floz+8floz	E	99	95	99	99	93	99	96	99	91	99	95	98
RUM+AMS+Assure II	26floz+6floz	E	99	92	99	99	87	99	90	92	86	99	89	94
RUM+AMS+Assure II/ RUM+AMS+Assure II	26floz+4floz/ 26floz+4floz	E/P	99	98	99	99	97	99	99	99	97	99	99	99
RUM+AMS+Assure II/ RUM+AMS+Assure II	26floz+3floz/ 26floz+3floz	E/P	98	98	99	99	97	99	99	99	97	99	99	99
RUM+AMS+Select	26floz+6floz	E	99	61	99	99	91	99	91	98	92	99	89	93
RUM+AMS+Select	26floz+4floz	E	99	63	99	99	90	93	91	96	89	99	91	99
Raptor+Quad 7	4floz+1%v/v	E	14	79	15	13	64	95	88	90	67	98	93	91
Raptor+Cobra+Quad 7	4floz+4floz+1%v/v	E	55	71	70	63	49	88	89	88	44	99	91	93
Flexstar+Fusion+PO	0.75pt+8floz+1qt	E	94	95	95	93	86	93	87	93	82	99	85	89
Untreated			0	0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)			16	9	7	6	9	4	8	5	7	1	9	5

[a]RUM = Roundup UltraMax; PO = Herbimax
[b]AMS = ammonium sulfate at 8.5lb/100gal
[c]E = EPOST; P = POST
[d]Fxtl = Grft and Yeft; Vwht = volunteer wheat

Weed control and crop response to POST glyphosate tank mixtures in glyphosate-resistant soybean, Carrington, 2001. (Endres and Frie) The experiment was conducted on a loam soil with 8.0 pH and 2.5% organic matter at the NDSU Carrington Research Extension Center. The experimental design was a randomized complete block with three replicates. Glyphosate-resistant Pioneer '90B72'' soybean was planted on May 25 at 150,000 seeds/A in 30-inch rows. Herbicide treatments were applied with a CO_2-hand-boom plot sprayer delivering 10 gal/A at 30 psi through 8002 (PPI trts) or 8001 (POST trts) flat fan nozzles to 10 by 25 ft plots. PPI treatments were applied on May 24 with 56 F, 63% RH, and 9 mph wind and immediately incorporated with a Melroe culti-harrow. EPOST treatments were applied on June 26 with 76 F, 49% RH, 50% clear sky, and 7 mph wind to 1-trifoliolate soybean, 3- to 5-leaf yellow and green foxtail, 0.5- to 6-inch tall redroot and prostrate pigweed,1- to 6-inch tall common lambsquarters, and 0.25- to 2-inch tall eastern black nightshade. MPOST treatments were applied on July 5 with 60 F, 76% RH, 100% clear sky, and 8 mph wind to 2-trifoliolate soybean, 2- to 6-inch tall yellow and green foxtail, 1- to 15-inch tall redroot and prostrate pigweed,1- to12-inch tall common lambsquarters, and 0.5- to 3-inch tall eastern black nightshade. LPOST treatments were applied on July 20 with 84 F, 62% RH, 35% clear sky, and 6 mph wind to R2 soybean, 1- to 12-tall yellow and green foxtail, 1- to 15-inch tall redroot and prostrate pigweed, 2- to 12-inch tall common lambsquarters, and 0.5- to 3-inch tall eastern black nightshade. Average soybean density was 6 plants/ft^2, foxtail density was 13 plants/ft^2, redroot and prostrate pigweed density was 7 plants/ft^2, and common lambsquarters and eastern black nightshade density was 2 plants/ft^2. Weed control and soybean response were visually estimated two and four WAA (weeks after treatment application).

Weed control was good to excellent with all herbicide treatments. Sequential application of glyphosate generally improved broadleaf weed control compared to glyphosate applied MPOST at 0.75 lb/A. Treatments containing imazamox reduced soybean growth.

Table. Weed control and crop response in glyphosate-resistant soybean.

Herbicide		Weed control[a]								Soybean growth reduction	
		2 wk after application				4 wk after application					
Treatment[b]	Rate	SETSS	AMASS	CHEAL	SOLPT	SETSS	AMASS	CHEAL	SOLPT	2WAA	4WAA
	lb/A[c]	%									
PPI/EPOST:											
Pendimethalin/Imazamox+NIS	1.25/0.031+0.25%v/v	95	99	95	98	97	99	98	99	11	3
Pend/Immx+glyphosate1+NIS	1.25/0.031+0.25%v/v	98	99	99	98	99	99	99	99	22	18
EPOST:											
Immx+glyphosate1+NIS	0.031+0.56+0.25%v/v	94	97	97	96	97	98	98	95	25	17
Immx+glyphosate1+NIS	0.039+0.56+0.25%v/v	96	98	99	99	92	94	96	97	15	10
Dimethenamid-P +glyphosate1+NIS	0.56+0.75+0.25%v/v	96	96	98	95	98	98	98	95	0	0
Chloransulam+glyphosate2	0.016+0.75	93	98	97	98	95	99	94	97	0	0
MPOST:											
Glyphosate2	0.75	98	90	88	84	98	96	92	84	0	0
EPOST/LPOST:											
Glyphosate2/glyphosate2	0.56/0.56	98	99	99	99	98	98	99	98	0	0
Untreated		0	0	0	0	0	0	0	0	0	0
LSD (0.05)		4	3	3	8	3	4	4	8	9	8

[a]SETSS=yellow and green foxtail; AMASS=redroot and prostrate pigweed; CHEAL=common lambsquarters; SOLPT=eastern black nightshade.

[b]NIS=Induce, a nonionic surfactant from Helena Chemical Company, Memphis, TN; Glyphosate1= Glyphosate Original, from Griffin LLC, Valdosta, GA; Glyphosate2=Glyphomax Plus, from Dow AgroSciences, Indianapolis, IN. All treatments include AMS at the equivalent of 12 lb/100 gal spray carrier.

[c]Glyphosate rates=acid equivalent.

Early-season biennial wormwood control in soybean, Fargo. (Kegode, Ciernia, and Fronning). An experiment was conducted near Fargo, ND, to evaluate control of biennial wormwood in soybean from herbicides applied PPI, PRE, POST, and POST split (POST I/POST II). Asgrow "0801" glyphosate-resistant soybean was seeded on May 30, 2001, in 30-inch rows. Plots consisted of four rows, 30 ft long, and arranged in a randomized complete block design with four replications. The study site had a Fargo-Ryan silt clay with 5.3% organic matter and pH 7.5. All herbicides were broadcast applied with a CO^2-pressurized bicycle sprayer: PPI and PRE treatments, XR 8002 flat-fan tips at 40 PSI and 17 GPA; POST treatments, XR 8001 flat-fan tips at 40 PSI and 8.5 GPA.

Date	May 30	May 30	Jul 5	Jul 19
Treatment	PPI	PRE	POST/POSTI	POSTII
Air temperature (C)	21	22	24	24
Soil moisture	dry	moist	--	--
Plant surface	--	--	dry	dry
Wind (mph)	6SE	2SE	4SW	4E
Sky	cloudy	cloudy	clear	cloudy
Relative humidity (%)	40	32	25	32
Soybean				
trifoliolate leaves (no.)	--	--	3-4	4-5
height (inches)	--	--	6-7	10-12
Biennial wormwood				
height (inches)	--	--	0.5-1.5	1.5-2.5
Redroot pigweed				
growth stage	--	--	cotyl-8 leaf	>8 leaf
height (inches)	--	--	0.5-4	8-14
Common cocklebur				
growth stage	--	--	4-8 leaf	>8 leaf
height (inches)	--	--	2-5	8-12

No soybean crop injury was detected regardless of herbicide or application date. Biennial wormwood and redroot pigweed control with PPI and PRE treatments was 89% or greater at the Aug 17 evaluation. POST treatments that included bentazon provided better than 90% control of biennial wormwood, and 75 – 90% control of redroot pigweed on Aug 17. Control with cloransulam was 50% or less for both species at either evaluation. Common cocklebur control for the Aug 17 evaluation was extremely variable and no significance was detected among treatments. Sulfentrazone PRE gave the best control of the three weed species. PPI treatments provided similar control of biennial wormwood as PRE treatments.

Application time/ Treatment[a]	Rate	Aug 1			Aug 17			Soybean yield
		ARTBI	AMARE	XANST	ARTBI	AMARE	XANST	
	oz ai/A	(%)	(%)	(%)	(%)	(%)	(%)	bu/A
PPI								
Sulfentrazone	4	96	97	90	96	94	79	38
Flumioxazin	1.5	96	98	71	98	96	72	39
Flumetsulam	1	99	95	87	98	90	70	37
Metribuzin	4	98	86	91	98	94	77	36
PRE								
Sulfentrazone	4	97	96	95	96	96	90	40
Flumioxazin	1.5	98	89	50	95	94	50	36
Flumetsulam	1	99	93	75	98	95	81	37
Metribuzin	4	99	69	59	97	89	65	38
POST								
Bentazon+COC	16+0.19G	96	46	94	93	75	91	32
Bentazon+Imazamox +COC	8+0.25 +0.19G	76	94	90	92	97	96	33
Cloransulam+COC	0.25+0.19G	25	11	98	26	50	89	40
POSTI/POSTII								
Bentazon+COC/ Bentazon+COC	8+0.19G/ 8+0.19G	98	79	94	97	76	95	37
Controls								
Hand-weeded	-	-	-	-	-	-	-	38
Untreated	-	-	-	-	-	-	-	29
LSD (0.05)		9	16	22	7	20	NS	6

[a]COC = Crop oil concentrate (Herbimax), a petroleum based additive with 17% emulsifier from Loveland Industries, Loveland, CO.

Late-season control of biennial wormwood in soybean, Fargo. (Kegode, Ciernia, and Fronning). Two studies were designed to determine the effect of glyphosate and bentazon applied late season on control of biennial wormwood and soybean yield. Study 1 also had an infestation of common cocklebur and study 2 had an infestation of redroot pigweed. The studies were conducted near Fargo, ND, on a Fargo-Ryan silt clay with 5.3% organic matter and pH 7.5, and Asgrow '0801' glyphosate-resistant soybean was seeded into a conventionally-tilled seedbed on May 30, 2001. Plots consisted of four rows, 30 ft long, with 30-inch row spacing arranged in a randomized complete block design with three (Study 1) and four (Study 2) replications. The herbicides were broadcast applied with a CO_2-pressurized bicycle sprayer using XR 8001 flat-fan tips at 40 PSI and 8.5 GPA.

Date	Jul 18	Jul 24	Aug 1
Treatment	LPOST1	LPOST2	LPOST3
Air temperature (C)	27	21	27
Soil moisture	dry	dry	moist
Plant surface	dry	dry	dry
Wind (mph)	3-4SE	4N	6W
Sky	clear	cloudy	clear
Relative humidity (%)	70	56	44
Soybean			
growth stage	flowering	flowering	flowering
height (inches)	16-20	12-24	24
Biennial wormwood			
height (inches)	2-4	2-8	6-10
Redroot pigweed			
growth stage	4 leaf-flowering	12 leaf-flowering	flowering
height (inches)	2-12	8-24	18-30
Common cocklebur			
growth stage	6-8 leaf	8 leaf-flowering	flowering
height (inches)	6-16	12-16	24-28

Study 1: With common cocklebur present in soybean, control of biennial wormwood by glyphosate with the low rate of 6 oz/A was fair to good and with the high rate of 12 oz/A was good. Biennial wormwood control by bentazon at both rates was poor to fair. Control of common cocklebur by glyphosate at both rates was excellent and by bentazon at both rates was poor.

Study 2: In the presence of redroot pigweed, control of biennial wormwood with both glyphosate and bentazon rates was excellent, regardless of application timing. Control of redroot pigweed by glyphosate with both rates was excellent at all application timings, and by bentazon at both rates was poor to fair, regardless of application timing.

Comparison of studies: These two studies were in the same 80 acre field so environmental, soil, and production conditions were similar, but both glyphosate and bentazon provided better biennial wormwood control when redroot pigweed was present (study 2) than when common cocklebur was present (study 1). In both studies, common cocklebur and redroot pigweed were substantially taller than biennial wormwood at each application timing. Apparently the canopy of common cocklebur which has larger and more horizontal leaves than redroot pigweed, intercepted more herbicide then redroot pigweed resulting in inadequate coverage and subsequent control of biennial wormwood when common cocklebur was present.

			Study 1					Study 2				
			Aug 10		Aug 30		Soybean	Aug 10		Aug 30		Soybean
Treatment[a]	Timing	Rate	ARTBI	XANST	ARTBI	XANST	Yield	ARTBI	AMARE	ARTBI	AMARE	Yield
		oz/A	(%)	(%)	(%)	(%)	bu/A	(%)	(%)	(%)	(%)	bu/A
Glyphosate+AMS	LPOST1	6	70	60	50	100	26	95	98	99	100	38
Glyphosate+AMS	LPOST2	6	79	91	90	100	20	67	86	77	96	40
Glyphosate+AMS	LPOST3	6	58	60	73	99	17	100	95	100	100	38
Glyphosate+AMS	LPOST1	12	88	91	87	100	24	100	100	100	100	40
Glyphosate+AMS	LPOST2	12	93	90	88	100	16	100	100	100	100	37
Glyphosate+AMS	LPOST3	12	59	68	85	100	15	93	97	100	99	38
Bentazon+Scoil	LPOST1	8+1.5%	13	43	61	22	17	98	23	100	59	37
Bentazon+Scoil	LPOST2	8+1.5%	37	58	69	37	17	72	43	98	71	35
Bentazon+Scoil	LPOST3	8+1.5%	45	20	40	40	13	83	20	99	68	33
Bentazon+Scoil	LPOST1	16+1.5%	8	40	57	30	10	98	24	99	55	32
Bentazon+Scoil	LPOST2	16+1.5%	45	52	73	55	18	98	48	100	75	35
Bentazon+Scoil	LPOST3	16+1.5%	38	30	75	40	12	93	51	99	76	35
Untreated	-	-	-	-	-	-	14	-	-	-	-	-
LSD (0.05)	-	-	31	38	26	30	7	NS	25	NS	19	4

[a] All glyphosate was Roundup Ultra 3.0 lb ae/gallon; ammonium sulfate (AMS) at 17 lb/100 gallon; Scoil is a methylated seed oil from AGSCO, Grand Forks, ND.