Effects of Option, Aim, and Callisto on sugar enhanced and supersweet sweetcorn - Oakes. Greenland, Richard G. Two field studies were conducted at the Oakes Irrigation Research Site near Oakes, ND (lat. 46E04'N, long. 98E06'W) in 2005 to evaluate the effect of Option and other herbicides on sugar enhanced (se) and supersweet (sh_2) sweetcorn. The soil for the se sweetcorn study was a Hecla sandy loam (sandy, mixed, frigid, Oxyaquic Hapludoll) with a pH of about 6.1 and soil organic matter content of about 2%. The soil for the sh_2 sweetcorn study was an Embden sandy loam (coarse-loamy, mixed, superactive, frigid Pachic Hapludoll) with a pH of 6.9 and soil organic matter of 2.8%. The se sweetcorn was planted on May 6 and the sh_2 sweetcorn was planted on May 17. The seeding rate for both types of sweetcorn was about 35,000 seeds/acre. The stand was thinned to 25,000 plants/acre on June 27. Both studies were fertilized as needed (both preplant and sidedress with N), were sprayed with Outlook + atrazine (1 pt + 0.5 lbs) PRE and hand weeded for weed control, and were sprayed with DiPel (1 lb/acre) for cornborer control. Herbicides treatments were applied on June 10 to both se and sh_2 sweetcorn in 17 gal/acre using a CO_2-pressurized back pack sprayer with air induction 110015 flat fan nozzles at a pressure of 54 psi and a walking speed of 3.7 mph. The se sweetcorn was 4 to 11 (mostly 7 to 10) inches tall and 3 to 5 lf, and the sh_2 sweetcorn was 5 to 9 inches tall and 2 to 4 lf. The sweetcorn was slightly yellow due to cool temperatures on the days previous to herbicide application. Applications were made on June 10 between 3:30 and 5:00 PM for se sweetcorn and between 5:00 and 5:30 PM for sh_2 sweetcorn. Air temperature was 67 to 70 F, relative humidity was 65 to 70%, wind velocity was about 4 mph, and the sky was 50% cloudy when the applications were made. It began raining on June 11 at 10:00 AM and we received 0.86 inches of rainfall over a 6 hr period. More information on treatments is given in Table 1.

Table 1. Herbicide application information

Herbicide	Herbicide rate (product/acre)	Surfactants	Rates of surfactants
Option	1.5 oz	MSO+28% N	1.5 pt+1.5 qt
Callisto	3.0 oz	COC	1%
Aim	1.0 oz	NIS	0.25%
Check	none	none	

Each study was arranged in a split plot design with sweetcorn hybrid as the main plot and herbicide treatment as the split plot. The main plot was 17 ft long by 12 rows (30 ft) wide. The herbicide treatment was applied to a single row in each main plot. There was also a check row in each main plot. There were sufficient rows in each main plot so that each treated row and the check row had an untreated border row on each side. Each study had four replications. Injury ratings were taken 6, 14, and 30 DAT. No weed ratings were taken. Each row of sweetcorn was hand harvested approximately 3 wk after it reached half-silk. Ear height, lodging, and ease of ear removal were measured at harvest. Ears were graded, counted, weighed, husked, and weighed again. Sweetcorn was graded for husk color, husk tightness, the distance the husk extended beyond the end of the ear, percent of ears with short shanks, the intensity of the yellow color of the kernels, and overall appearance. A representative ear from each row was measured for length, diameter, and number of rows.

Results

se sweetcorn. Aim injured sweetcorn much more than the other treatments (Table 2). Injury by Aim was leaf necrosis or burning along with some buggy whipping of the leaves making it difficult for the new leaves to emerge. Option injury was small, light-yellow patches, in the leaves. These patches were not readily visible and at about 10 feet distance could not be distinguished from the regular leaf. Callisto injury was a slight yellowing of the leaves. Injury decreased with time. At 14 DAT no injury was visible for the Callisto treatments and very little injury was visible for the Option treatments. At 30 DAT there was no visible injury to any of the sweetcorn plants from any of the herbicide treatments. Aim delayed maturity an average of about one day, but some hybrids responded differently (see Table 5). Both Aim and Option lowered ear height about 1.5 inches. For some hybrids, such as Exotic 65, that have low ears, this may make it harder to harvest. It should not cause harvest problems for most hybrids. None of the treatments affected the ease of ear removal from the stock or the amount of lodging. Aim was the only treatment to reduce the number of marketable ears. Aim and Option both reduced sweetcorn yield, but Callisto did not. The reduction in yield with Option, even though there was no reduction in number of ears, indicates that Option must have reduced the size of the ears. This is verified in the ear measurements (Table 3). When an ear is removed from the stalk it can break off the stalk just below the ear (short shank) or further down the stalk leaving the ear with a long shank. All of the treatments caused a decrease in the percentage of ears that came off the stalk with a short shank. Plants receiving Callisto had slightly lighter green-colored husks. None of the herbicides affected the length the husk extended beyond the end of the ear (husk cover), the tightness of the husk around the ear, or the overall appearance of the unhusked ear. Option slightly reduced the length of the ear and the number of rows of kernels. Both Option and Aim reduced the ear diameter. The color intensity of the yellow kernels of the ear was not affected by any of the treatments. There were some interactions, indicating that not all hybrids responded the same to each herbicide. Tables 4 to 7 show individual hybrid reaction to the herbicide treatments where there was a significant interaction. Aim injury to sweetcorn varied with hybrid and was very severe in some cases (Table 4). BC1136 and Charisma were injured most by Aim. Callisto and Option injury to sweetcorn was low and similar for all hybrids. The crop injury by Option and Callisto did not vary significantly between

hybrids. Generally, those hybrids that were injured most by Aim also had the half-silk date delayed the most (Table 5). Callisto and Option did not delay sweetcorn maturity. On average, the percentage of ears with short shanks was reduced by all three herbicides, but some hybrids responded differently, such as Accord where Aim and Option increased the percentage of ears with short shanks while Callisto reduced the percentage of ears with short shanks (Table 5). There was interaction between herbicide and hybrid treatment for the number of unhusked ears per acre but not husked ears per acre (Table 6). Note that for Honey Select, Aim increased the number of ears, but for several others, including Brocade, Charisma, Colonial, Harris 1001, and Renaissance, Aim reduced the number of ears. Hybrids also varied in their response to Callisto and Option. The largest percent reduction (increase) in unhusked ears for Aim, Callisto, and Option were 18 (25), 12 (19), and 19 (22), respectively. There was interaction between herbicide and hybrid treatments for the unhusked yield but not husked yield (Table 7). The hybrids that had yield reductions were usually the same ones that had a reduction in number of ears.

sh_2 sweetcorn. Herbicide injury looked the same as that seen in se sweetcorn, but overall injury levels were less (Table 8). Aim injured sh2 sweetcorn much more than the other treatments. Injury decreased with time. At 14 DAT no injury was visible for the Option or Callisto treatments. At 30 DAT there was no visible injury to any of the sweetcorn plants from any of the herbicide treatments. Aim delayed maturity an average of about 1.5 days. Both Aim and Option lowered ear height about 1 to 2 inches. For some hybrids, such as Exotic 65, that have low ears, this may make it harder to harvest. It should not cause harvest problems for most hybrids. None of the treatments affected the ease of ear removal from the stock, the amount of lodging, or the number of marketable ears. Option reduced sweetcorn yield, but Callisto and Aim did not. The reduction in yield with Option, even though there was no reduction in number of ears, indicates that Option must have reduced the size of the ears. This is verified in the ear measurements (Table 9) where it is seen that Option reduced the ear length. No other husk or ear traits were affected by any of the herbicides. There were no significant interactions between sh_2 sweetcorn hybrid and herbicide treatments. The sh_2 sweetcorn hybrids tested were Double Up and WSS 0987 from Rogers (Syngenta) and Fantastic from Seedway.

Table 2. Effect of Aim, Callisto, and Option on se sweetcorn injury, maturity, number of ears and yield.

	Crop injury		Days to	Days to	Ear	Ease of ear		Marketable ears		Marketable yield	
Treatment	6 DAT[1]	14 DAT	half-silk	harvest	height[2]	removal[3]	lodging	unhusked	husked	unhusked	husked
	0 to 100 %				inches	1 to 10	%	1000s/acre		tons/acre	
Check	0 a[4]	0 a	70 a	91.2 a	20.7 a	6.0	14	20.6 a	19.2 a	7.9 a	4.9 a
Aim	43 d	25 c	71 b	92.1 c	19.0 b	6.0	12	19.4 b	17.6 b	7.2 b	4.3 c
Callisto	4 b	0 a	70 a	91.2 a	20.3 a	6.1	13	20.9 a	19.5 a	8.1 a	5.0 a
Option	10 c	2 b	70 a	91.4 b	19.1 b	6.1	13	20.7 a	19.4 a	7.4 b	4.7 b
Prob.	<.0001	<.0001	<.0001	<.0001	<.0001	0.09	0.37	0.006	<.0001	<.0001	<.0001
Interaction[5]	<.0001	<.0001	0.005	0.92	0.19	0.48	0.99	0.013	0.32	0.04	0.28

[1]DAT = Days after treatment was applied.
[2]Distance from ground to base of ear.
[3]Indicates ease of ear removal. The higher the score, the easier it was to remove the ear.
[4]Values in the same column followed by the same letter are not significantly different at the 0.05 level.
[5]When interaction between hybrid and herbicide treatment is significant, see Tables 4 to 7 for hybrids listed separately.

Table 3. Effect of Aim, Callisto, and Option on se sweetcorn injury, maturity, number of ears and yield.

	% short	Husk				Ear				Yellow
	shank[1]	color[2]	cover[3]	tightness[4]	overall	length	diameter	# of rows	overall	intensity
	%	1 to 3	inches	1 to 3	1 to 10	inches			1 to 10	1 to 5
Check	90 a	2.0 a	1.7	2.3	7.5	8.0 a	1.83 a	16.1 a	7.7	1.5
Aim	85 b	1.9 ab	1.8	2.3	7.4	8.0 ab	1.81 b	15.8 a	7.5	1.5
Callisto	86 b	1.9 b	1.6	2.2	7.5	8.1 a	1.84 a	16.3 a	7.6	1.5
Option	86 b	2.0 a	1.6	2.3	7.4	7.9 b	1.78 c	14.8 b	7.6	1.5
Prob.	0.002	0.03	0.12	0.49	0.62	0.013	<.0001	<.0001	0.11	0.91
Interaction[6]	0.0003	0.16	0.91	0.64	0.14	0.99	0.14	0.20	0.17	0.47

[1]Percent of ears that have short shanks.
[2]Color of husk. 1 to 3 is light to dark green.
[3]The distance the husk extends beyond the end of the ear.
[4]How tight husk is around ear. 1 = loose; 3 = tight.
[5]Values in the same column followed by the same letter are not significantly different at the 0.05 level.
[6]Because the interaction between hybrid and herbicide treatment is significant for % short shank, see Table 4 for herbicide effects on individual hybrids.

Table 4. Aim, Callisto, and Option injury to se sweetcorn and their effect on days to half-silk. This table shows interactions.

Hybrid	Company[2]	Sweetcorn injury 6 DAT[1]				Sweetcorn injury 14 DAT[1]			
		Aim	Callisto	Option	Check	Aim	Callisto	Option	Check
		% injury							
Accord	MM	48 c[3]	10 b	13 b	0 a	25 b	0 a	0 a	0 a
Avalon	RG	38 c	3 a	10 b	0 a	23 b	0 a	0 a	0 a
BC 0805 VP	RG	48 c	3 a	10 b	0 a	28 b	0 a	3 a	0 a
BC 1136	RG	60 c	5 ab	10 b	0 a	43 b	0 a	3 a	0 a
Bon Jour	MM	35 c	5 ab	10 b	0 a	13 b	0 a	0 a	0 a
Brocade	MM	48 c	10 b	10 b	0 a	28 b	0 a	0 a	0 a
Buccaneer	MM	33 c	3 a	10 b	0 a	18 b	0 a	3 a	0 a
Charisma	SW	65 c	8 b	8 b	0 a	45 b	0 a	3 a	0 a
Colonial	RG	53 c	5 ab	8 b	0 a	30 b	0 a	3 a	0 a
Exotic 65	MA	38 c	0 a	10 b	0 a	23 b	0 a	3 a	0 a
Harris 1001	HR	33 c	5 ab	10 b	0 a	15 b	0 a	0 a	0 a
Honey Treat	RG	33 c	3 a	10 b	0 a	20 b	0 a	3 a	0 a
Honey Select	SW	38 c	8 b	10 b	0 a	20 b	0 a	3 a	0 a
Infinite Delight II	MA	35 c	0 a	8 b	0 a	20 c	0 a	5 b	0 a
Luscious	MM	40 c	5 ab	10 b	0 a	23 b	0 a	0 a	0 a
Precious Gem	MM	48 c	10 b	10 b	0 a	33 b	0 a	3 a	0 a
Providence	RG	45 c	0 a	10 b	0 a	20 b	0 a	3 a	0 a
Renaissance	HR	45 c	5 ab	10 b	0 a	23 b	0 a	3 a	0 a
WH 0807	RG	30 c	0 a	10 b	0 a	25 b	0 a	3 a	0 a
Average		43 c	5 b	10 b	0 a	25 c	0 a	2 b	0 a
Probability		<.0001	NS	NS	NS	<.0001	NS	NS	NS
LSD (0.05)		13				7			

[1]DAT = days after herbicide treatment.
[2]MM is Mesa Maize; RG is Rogers (Syngenta); SW is Seedway; HR is Harris Seed; MA is Mallard Seeds.
[3]Values in the same row and section followed by the same letter are not significantly different at the 0.05 level.

Table 5. Aim, Callisto, and Option effect on days to half-silk and percent short shank of se sweetcorn hybrids. This table shows interactions.

Hybrid	Company[1]	Days to half-silk				Percent short shank			
		Aim	Callisto	Option	Check	Aim	Callisto	Option	Check
Accord	MM	76 b[2]	75 ab	74 a	74 a	84 ab	67 c	88 a	74 bc
Avalon	RG	74 a	73 a	73 a	73 a	90 a	91 a	87 a	91 a
BC 0805 VP	RG	73 a	73 a	72 a	73 a	78 a	87 a	82 a	90 a
BC 1136	RG	76 b	73 a	74 a	73 a	92 a	93 a	91 a	94 a
Bon Jour	MM	68 b	67 ab	67 a	67 ab	99 a	100 a	98 a	96 a
Brocade	MM	73 b	71 a	70 a	71 a	65 ab	64 ab	53 b	68 a
Buccaneer	MM	73 b	72 ab	72 ab	72 a	62 b	49 b	82 a	86 a
Charisma	SW	72 b	70 a	71 a	70 a	77 b	92 a	92 a	90 ab
Colonial	RG	71 b	69 a	70 a	70 a	91 a	91 a	96 a	99 a
Exotic 65	MA	65 a	64 a	65 a	64 a	96 a	93 a	80 b	97 a
Harris 1001	HR	70 b	69 a	69 ab	70 ab	65 c	78 b	82 ab	92 a
Honey Treat	RG	68 a	68 a	68 a	68 a	91 a	95 a	83 a	92 a
Honey Select	SW	73 a	73 a	73 a	72 a	87 a	84 a	91 a	89 a
Infinite Delight II	MA	66 a	66 a	66 a	66 a	99 a	94 ab	83 b	100 a
Luscious	MM	70 b	69 ab	68 a	69 ab	96 a	95 a	100 a	93 a
Precious Gem	MM	74 b	72 a	72 a	72 a	95 a	99 a	98 a	99 a
Providence	RG	76 b	74 a	74 a	75 a	88 a	91 a	94 a	88 a
Renaissance	HR	68 b	66 a	66 a	66 a	60 b	70 ab	60 b	78 a
WH 0807	RG	70 ab	69 a	70 b	69 ab	95 a	92 a	89 a	94 a
Average		71 b	70 a	70 a	70 a	85 b	86 b	86 b	90 a
Probability		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
LSD (0.05)		2	2	1	1				

[1]MM is Mesa Maize; RG is Rogers (Syngenta); SW is Seedway; HR is Harris Seed; MA is Mallard Seeds.
[2]Values in the same row and section followed by the same letter are not significantly different at the 0.05 level.

Table 6. Effect of Aim, Callisto, and Option on marketable ears of se sweetcorn. This table shows interactions.

Hybrid	Co.[1]	Marketable unhusked ears				Marketable unhusked yield			
		Aim	Callisto	Option	Check	Aim	Callisto	Option	Check
		1000's of ears per acre				tons/acre			
Accord	MM	16.4 a[2]	16.7 a	18.4 a	17.7 a	6.5 a[2]	7.3 a	7.5 a	7.6 a
Avalon	RG	20.8 ab	18.2 b	23.6 a	20.8 ab	8.2 ab	7.7 b	9.1 a	8.6 ab
BC 0805 VP	RG	19.5 a	21.3 a	18.4 a	19.7 a	7.9 ab	8.7 a	7.1 b	8.0 ab
BC 1136	RG	17.4 a	17.9 a	15.1 a	18.4 a	6.7 ab	7.4 a	5.7 b	7.1 a
Bon Jour	MM	17.7 b	18.4 b	23.3 a	19.2 b	6.1 b	6.9 ab	7.6 a	6.9 ab
Brocade	MM	20.8 a	20.8 a	22.5 a	23.3 a	8.3 b	9.0 ab	9.1 ab	9.6 a
Buccaneer	MM	16.7 a	18.7 a	19.2 a	17.9 a	6.4 a	7.3 a	6.9 a	7.0 a
Charisma	SW	18.8 b	24.3 a	18.4 b	21.2 ab	6.5 b	8.8 a	6.3 b	7.4 ab
Colonial	RG	16.7 b	21.3 a	17.9 ab	20.0 ab	6.1 b	8.2 a	6.2 b	7.5 a
Exotic 65	MA	17.4 a	18.4 a	20.5 a	20.2 a	5.7 a	5.8 a	6.1 a	6.1 a
Harris 1001	HR	16.1 b	22.5 a	17.7 b	19.7 ab	6.0 c	8.6 a	6.3 bc	7.5 ab
Honey Treat	RG	20.8 a	21.0 a	22.3 a	20.8 a	7.5 a	7.9 a	8.0 a	7.5 a
Honey Select	SW	25.9 a	22.8 ab	21.8 ab	20.8 b	9.1 a	9.1 a	7.9 a	8.2 a
Infinite Delight II	MA	22.2 ab	23.9 ab	20.5 b	25.3 a	6.9 ab	8.1 a	6.3 b	8.3 a
Luscious	MM	19.5 a	20.2 a	21.0 a	19.5 a	8.0 a	8.3 a	8.3 a	8.0 a
Precious Gem	MM	20.0 b	22.3 ab	23.8 a	21.0 ab	7.0 a	8.1 a	8.1 a	7.6 a
Providence	RG	19.7 ab	21.3 ab	22.8 a	18.7 b	8.1 a	8.8 a	9.0 a	8.6 a
Renaissance	HR	22.3 b	23.3 ab	21.5 b	26.1 a	7.9 b	8.7 ab	7.7 b	9.6 a
WH 0807	RG	21.0 ab	24.3 a	23.6 ab	20.5 b	7.9 a	8.7 a	8.3 a	8.3 a
Average		19.4 b	20.9 a	20.7 a	20.6 a	7.2 b	8.1 a	7.4 b	7.9 a
Probability		0.0011	0.002	0.0008	0.014	0.0002	0.0005	<.0001	0.003

[1]MM is Mesa Maize; RG is Rogers (Syngenta); SW is Seedway; HR is Harris Seed; MA is Mallard Seeds.
[2]Values in the same row and section followed by the same letter are not significantly different at the 0.05 level

Table 7. Effect of Aim, Callisto, and Option on sh_2 sweetcorn injury, maturity, number of ears and yield.

Treatment	Crop injury		Days to	Days to	Ear	Ease of ear		Marketable ears		Marketable yield	
	6 DAT[1]	14 DAT	half-silk	harvest	height[2]	removal[3]	lodging	unhusked	husked	unhusked	husked
	0 to 100 %				inches	1 to 10	%	1000s/acre		tons/acre	
Check	0 a	0 a	63.2 a	84.2 a	26.3 a	6.2	14.2	28.3	25.9	10.3 a	6.6 a
Aim	36 d	18 b	64.6 b	85.8 b	25.2 b	6.0	7.5	28.0	25.6	10.4 a	6.4 a
Callisto	5 b	0 a	63.3 a	84.3 a	25.3 ab	6.0	8.8	27.0	25.5	9.9 ab	6.4 a
Option	8 c	0 a	63.6 a	85.0 ab	24.4 b	5.9	10.8	26.3	23.8	9.4 b	5.8 b
Prob.	<.0001	<.0001	0.009	0.03	0.015	0.4	0.47	0.15	0.17	0.02	0.03

[1]DAT = Days after treatments were applied. No injury to any sweetcorn
[2]Distance from ground to base of ear.
[3]Indicates ease of ear removal. The higher the score, the easier it was to remove the ear.
[4]Values in the same column followed by the same letter are not significantly different at the 0.05 level. No letters = no differences between values in that column.

Table 8. Effect of Aim, Callisto, and Option on sh_2 sweetcorn injury, maturity, number of ears and yield.

Treatment	% short	Husk				Ear				Yellow
	shank[1]	color[2]	cover[3]	tightness[4]	overall	length	diameter	# of rows	overall	intensity
	%	1 to 3	inches	1 to 3	1 to 10	inches			1 to 10	1 to 5
Check	92	2.0	1.3	2.0	7.1	8.1 a	1.8	16.0	8.4	2.5
Aim	88	2.0	1.9	2.0	7.3	8.2 a	1.8	15.8	8.3	2.5
Callisto	93	2.0	1.5	1.9	7.4	8.2 a	1.8	16.2	8.6	2.5
Option	89	2.0	1.6	1.9	7.3	7.9 b	1.8	15.3	8.1	2.5
Prob.	0.23	0.82	0.06	0.53	0.14	0.05	0.75	0.68	0.24	

[1]Percent of ears that have a short shank.
[2]Color of husk. 1 to 3 is light to dark green.
[3]The distance the husk extends beyond the end of the ear.
[4]How tight husk is around ear. 1 = loose; 3 = tight.
[5]Values in the same column followed by the same letter are not significantly different at the 0.05 level. No letters = no differences between values in that column.

Corn response to soil residues of grass herbicides. Kirk Howatt, Ronald Roach, and Janet Harrington. Treatments 1 through 4 were applied to bare soil May 3, 14 days before seeding (DBS) with air temperature at 61° F, 0% RH, 5 % cloud cover, 5 to 7 mph wind at 315°, and dry soil at 41° F. Treatments 5 through 8 were applied to bare soil May 10 (7 DBS) with air temperature at 51° F, 66% RH, 100% cloud cover, 15 mph wind at 0°, and damp soil at 53° F. Treatments 9 through 12 were applied pre plant May 17 (0 DBS) with air temperature at 64° F, 61% RH, 0% cloud cover, 14 mph wind at 180°, and dry soil at 48° F. All treatments were applied with a backpack sprayer delivering 8.5 gpa at 35 psi through 11001 TT nozzles to a 7 ft wide area the length of 10 by 30 ft plots. Glyphosate-resistant corn was seeded May 17. A maintenance treatment of glyphosate at 12 oz ae/A was applied to the entire study for weed control. Corn injury was visually evaluated and plant populations were determined. Corn was harvested at maturity with a two-row combine. The experiment was a randomized complete block design with four replicates.

Treatment	Rate	Application	6/22 Corn	7/22 Corn	10/19 Yield
	oz ai/A	DBS	%		bu/A
Quizalofop	1.54	14	0	0	76
Fluazifop-P	3	14	0	0	89
Sethoxydim	9	14	1	0	76
Clethodim	8	14	14	5	75
Quizalofop	1.54	7	0	2	75
Fluazifop-P	3	7	0	2	84
Sethoxydim	9	7	0	4	80
Clethodim	8	7	53	27	76
Quizalofop	1.54	0	0	2	72
Fluazifop-P	3	0	0	0	86
Sethoxydim	9	0	47	32	70
Clethodim	8	0	88	81	36
Untreated	0		0	0	81
CV			32	38	17
LSD (P=0.05)			7	6	17

Corn population was only less than untreated corn when clethodim was applied the day of seeding, 25% reduction of population. Other plant injury was recorded for clethodim and sethoxydim applied the day of seeding or with clethodim applied as early as 14 DBS. Injury was stunting and poorly developed plants. Treatment rates were two- to three-times typical use rates to encourage injury and determine the herbicides with the greatest margin of safety. Quizalofop and fluazifop caused slight and non-significant expression of stunting and discoloration, but symptoms were not observed in each replicate and yield was not effected. Clethodim caused severe injury to corn of 50 to 90% when applied 7 or 0 DBS, but only clethodim applied the day of seeding resulted in less corn yield than untreated corn.

Volunteer canola control in corn. Jenks, Markle, and Willoughby. 212 Roundup Ready BT corn was seeded May 17 into 30-inch rows. Canola was then seeded over the top to simulate a volunteer canola (VC) situation. Herbicide treatments were applied preemergence (PRE) on May 19 with a bicycle sprayer delivering 20 gpa at 30 psi through XR 80015 nozzles. Air and soil temperatures were 83 and 72 F, respectively, and relative humidity was 29%. Postemergence treatments were applied to 3-leaf canola May 19 with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. Air and soil temperatures were 74 and 62 F, respectively, and relative humidity was 68%. Treatments to 6-leaf canola were applied June 23 with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. Air and soil temperatures were 82 and 75 F, respectively, relative humidity was 76%. Individual plots were 10 x 30 ft and replicated three times.

Soil-applied Balance Pro provided excellent VC control. The postemergence herbicides Steadfast, Accent, Option, Callisto, and Distinct provided good to excellent VC control at both application timings. Atrazine and 2,4-D amine provided only fair control at the 3-leaf application.

VC control with Callisto and Distinct dropped about 10% with the later application, while the 6-leaf application of atrazine and 2,4-D amine was 15-20% lower than the 3-leaf application. Starane provided very little control at either application stage. Starane doesn't control VC very well, but causes too much injury to be considered for use in canola.

These results are generally consistent with our 2004 results. The biggest difference was with atrazine. We saw very little VC control with atrazine at 0.25 lb ai in 2004, but saw better control in 2005 with 0.375 lb ai.

Table. Volunteer canola control in corn.

Treatment	Rate	Timing	Volunteer canola	
			Jun 30	Jul 14
			% control	
Untreated			0	0
Balance Pro	3 fl oz	PRE	97	97
Steadfast + MSO + 28% N	0.75 oz + 1% v/v + 2 qt	3-leaf	98	100
Steadfast + MSO + 28% N	0.75 oz + 1% v/v + 2 qt	6-leaf	89	100
Accent + MSO + 28% N	0.5 oz + 1% v/v + 1 qt	3-leaf	94	100
Accent + MSO + 28% N	0.5 oz + 1% v/v + 1 qt	6-leaf	83	99
Option + MSO + 28% N	1.5 oz 1.5 pt 1.5 qt	3-leaf	96	100
Option + MSO + 28% N	1.5 oz 1.5 pt 1.5 qt	6-leaf	83	99
Atrazine + COC	0.375 lb ai + 1 qt	3-leaf	87	81
Atrazine + COC	0.375 lb ai + 1 qt	6-leaf	65	59
2,4-D amine	0.5 pt	3-leaf	84	75
2,4-D amine	0.5 pt	6-leaf	55	60
Callisto + COC + 28% N	3 fl oz + 1% v/v + 2.5% v/v	3-leaf	98	100
Callisto + COC + 28% N	3 fl oz + 1% v/v + 2.5% v/v	6-leaf	72	91
Starane	0.5 pt	3-leaf	35	35
Starane	0.5 pt	6-leaf	28	28
Distinct + NIS + 28% N	4 oz + 0.25% v/v + 1.25% v/v	3-leaf	90	97
Distinct + NIS + 28% N	4 oz + 0.25% v/v + 1.25% v/v	6-leaf	80	88
LSD (0.05)			9	8
CV			8	6

PRE weed control in corn - Metolachlor. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Prosper, ND, to evaluate Metolachlor products applied PRE. DeKalb 'DKC37-14' corn was planted May 5, 2005, followed by the application of PRE treatments at 2:30 pm with 72 F air, 50 F soil at a 4 inch depth, 8% relative humidity, 50% clouds, 5 to 8 mph NW wind, dry soil surface, and moist subsoil. Soil characteristics were 35.2% sand, 43.2% silt, 21.6% clay, loam soil texture, 3.8% OM, and 6.5 pH. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a bicycle-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet flat-fan nozzles. The experiment had randomized complete block design with three replicates per treatment.

On May 27, corn was 2 inches tall and had 2 leaves and no collars. Grass and broadleaf weeds were less than 0.5 inches tall. No corn injury was observed. All PRE treatments gave 100% grass and broadleaf weed control. Weather was cool and wet since the middle of May. On June 16, excess rain came and cool weather occured most of the month of June. Corn was V2 and chlorotic and weeds in the untreated plots were smaller because of environmental conditions. New flushes of foxtail and several broadleaf weeds were starting to germinate. At 29 DAT, MANA 283 and 284 formulations were generally equal in weed control but MANA 284 gave greater hairy nightshade, common ragweed, and common cocklebur control. By 56 DAT, the MANA 284 formulation provided greater control of common lambsquarters, hairy nightshade, kochia, wild buckwheat, common ragweed, and common cocklebur. Generally, MANA 284 gave equal or greater weed control than Bicep II Magnum at similar rate structures. (Dept. of Plant Sciences. North Dakota State University, Fargo).

Table 1. PRE weed control in corn - Metolachlor, 29 DAT (Zollinger and Ries).

		29 DAT							
Treatment[1]	Rate	Yeft	Rrpw	Colq	Hans	Koch	Wibw	Corw	Cocb
	(product/A)	- - - - - - - - - - - - - - - - (%) - - - - - - - - - - - - - - - -							
MANA-283	1.23qt	86	98	81	41	40	28	30	23
MANA-283	1.84qt	89	99	86	55	39	33	51	39
MANA-284	2.46qt	98	99	96	64	69	50	61	54
MANA-284	1.48qt	81	99	99	63	43	40	54	50
MANA-284	2.22qt	85	99	99	70	45	39	64	51
MANA-284	2.96qt	95	99	99	80	62	50	71	60
Bicep II Magnum	1.11qt	76	99	99	51	55	33	48	30
Bicep II Magnum	1.67qt	86	99	99	59	70	43	53	40
Bicep II Magnum	2.5qt	81	99	99	61	73	55	66	46
Bicep II Magnum	3.34qt	91	99	99	64	65	66	69	43
LSD (0.05)		4	1	2	6	7	6	8	8

[1]MANA-283 and MANA-284 = proprietary herbicides from Makhteshim Agan of North America.

Table 2. PRE weed control in corn - Metolachlor, 42 DAT (Zollinger and Ries).

		42 DAT							
Treatment[1]	Rate	Yeft	Rrpw	Colq	Hans	Koch	Wibw	Corw	Cocb
	(product/A)	- - - - - - - - - - - - - - - - (%) - - - - - - - - - - - - - - - -							
MANA-283	1.23qt	71	89	71	29	29	21	26	20
MANA-283	1.84qt	75	99	78	43	29	24	44	29
MANA-284	2.46qt	89	99	91	51	53	35	54	40
MANA-284	1.48qt	68	99	99	51	33	33	48	36
MANA-284	2.22qt	71	99	99	58	31	28	50	38
MANA-284	2.96qt	87	99	99	70	53	39	56	48
Bicep II Magnum	1.11qt	65	91	99	35	43	25	35	20
Bicep II Magnum	1.67qt	75	99	99	48	59	31	41	28
Bicep II Magnum	2.5qt	72	99	99	51	60	43	53	34
Bicep II Magnum	3.34qt	79	99	99	51	49	50	49	29
LSD (0.05)		4	8	2	7	7	6	7	6

[1]MANA-283 and MANA-284 = proprietary herbicides from Makhteshim Agan of North America.

Table 3. PRE weed control in corn - Metolachlor, 56 DAT (Zollinger and Ries).

		56 DAT							
Treatment[1]	Rate	Yeft	Rrpw	Colq	Hans	Koch	Wibw	Corw	Cocb
	(product/A)	- - - - - - - - - - - - - - - - (%) - - - - - - - - - - - - - - - -							
MANA-283	1.23qt	71	89	71	29	29	21	26	20
MANA-283	1.84qt	79	99	94	86	49	46	64	36
MANA-284	2.46qt	89	99	92	90	72	60	66	38
MANA-284	1.48qt	68	99	99	81	73	33	48	36
MANA-284	2.22qt	84	99	99	90	81	71	83	74
MANA-284	2.96qt	87	99	99	92	82	90	91	84
Bicep II Magnum	1.11qt	65	91	99	91	48	23	35	20
Bicep II Magnum	1.67qt	74	99	99	88	92	91	85	71
Bicep II Magnum	2.5qt	91	99	99	95	65	89	50	31
Bicep II Magnum	3.34qt	91	99	99	97	51	83	51	41
LSD (0.05)		4	8	3	4	5	11	5	4

[1]MANA-283 and MANA-284 = proprietary herbicides from Makhteshim Agan of North America.

PRE weed control in corn - Acetochlor. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Prosper, ND, to evaluate Acetochlor products applied PRE to corn. DeKalb 'DKC37-14' corn was planted May 5, 2005 followed by the application of PRE treatments at 3:15 pm with 73 F air, 50 F soil at a 4 inch depth, 10% relative humidity, 25% clouds, 4 to 10 mph NW wind, dry soil surface, and moist subsoil. Soil characteristics were 35.2% sand, 43.2% silt, 21.6% clay, loam soil texture, 3.8% OM, and 6.5 pH. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a bicycle-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet flat-fan nozzles. The experiment had randomized complete block design with three replicates per treatment.

No corn injury was observed. Good precipitation occurred after application. At 29 DAT, Acetochlor at 2 pt/A controlled grass and small seeded broadleaf weeds. Acetochlor applied with Atrazine or Atrazine + Balance Pro increased weed control. By 56 DAT, Acetochlor showed residual control of redroot pigweed and common lambsquarters. Acetochlor applied with Atrazine or Atrazine + Balance Pro at higher rates provided near complete weed control. (Dept. of Plant Sciences. North Dakota State University, Fargo).

Table. PRE weed control in corn - Acetochlor, 29 DAT (Zollinger and Ries).

		29 DAT							
Treatment[1]	Rate	Yeft	Rrpw	Colq	Hans	Koch	Wibw	Corw	Cocb
	(product/A)	(%)							
MAN-Ace	1pt	68	86	71	30	30	29	21	0
MAN-Ace	1.5pt	87	99	80	64	41	43	31	3
MAN-Ace	2pt	97	99	96	80	53	46	60	13
Aceto+Atraz	1.83pt	74	97	70	49	49	50	40	20
Aceto+Atraz	2.74pt	87	99	86	71	75	41	55	31
Aceto+Atraz	3.66pt	96	99	99	86	95	74	76	61
Aceto+Atraz + Balance Pro	1.83pt+1.5oz	97	99	99	81	99	75	95	68
Aceto+Atraz + Balance Pro	1.83pt+2.25oz	98	99	99	83	99	78	97	70
Aceto+Atraz + Balance Pro	2.74pt+1.5oz	99	99	99	84	99	73	97	78
Aceto+Atraz + Balance Pro	2.74pt+2.25oz	99	99	99	96	99	75	99	81
Aceto+Atraz + Balance Pro	3.66pt+1.5oz	99	99	99	95	99	80	99	78
Aceto+Atraz + Balance Pro	3.66pt+2.25oz	99	99	99	97	99	85	99	75
Atrazine	0.456lb	26	80	41	26	24	20	26	0
Atrazine	0.68lb	38	93	44	31	26	20	26	0
Atrazine	0.9lb	30	91	58	33	34	25	34	0
Balance Pro	1.5oz	81	95	81	43	93	0	64	33
Balance Pro	2.25oz	96	99	99	69	99	0	79	31
Lumax	5pt	91	99	99	94	88	41	99	41
LSD (0.05)		4	4	4	5	4	5	4	4

[1]MAN-Ace = acetochlor from Makhteshim Agan of North America; Aceto+Atraz = a premix of acetochlor + atrazine from Makhteshim Agan of North America.

Table cont. PRE weed control in corn - Acetochlor, 42 DAT (Zollinger and Ries).

Treatment[1]	Rate	42 DAT							
		Yeft	Rrpw	Colq	Hans	Koch	Wibw	Corw	Cocb
	(product/A)	(%)							
MAN-Ace	1pt	51	75	62	23	23	23	20	0
MAN-Ace	1.5pt	69	91	69	54	39	38	29	0
MAN-Ace	2pt	86	99	86	65	41	43	30	5
Aceto+Atraz	1.83pt	55	95	59	39	43	39	39	18
Aceto+Atraz	2.74pt	71	95	74	60	63	49	51	29
Aceto+Atraz	3.66pt	86	99	99	68	86	71	74	59
Aceto+Atraz + Balance Pro	1.83pt+1.5oz	86	99	97	69	99	71	93	63
Aceto+Atraz + Balance Pro	1.83pt+2.25oz	93	99	99	71	99	71	95	68
Aceto+Atraz + Balance Pro	2.74pt+1.5oz	94	99	99	74	99	71	95	70
Aceto+Atraz + Balance Pro	2.74pt+2.25oz	96	99	99	82	99	73	96	70
Aceto+Atraz + Balance Pro	3.66pt+1.5oz	99	99	99	86	99	78	96	65
Aceto+Atraz + Balance Pro	3.66pt+2.25oz	99	99	99	88	99	86	96	74
Atrazine	0.456lb	16	73	21	20	21	20	20	0
Atrazine	0.68lb	29	83	29	21	20	20	20	0
Atrazine	0.9lb	29	81	39	23	24	25	23	0
Balance Pro	1.5oz	71	84	79	31	83	0	54	28
Balance Pro	2.25oz	86	99	99	54	90	0	75	29
Lumax	5pt	80	99	99	84	68	39	99	36
LSD (0.05)		5	3	3	4	4	4	4	5

[1]MAN-Ace = acetochlor from Makhteshim Agan of North America; Aceto+Atraz = a premix of acetochlor + atrazine from Makhteshim Agan of North America.

Table cont. PRE weed control in corn - Acetochlor, 56 DAT (Zollinger and Ries).

Treatment[1]	Rate	56 DAT							
		Yeft	Rrpw	Colq	Hans	Koch	Wibw	Corw	Cocb
	(product/A)	(%)							
MAN-Ace	1pt	46	84	73	20	0	0	0	0
MAN-Ace	1.5pt	48	90	81	41	15	18	14	5
MAN-Ace	2pt	75	99	84	53	31	44	30	23
Aceto+Atraz	1.83pt	55	95	72	60	60	23	66	29
Aceto+Atraz	2.74pt	71	96	96	71	70	44	51	48
Aceto+Atraz	3.66pt	86	99	99	91	88	94	85	69
Aceto+Atraz + Balance Pro	1.83pt+1.5oz	91	99	97	90	99	71	88	66
Aceto+Atraz + Balance Pro	1.83pt+2.25oz	93	99	99	85	99	73	94	68
Aceto+Atraz + Balance Pro	2.74pt+1.5oz	95	99	99	88	99	75	95	76
Aceto+Atraz + Balance Pro	2.74pt+2.25oz	95	99	99	93	99	83	96	74
Aceto+Atraz + Balance Pro	3.66pt+1.5oz	97	99	99	96	99	86	96	78
Aceto+Atraz + Balance Pro	3.66pt+2.25oz	99	99	99	93	99	93	96	82
Atrazine	0.456lb	16	73	21	20	23	24	20	0
Atrazine	0.68lb	29	83	29	24	34	23	24	0
Atrazine	0.9lb	29	91	80	28	39	45	26	5
Balance Pro	1.5oz	71	89	89	39	88	0	56	28
Balance Pro	2.25oz	84	99	99	71	90	0	78	61
Lumax	5pt	82	99	99	88	89	83	99	34
LSD (0.05)		5	3	3	9	9	7	7	6

[1]MAN-Ace = acetochlor from Makhteshim Agan of North America; Aceto+Atraz = a premix of acetochlor + atrazine from Makhteshim Agan of North America.

Glyphosate plus Basis in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Prosper, ND, to evaluate weed control programs in corn. DeKalb 'DKC37-14' corn was planted May 5, 2005 followed by the application of PRE treatments at 3:45 pm with 76 F air, 50 F soil at a 4 inch depth, 8% relative humidity, 0% clouds, 8 to 14 mph NW wind, dry soil surface, and moist subsoil. Soil characteristics were 35.2% sand, 43.2% silt, 21.6% clay, loam soil texture, 3.8% OM, and 6.5 pH. EPOST treatments were applied on June 1 at 1:00 pm with 71 F air, 69 F soil surface, 82% relative humidity, 100% clouds, 2 to 5 mph SW wind, moist soil surface, wet subsoil, fair crop vigor (water stress) and no dew present to spike to V1 corn. Weed species present were 1 to 2 inch (5 to 15/ft^2) yellow foxtail; 1 to 2 inch (5 to 15/yd^2) common lambsquarters; and 1 to 2 inch (1 to 5/yd^2) kochia. POST treatments were applied June 20 at 2:30 pm wtih 91 F air, 79 F soil surface, 45% relative humidity, 25% clouds, 2 to 5 mph SW wind, moist soil surface, moist subsoil, fair crop vigor (water stress) and no dew present to spike to V3 to V4 corn. Weed species present were: 3 to 6 inch (25 to 100/ft^2) yellow foxtail; 2 to 6 inch (1 to 20/yd^2) common lambsquarters; 4 to 6 inch (1 to 10/yd^2) kochia; 3 to 6 inch (1 to 5/yd^2) common cocklebur; and 4 to 8 inch (1 to 20/yd^2) wild buckwheat. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a bike-type sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet flat-fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet flat-fan nozzles for POST treatments. The experiment had randomized complete block design with three replicates per treatment.

On May 27, corn was 2 iches tall and had 2 leaves with no collars. Grass and broadleaf weeds were less than 0.5 inch tall. No corn injury. All Basis PRE treatments gave 100% broadleaf weed control (redroot pigweed, common lambsquarters, kochia, wild buckwheat, common cocklebur) but did not have any affect on grass control. Cinch PRE has poor grass and broadleaf weed control (25% or less). Weather had been cool and wet since the middle of May.

On June 16, there was no evidence of residual broadleaf weed control from any Basis treatments. Broadleaf weeds present were redroot pigweed, common lambsquarters, hairy nightshade, kochia, wild buckwheat, common ragweed, and common cocklebur. Cinch treatments gave 50% yellow foxtail control and 30 to 40% redroot pigweed and common lambsquarters control. Excessive rains occurred from early June through June 14. Grass and broadleaf weeds were 3 to 5 inches tall. Corn was 5 to 6 inches tall and had 3 to 4 collars.

On June 20, POST treatments were applied and both EPOST treatments had 100% weed control.

On June 27, there was no corn injury at 7 DAT. Excessive rain and high weed infestation had caused corn to be stunted and chlorotic making it difficult to evaluate corn injury. Corn plants in Basis (PRE) treatments appeared to have white chlorotic areas in middle of older leaves.

On July 5 and 18, there was 99% control of all weeds for all treatments.

(Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Glyphosate plus Basis in corn, June 16 (Zollinger and Ries).

Treatment[1]	Rate	June 16					
		Yeft	Rrpw	Colq	Kochia	Wibw	Cocb
	(product/A)	(%)					
PRE/POST							
Basis/Roundup Original Max+AMS	0.33oz/22fl oz+1lb	0	0	0	0	0	0
Basis/Roundup Original Max+AMS	0.5oz/22fl oz+1lb	0	0	0	0	0	0
Basis+Atrazine/Roundup Original Max+AMS	0.33oz+0.42lb/22fl oz+1lb	0	0	0	0	0	0
Basis+Atrazine/Roundup Original Max+AMS	0.5oz+0.42lb/22fl oz+1lb	0	0	0	0	0	0
Basis/Steadfast+Callisto+Atrazine+ PO+28% N	0.33oz/0.75oz+2fl oz+0.42lb+ 1qt+2qt	0	0	0	0	0	0
Basis/Steadfast+Callisto+Atrazine+ PO+28% N	0.5oz/0.75oz+2fl oz+0.42lb+ 1qt+2qt	0	0	0	0	0	0
Cinch/Roundup Original Max+AMS	0.75pt/22fl oz+1lb	40	30	0	0	0	0
PRE/EPOST/POST							
Basis/Roundup Original Max+AMS/ Roundup Original Max+AMS	0.33oz/22fl oz+1lb/ 22fl oz+1lb	99	99	99	99	99	99
EPOST							
Steadfast+Accent+Atrazine+ MSO+AMS	0.75oz+0.125oz+0.42lb+ 1.5pt+2lb		99	99	99	99	50
Steadfast+Accent+Dicamba+Atrazine+ MSO+AMS	0.75oz+0.125oz+4fl oz+0.42lb+ 1.5pt+2lb		99	99	99	99	99
POST							
Roundup Original Max+AMS	22fl oz+1lb		-	-	-	-	-
Steadfast+Callisto+Atrazine+ PO+28% N	0.75oz+2fl oz+0.42lb+ 1qt+2qt		-	-	-	-	-
Cinch+Roundup Original Max+AMS	0.75pt+22fl oz+1lb		-	-	-	-	-
Untreated		0	0	0	0	0	0
LSD (0.05)		NS	NS	NS	NS	NS	NS

[1]AMS = ammonium sulfate; PO = petroleum concentrate = Herbimax; 28% N = 28-0-0.

Table cont. Glyphosate plus Basis in corn, July 5 (Zollinger and Ries).

Treatment[1]	Rate	July 5				
		Yeft	Colq	Kochia	Wibw	Cocb
	(product/A)	(%)				
PRE/POST						
Basis/Roundup Original Max+AMS	0.33oz/22fl oz+1lb	96	98	99	99	99
Basis/Roundup Original Max+AMS	0.5oz/22fl oz+1lb	99	99	99	99	99
Basis+Atrazine/Roundup Original Max+AMS	0.33oz+0.42lb/22fl oz+1lb	99	99	99	99	99
Basis+Atrazine/Roundup Original Max+AMS	0.5oz+0.42lb/22fl oz+1lb	99	99	99	99	99
Basis/Steadfast+Callisto+Atrazine+ PO+28% N	0.33oz/0.75oz+2fl oz+0.42lb+ 1qt+2qt	86	99	77	99	99
Basis/Steadfast+Callisto+Atrazine+ PO+28% N	0.5oz/0.75oz+2fl oz+0.42lb+ 1qt+2qt	96	99	68	99	99
Cinch/Roundup Original Max+AMS	0.75pt/22fl oz+1lb	99	99	99	99	99
PRE/EPOST/POST						
Basis/Roundup Original Max+AMS/ Roundup Original Max+AMS	0.33oz/22fl oz+1lb/ 22fl oz+1lb	76	99	99	99	72
EPOST						
Steadfast+Accent+Atrazine+ MSO+AMS	0.75oz+0.125oz+0.42lb+ 1.5pt+2lb	52	65	43	99	25
Steadfast+Accent+Dicamba+Atrazine+ MSO+AMS	0.75oz+0.125oz+4fl oz+0.42lb+ 1.5pt+2lb	47	99	99	99	99
POST						
Roundup Original Max+AMS	22fl oz+1lb	99	99	76	93	83
Steadfast+Callisto+Atrazine+ PO+28% N	0.75oz+2fl oz+0.42lb+ 1qt+2qt	60	70	47	47	25
Cinch+Roundup Original Max+AMS	0.75pt+22fl oz+1lb	99	99	99	99	99
Untreated		0	0	0	0	0
LSD (0.05)		8	3	9	6	8

[1]AMS = ammonium sulfate; PO = petroleum concentrate = Herbimax; 28% N = 28-0-0.

Table cont. Glyphosate plus Basis in corn, July 18 (Zollinger and Ries).

Treatment[1]	Rate	July 18				
		Yeft	Colq	Kochia	Wibw	Cocb
	(product/A)	(%)				
PRE/POST						
Basis/Roundup Original Max+AMS	0.33oz/22fl oz+1lb	91	98	99	99	99
Basis/Roundup Original Max+AMS	0.5oz/22fl oz+1lb	85	99	99	99	99
Basis+Atrazine/Roundup Original Max+AMS	0.33oz+0.42lb/22fl oz+1lb	91	99	99	99	99
Basis+Atrazine/Roundup Original Max+AMS	0.5oz+0.42lb/22fl oz+1lb	91	99	99	99	99
Basis/Steadfast+Callisto+Atrazine+ PO+28% N	0.33oz/0.75oz+2fl oz+0.42lb+ 1qt+2qt	82	99	72	99	99
Basis/Steadfast+Callisto+Atrazine+ PO+28% N	0.5oz/0.75oz+2fl oz+0.42lb+ 1qt+2qt	93	99	52	99	99
Cinch/Roundup Original Max+AMS	0.75pt/22fl oz+1lb	86	99	99	99	99
PRE/EPOST/POST						
Basis/Roundup Original Max+AMS/ Roundup Original Max+AMS	0.33oz/22fl oz+1lb/ 22fl oz+1lb	73	99	99	99	72
EPOST						
Steadfast+Accent+Atrazine+ MSO+AMS	0.75oz+0.125oz+0.42lb+ 1.5pt+2lb	33	52	47	99	23
Steadfast+Accent+Dicamba+Atrazine+ MSO+AMS	0.75oz+0.125oz+4fl oz+0.42lb+ 1.5pt+2lb	43	99	99	99	99
POST						
Roundup Original Max+AMS	22fl oz+1lb	99	99	99	99	86
Steadfast+Callisto+Atrazine+ PO+28% N	0.75oz+2fl oz+0.42lb+ 1qt+2qt	48	88	37	50	20
Cinch+Roundup Original Max+AMS	0.75pt+22fl oz+1lb	94	99	99	99	99
Untreated		0	0	0	0	0
LSD (0.05)		7	4	4	2	5

[1]AMS = ammonium sulfate; PO = petroleum concentrate = Herbimax; 28% N = 28-0-0.

Accent plus Harmony GT in corn. Zollinger, Richard K. and Jerry Ries. An experiment conducted near Valley City, ND, to evaluate weed control from Accent and Harmony GT tank-mixes. Pioneer '39D81' corn was planted May 27, 2005. POST treatments were applied June 24 at 11:30 am with 70 F air, 82 F soil surface, 37% relative humidity, 85% clouds, 5 to 10 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: 2 to 5 inch (15 to 40/ft^2) yellow foxtail; 1 to 5 inch (10 to 20/ft^2) green foxtail; and 3 to 4 inch (1 to 10/yd^2) common lambsquarters. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa at 40 psi through 11001 Turbo TeeJet flat-fan nozzles. The experiment had randomized complete block design with three replicates per treatment.

No corn injury was observed and there was no observable injury at tasseling. Green foxtail was completely controlled. There was no change in ratings at August 19 (56 DAT). Adding Harmony GT or Permit to Accent increased yellow foxtail control but Distinct antagonized grass control. Accent rates of 0.75 oz/A and Harmony GT rates of 0.056 oz/A were necessary to get greater than 80% yellow foxtail control. Only treatments containing Harmony GT controlled common lambsquarters. This study was conducted to evaluate a commercial premix of Accent + Harmony GT (Stout). Stout = Accent at 2/3 oz product/A + Harmony GT at ⅔ oz product/A. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Accent plus Harmony GT in corn (Zollinger and Ries).

		14 DAT		28 DAT	
Treatment[1]	Rate	Yeft	Colq	Yeft	Colq
	(product/A)	----- (%) -----		----- (%) -----	
Accent+PO+AMS	1oz+1% v/v+2lb	68	82	65	82
Accent+Harmony GT+ PO+AMS	1oz+0.075oz+ 1% v/v+2lb	85	99	81	99
Accent+Harmony GT+ PO+AMS	1oz+0.056oz+ 1% v/v+2lb	92	99	81	99
Accent+Harmony GT+Distinct+ PO+AMS	1oz+0.075oz+4oz 1% v/v+2lb	73	99	77	99
Accent+PO+AMS	0.75oz+1% v/v+2lb	70	65	61	55
Accent+Harmony GT+ PO+AMS	0.75oz+0.056oz+ 1% v/v+2lb	86	95	82	99
Accent+Harmony GT+ PO+AMS	0.75oz+0.0413oz+ 1% v/v+2lb	82	97	76	99
Accent+Harmony GT+Distinct+ PO+AMS	0.75oz+0.056oz+4oz 1% v/v+2lb	69	99	67	99
Accent+Permit+PO+AMS	0.75oz+0.67oz+1% v/v+2lb	88	75	86	62
Accent+Permit+PO+AMS	0.75oz+0.44oz+1% v/v+2lb	69	25	71	28
Accent+PO+AMS	0.5oz+1% v/v+2lb	62	67	57	43
Accent+Harmony GT+ PO+AMS	0.5oz+0.0373oz+ 1% v/v+2lb	68	98	70	99
Accent+Harmony GT+ PO+AMS	0.5oz+0.028oz+ 1% v/v+2lb	74	95	77	99
Accent+Harmony GT+Distinct+ PO+AMS	0.5oz+0.0373oz+4oz 1% v/v+2lb	57	99	49	99
Accent+Permit+PO+AMS	0.5oz+0.44oz+1% v/v+2lb	72	68	67	60
Accent+Permit+PO+AMS	0.5oz+0.3oz+1% v/v+2lb	65	42	67	43
Accent+PO+AMS	0.367oz+1% v/v+2lb	62	47	57	43
Accent+Harmony GT+ PO+AMS	0.0367oz+0.028oz+ 1% v/v+2lb	61	98	56	99
Accent+Harmony GT+ PO+AMS	0.367oz+0.028oz+ 1% v/v+2lb	66	95	62	97
Accent+Harmony GT+Distinct+ PO+AMS	0.367oz+0.028oz+4oz 1% v/v+2lb	50	99	48	99
Steadfast+PO+AMS	0.75oz+1% v/v+2lb	68	68	68	73
Untreated		0	0	0	0
LSD (0.05)		9	13	13	17

[1]PO = petroleum oil concentrate = Herbimax; AMS = ammonium sulfate.

Accent and Harmony GT tank-mixes plus adjuvants in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Valley City, ND, to evaluate weed control and crop response to corn tank-mixes applied POST. Pioneer '39D81' corn was planted May 27, 2005. POST treatments were applied June 24 at 12:00 pm with 71 F air, 85 F soil surface, 37% relative humidity, 85% clouds, 5 to10 mph W wind, dry soil surface, moist subsoil, good crop vigor and no dew present to 3 collar corn. Weed species present were: 1 to 5 inch (15 to 40/ft^2) yellow foxtail; 1 to 5 inch (10 to 20/ft^2) green foxtail; and 2 to 3 inch (1 to 10/yd^2) common lambsquarters. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa at 40 psi through 11001 Turbo TeeJet flat-fan nozzles. The experiment had randomized complete block design with three replicates per treatment.

No corn injury was observed and there was no observable injury at tasseling. Green foxtail was completely controlled. There was no change in ratings at August 19 (56 DAT). Adding Harmony GT to Accent increased yellow foxtail control and Dynamic enhanced Accent and Harmony GT and other herbicide combinations greater than Silwett L-77 or Agri-Dex. Adding broadleaf herbicides (Distinct, Atrazine, Callisto, or Starane) provided complete common lambsquarters control. In most cases, adding additional broadleaf herbicides did not improve yellow foxtail control beyond control of Accent + Harmony GT. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Accent and Harmony GT tank-mixes plus adjuvants in corn (Zollinger and Ries).

		14 DAT		28 DAT	
Treatment[1]	Rate	Yeft	Colq	Yeft	Colq
	(product/A)	---- (%) ----		---- (%) ----	
Accent+Silwett L-77+AMS	0.75oz+0.25% v/v+2lb	71	72	73	70
Accent+Agri-Dex+AMS	0.75oz+1% v/v+2lb	71	71	68	70
Accent+Dyne-amic+AMS	0.75oz+0.5% v/v+2lb	84	99	86	99
Accent+Harmony GT+Silwett L-77 +AMS	0.75oz+0.056oz+ 0.25% v/v+2lb	85	99	79	99
Accent+Harmony GT+Agri-Dex+AMS	0.75oz+0.056oz+1% v/v+2lb	76	99	82	99
Accent+Harmony GT+Dyne-amic+AMS	0.75oz+0.056oz+0.5% v/v+2lb	91	99	90	99
Accent+Harmony GT+Distinct+ Silwett L-77+AMS	0.75oz+0.056oz+4oz+ 0.25% v/v+2lb	65	99	68	99
Accent+Harmony GT+Distinct+ Agri-Dex+AMS	0.75oz+0.056oz+4oz+ 1% v/v+2lb	60	99	82	99
Accent+Harmony GT+Distinct+ Dyne-amic+AMS	0.75oz+0.056oz+4oz+ 0.5% v/v+2lb	84	99	88	99
Accent+Harmony GT+Atrazine+ Silwett L-77+AMS	0.75oz+0.056oz+0.83lb+ 0.25% v/v+2lb	75	99	70	99
Accent+Harmony GT+Atrazine+ Agri-Dex+AMS	0.75oz+0.056oz+0.83lb+ 1% v/v+2lb	85	99	84	99
Accent+Harmony GT+Atrazine+ Dyne-amic+AMS	0.75oz+0.056oz+0.83oz+ 0.5% v/v+2lb	91	99	90	99
Accent+Harmony GT+Callisto+ Silwett L-77+AMS	0.75oz+0.056oz+1.5fl oz+ 0.25% v/v+2lb	70	99	68	99
Accent+Harmony GT+Callisto+ Agri-Dex+AMS	0.75oz+0.056oz+1.5fl oz+ 1% v/v+2lb	64	99	67	99
Accent+Harmony GT+Callisto+ Dyne-amic+AMS	0.75oz+0.056oz+1.5fl oz+ 0.5% v/v+2lb	85	99	86	96
Accent+Harmony GT+Starane+ Silwett L-77+AMS	0.75oz+0.056oz+5.33fl oz+ 0.25% v/v+2lb	91	99	85	99
Accent+Harmony GT+Starane+ Agri-Dex+AMS	0.75oz+0.056oz+5.33fl oz+ 1% v/v+2lb	92	99	88	99
Accent+Harmony GT+Starane+ Dyne-amic+AMS	0.75oz+0.056oz+5.33fl oz+ 0.5% v/v+2lb	96	99	90	99
Accent+Permit+Silwett L-77+AMS	0.75oz+0.44oz+0.25% v/v+2lb	80	99	76	99
Accent+Permit+Agri-Dex+AMS	0.75oz+0.44oz+1% v/v+2lb	69	67	72	63
Accent+Permit+Dyne-amic+AMS	0.75oz+0.44oz+0.5% v/v+2lb	89	99	89	99
Untreated		0	0	0	0
LSD (0.05)		6	2	8	3

[1]Silwett L-77 = NIS + with silicone; Agri-Dex = petroleum oil conc.; Dyne-amic = MSO + organosilicone surfactant.

Timing applications of Accent plus Harmony GT timing in corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Valley City, ND, to evaluate weed control and crop response to corn at two application timings. Pioneer '39D81' corn was planted May 27, 2005. EPOST treatments were applied June 17 at 9:00 am with 70 F air, 78 F soil surface, 57% relative humidity, 30% clouds, 7 to 10 mph SE wind, dry soil surface, moist subsoil, good crop vigor and no dew present to 2 collar corn. Weed species present were: 1 to 3 inch (10 to 40/ft^2) yellow foxtail; and 1 to 3 inch (5 to 20/ft^2) green foxtail. LPOST treatments were applied June 28 at 10:30 am with 61 F air, 68 F soil surface, 90% relative humidity, 100% clouds, moist soil surface, moist subsoil, good crop vigor and slight dew to 3 to 4 collar corn. Weed species present were: 3 to 8 inch (20 to 50/ft^2) yellow foxtail; 3 to 8 inch (5 to 20/ft^2) green foxtail; and 3 to 7 inch (1 to 10/yd^2) common lambsquarters. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa at 40 psi through 11001 Turbo TeeJet flat-fan nozzles. The experiment had randomized complete block design with three replicates per treatment.

On June 24 (7 dat), there was no corn injury from EPOST treatments but injury from LPOST treatments containing Harmony GT was exhibited as stunting and characteristic ALS symptomology with white and chlorotic lesions or bands on the 2 to 3 newest leaves. Chlorotic areas are in leaf middles and near the collar region. Leaves were also wrinkled at leaf margins. On July 1, corn injury was slight stunting and light chlorosis. August 23, there was no observation of injury at/or during tasseling. All treatments gave 99% green foxtail control. Treatments containing Harmony GT and Distinct controlled common lambsquarters. EPOST treatments generally gave greater yellow foxtail control than LPOST treatments. Distinct antagonized grass control. The greater amount of Harmony GT with Accent usually gave greater grass control. Permit surprisingly enhanced grass control from Accent. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Timing applications of Accent plus Harmony GT timing in corn (Zollinger and Ries).

		14 DAT		28 DAT	
Treatment[1]	Rate	Yeft	Colq	Yeft	Colq
	(product/A)	- - - (%) - - -		- - - (%) - - -	
EPOST					
Accent+PO+AMS	0.5oz+1% v/v+2lb	67	99	65	99
Accent+Harmony GT+PO+AMS	0.5oz+0.028oz+1% v/v+2lb	79	99	70	99
Accent+Harmony GT+PO+AMS	0.5oz+0.0373oz+1% v/v+2lb	83	99	77	99
Accent+PO+AMS	0.75oz+1% v/v+2lb	76	99	75	99
Accent+Harmony GT+PO+AMS	0.75oz+0.0413oz+1% v/v+2lb	84	99	79	99
Accent+Harmony GT+Distinct+PO+AMS	0.75oz+0.0413oz+4oz+1% v/v+2lb	68	99	65	99
Accent+Harmony GT+PO+AMS	0.75oz+0.056oz+1% v/v+2lb	87	99	77	99
Accent+Harmony GT+Distinct+PO+AMS	0.75oz+0.056oz+4oz+1% v/v+2lb	71	99	70	99
Accent+Permit+PO+AMS	0.75oz+0.3oz+1% v/v+2lb	78	99	75	99
Accent+Permit+PO+AMS	0.75oz+0.44oz+1% v/v+2lb	82	99	77	99
Steadfast+PO+AMS	0.75oz+1% v/v+2lb	83	99	78	99
LPOST					
Accent+PO+AMS	0.5oz+1% v/v+2lb	57	72	51	60
Accent+Harmony GT+PO+AMS	0.5oz+0.028oz+1% v/v+2lb	70	77	63	99
Accent+Harmony GT+PO+AMS	0.5oz+0.0373oz+1% v/v+2lb	78	99	68	99
Accent+PO+AMS	0.75oz+1% v/v+2lb	75	78	64	60
Accent+Harmony GT+PO+AMS	0.75oz+0.0413oz+1% v/v+2lb	82	99	70	99
Accent+Harmony GT+Distinct+PO+AMS	0.75oz+0.0413oz+4oz+1% v/v+2lb	70	99	64	99
Accent+Harmony GT+PO+AMS	0.75oz+0.056oz+1% v/v+2lb	82	70	75	73
Accent+Harmony GT+Distinct+PO+AMS	0.75oz+0.056oz+4oz+1% v/v+2lb	80	99	71	99
Accent+Permit+PO+AMS	0.75oz+0.3oz+1% v/v+2lb	87	50	71	32
Accent+Permit+PO+AMS	0.75oz+0.44oz+1% v/v+2lb	92	50	81	30
Steadfast+PO+AMS	0.75oz+1% v/v+2lb	73	99	70	99
LSD (0.05)		12	7	9	5

[1]PO = petroleum oil concentrate = Herbimax; AMS = ammonium sulfate.

Weed control in Roundup Ready/Liberty Linked stacked corn. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Prosper, ND, to evaluate weed control and crop injury to a dual stacked corn hybrid. Pioneer '39085' Roundup Ready/Liberty Linked stacked corn was planted May 5, 2005, followed by PRE treatments at 4:10 pm with 78 F air, 50 F soil at a 4 inch depth, 7% relative humidity, 0% clouds, 8 to 15 mph NW wind, dry soil surface, and moist subsoil. POST treatments were applied June 10 at 12:45 pm with 71 F air, 69 F soil surface, 82% relative humidity, 100% clouds, 2 to 5 mph SW wind, moist soil surface, wet subsoil, and no dew present to V2 corn. Weed species present to plots with PRE's applied were: 1 to 3 inch (5 to 25/yd^2) yellow foxtail; 1 to 3 inch (5 to 25/yd^2) common lambsquarters; 2 inch to vining (1 to 10/yd^2) wild buckwheat; 3 to 4 inch (1 to 10/yd^2) wild mustard; 1 to 2 inch (1 to 2/yd^2) common ragweed. Weed species present to plots without PRE's applied were: 1 to 3 inch (20 to 50/yd^2) yellow foxtail; 1 to 3 inch (5 to 25/ft^2) common lambsquarters; 2 inch to vining (5 to 200/yd^2) wild buckwheat; 3 to 5 inch (1 to 5/yd^2) wild mustard; 1 to 2 inch (1 to 5/yd^2) common ragweed. LPOST treatments were applied June 20 at 2:30 pm with 92 F air, 78 F soil surface, 46% relative humidity, 25% clouds, 2 to 5 mph SW wind, moist soil surface, wet subsoil, and no dew present to V4 to V6 corn. Weeds species present were: 3 to 5 inch (1/yd^2) yellow foxtail; and 1 to 3 inch (5 to 25/yd^2). Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet flat-fan nozzles for PRE treatments and 8.5 gpa at 40 psi through 11001 Turbo TeeJet flat-fan nozzles for POST and LPOST treatments. The experiment had randomized complete block design with three replicates per treatment.

On May 27, corn was 2 inches tall with 2 leaves emerged and no collars. Grass and broadleaf weeds were less than 0.5 inches tall. No corn injury was observed. All PRE treatments gave 100% grass and broadleaf weed control. Weather had been cool and wet since the middle of May. By 28 DAT, PRE followed by POST or PRE followed by LPOST controlled grass and broadleaf weeds. POST applied treatments did not control yellow foxtail. No yield taken due to excessive water damage in reps 1 and 2. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Weed control in Roundup Ready/Liberty Linked stacked corn (Zollinger and Ries).

Treatment[1]	Rate	PRE				14 DAT - June 10				28 DAT - July 8		
		Yeft	Colq	Wibw	Wimu	Yeft	Wibw	Corw	Cocb	Yeft	Corw	Cocb
	(product/A)	(%)				(%)				(%)		
PRE/POST												
Outlook/Rodeo+ NIS+AMS	12fl oz/24fl oz+ 0.25% v/v+3lb	85	88	8	89	99	99	98	99	93	99	88
Outlook/Rodeo+Distinict+ NIS+AMS	12fl oz/24fl oz+3oz+ 0.25% v/v+3lb	91	92	13	80	99	99	99	99	91	99	98
Outlook/Liberty+AMS	12fl oz/32fl oz+3lb	86	93	8	89	99	99	99	99	99	99	96
Outlook/Liberty+Distinct+ AMS	12fl oz/32fl oz+3oz+ 3lb	95	89	17	87	99	99	99	99	96	99	99
PRE/LPOST												
Outlook/Rodeo+Distinct+ NIS+AMS	12fl oz/24fl oz+3oz 0.25% v/v+3lb	85	85	12	92	93	62	87	73	98	99	97
POST												
Roundup UltraMax II+AMS	22fl oz+3lb					99	84	73	78	82	73	68
Rodeo+Clarity+ NIS+AMS	24fl oz+8fl oz+ 0.25% v/v+3lb					99	96	73	80	78	93	93
Rodeo+Clarity+ NIS+AMS	24fl oz+3fl oz+ 0.25% v/v+3lb					98	99	87	96	77	93	83
Liberty+AMS	32fl oz+3lb					72	99	99	92	57	99	69
Liberty+Distinct+AMS	32fl oz+30z+3lb					83	99	99	96	77	99	89
Untreated		0	0	0	0	0	0	0	0	0	0	0
LSD (0.05)		12	13	13	8	3	10	3	2	9	8	5

[1]NIS = nonionic sufactant = R-11; AMS = ammonium sulfate.

Volunteer canola control in soybean. Jenks, Markle, and Willoughby. Roundup Ready DSR0501 Dairyland soybeans were seeded May 17 at 80 lb/A into 6-inch rows. Canola was then seeded over the top to simulate a volunteer canola (VC) situation. Herbicide treatments were applied preemergence (PRE) on May 19 with a bicycle sprayer delivering 20 gpa at 30 psi through XR 80015 nozzles. Air and soil temperatures were 83 and 72 F, respectively, and relative humidity was 29%. Postemergence treatments were applied to 3-leaf canola May 19 with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. Air and soil temperatures were 77 and 63 F, respectively, and relative humidity was 65%. Treatments to 6-leaf canola were applied June 23 with a bicycle sprayer delivering 10 gpa at 40 psi through XR 8001 nozzles. Air and soil temperatures were 80 and 75 F, respectively, relative humidity was 74%. Individual plots were 10 x 30 ft and replicated three times.

Soil-applied Sencor, Valor, Python, and Extreme provided good to excellent VC control. Flexstar, Basagran, and Raptor at any rate provided good to excellent VC control. Harmony GT, Cobra, and Ultra Blazer provided only poor to fair VC control. These results are generally similar to the 2004 study.

Table. Volunteer canola control in soybean.

Treatment	Rate	Timing	Volunteer canola	
			Jun 30	Jul 14
			% control	
Sencor	0.25 lb	PRE	91	89
Valor	2.5 oz	PRE	88	84
Python	1 oz	PRE	95	93
Extreme	1.5 pt	PRE	98	99
Harmony GT + NIS	0.083 oz + 0.125% v/v	3-leaf	86	67
Harmony GT + NIS	0.083 oz + 0.125% v/v	6-leaf	71	65
Basagran + COC	0.5 pt + 1 qt	3-leaf	100	93
Basagran + COC	0.5 pt + 1 qt	6-leaf	83	81
Raptor + NIS + 28% N	4 fl oz + 0.25% v/v + 2.5% v/v	3-leaf	97	99
Raptor + NIS + 28% N	4 fl oz + 0.25% v/v + 2.5% v/v	6-leaf	76	96
Raptor + NIS + 28% N	2 fl oz + 0.25% v/v + 2.5% v/v	3-leaf	95	97
Raptor + NIS + 28% N	2 fl oz + 0.25% v/v + 2.5% v/v	6-leaf	70	94
Raptor + NIS + 28% N	1 fl oz + 0.25% v/v + 2.5% v/v	3-leaf	91	84
Raptor + NIS + 28% N	1 fl oz + 0.25% v/v + 2.5% v/v	6-leaf	60	89
Cobra + COC	6 fl oz + 1 qt	3-leaf	89	78
Cobra + COC	6 fl oz + 1 qt	6-leaf	79	53
Ultra Blazer + NIS	0.5 pt + 0.125% v/v	3-leaf	77	64
Ultra Blazer + NIS	0.5 pt + 0.125% v/v	6-leaf	68	50
Flexstar + MSO + AMS	0.75 pt + 1% v/v + 2.94 gal/100 gal	3-leaf	100	100
Flexstar + MSO + AMS	0.75 pt + 1% v/v + 2.94 gal/100 gal	6-leaf	93	100
Untreated			0	0
LSD (0.05)			10	12
CV			7	9

Sencor in conventional soybean. Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Fairmont, ND, to evaluate soybean injury from Sencor and Sencor tank-mixes applied PRE to high pH soil. Brushvale 'BS310' soybean was planted May 7, 2005. PRE treatments were applied May 9 at 1:00 pm with 63 F air, 57 F soil at a 4 inch depth, 95% relative humidity, 100% clouds, 4 to 5 mph SE wind, moist to dry soil surface, and moist subsoil. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type sprayer delivering 17 gpa at 40 psi through 11002 Turbo TeeJet flat-fan nozzles. The experiment had randomized complete block design with three replicates per treatment.

On May 27, soybean was emerging to mostly cotyledon and some in the unifoliate stage. No injury was observed on any treatment. On June 3, soybean was cotyledon to unifoliate with no injury. On June 15, soybean was 2 to 3 trifoliate and 3 to 4 inches tall. It had rained for the several weeks amounting to more than 6 inches of precipitation. Yellowing from iron chlorosis and necrotic areas were on cotyledons, unifoliates and newest trifoliates on plants throughout the study. No treatment effects were observed. No weeds were present in the study or in the field. It was intended to put the study in soil with high pH but pH was 7.4 and OM was 3.4 with silt loam soil. No injury was observed at any evaluation. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Sencor in conventional soybean (Zollinger and Ries).

Treatment	Rate (product/A)	
Sencor	0.5 lb	No soybean injury was observed -
Sencor	0.33 lb	See paragraph above.
Sencor	0.25 lb	
Sencor + Valor	0.25 lb + 2 oz	
Sencor + Valor	0.25 lb + 2.5 oz	
Sencor + Valor	0.25 lb + 3 oz	
Sencor + Valor	0.33lb + 2 oz	
Sencor + Valor	0.33 lb + 2.5 oz	
Sencor + Valor	0.33 lb + 3 oz	
Sencor + Valor	0.5 lb + 2 oz	
Sencor + Valor	0.5 lb + 2.5 oz	
Sencor + Spartan	0.5 lb + 3 oz	
Sencor + Spartan	0.25 lb + 4.5 fl oz	
Sencor + Spartan	0.25 lb + 6 fl oz	
Sencor + Spartan	0.33 lb + 4.5 fl oz	
Sencor + Spartan	0.33 lb + 6 fl oz	
Sencor + Spartan	0.5 lb lb + 4.5 fl oz	
Sencor + Spartan	0.5 lb + 6 fl oz	
Sencor + Spartan	0.33 lb + 7.5 fl oz	
Sencor + Spartan	0.5 lb + 7.5 fl oz	

Glyphosate tank-mixes with sulfonylurea in sulfonylurea tolerant soybean (STS). Zollinger, Richard K. and Jerry L. Ries. An experiment was conducted near Fargo, ND, to evaluate STS soybean response and weed control from glyphosate with sulfonylurea tank-mixes. Glyphosate-resistant canola seed was spread throughout the study and incorporated with a field cultivator, followed by planting of Dairyland 'DM5-64' STS soybean May 5, 2005. POST treatments were applied June 20 at 5:30 pm with 87 F air, 82 F soil surface, 45% relative humidity, 25% clouds, 2 to 4 mph W wind, moist soil surface and subsoil, and no dew present to 6 to 10 inch soybean. Weeds species present were: 4 to 8 inch (10 to 50/ft^2) yellow foxtail, 1 inch to blossoming (10 to 20/yd^2) volunteer canola, and 1 to 8 inch (vining) (10 to 20/yd^2) wild buckwheat. Treatments were applied to the center 6.7 feet of the 10 by 40 foot plots with a backpack-type plot sprayer delivering 8.5 gpa at 40 psi through 11001 Turbo TeeJet flat-fan nozzles. The experiment had a randomized complete block design with three replicates per treatment.

Harmony GT used in glyphosate-resistant plus sulfonylurea tolerant soybean (STS) soybean will control weeds that are more tolerant to glyphosate and may control mustard species, including volunteer glyphosate-resistant canola. Harmony GT provides control of common lambsquarters, wild buckwheat, and annual smartweed. Dense volunteer glyphosate-resistant canola and weed infestation caused soybean plants to be extremely stressed, stunted, and chlorotic from water and space competition, and determining herbicide phytotoxicity was difficult. Staple clearly caused 28 to 33% soybean injury beyond injury caused by weed competition. Only treatments containing Staple exhibited injury from herbicides. All treatments completely controlled yellow foxtail. Volunteer canola was emerging to bloom stage at application. Volunteer canola control did not exceed 60%. All volunteer canola in the pre-bolt stage was controlled. Plants that were bolting to flower stage were not controlled and were responsible for the poor control ratings. The wild buckwheat infestation was severe with 10 to 20 plants per square yard. All herbicides applied with glyphosate improved wild buckwheat control compared to glyphosate applied alone. Oil adjuvants increased wild buckwheat control from Harmony GT plus Classic at 14 DAT. All treatments gave greater than 92% wild buckwheat control at 28 DAT. (Dept. of Plant Sciences, North Dakota State University, Fargo).

Table. Glyphosate tank-mixes with sulfonylurea in sulfonylurea tolerant soybean (STS) (Zollinger and Ries).

Treatment[1]	Rate	14 DAT				28 DAT			
		injury	Yeft	V. Canola[2]	Wibw	injury	Yeft	V. Canola	Wibw
	(product/A)	(%)				(%)			
Roundup Ultra Max+	22fl oz+								
AMS	17lb/100gal	0	99	0	63	0	99	0	95
Harmony GT+AMS	0.083oz+17lb/100gal	0	99	37	84	0	99	38	99
Harmony GT+AMS	0.167oz+17lb/100gal	0	99	32	75	0	99	40	99
Harmony GT+AMS	0.33oz+17lb/100gal	0	99	28	79	0	99	33	99
Classic+AMS	0.33oz+17lb/100gal	3	99	47	82	0	99	60	99
Harmony GT+Classic+AMS	0.33oz+0.33oz+17lb/100gal	0	99	50	78	0	99	55	99
Harmony GT+Classic+AMS	0.035oz+0.33oz+17lb/100gal	0	99	50	75	0	99	50	99
Harmony GT+Classic+Select+ PO+AMS	0.33oz+0.33oz+8fl oz+ 1% v/v+17lb/100gal	0	99	50	87	0	99	47	92
Harmony GT+Assure II+ Superb HC+AMS	0.33oz+5fl oz+ 1pt+17lb/100gal	0	99	25	87	0	99	32	99
Harmony GT+Classic+Assure II+ Superb HC+AMS	0.33oz+0.33oz+5fl oz+ 1pt+17lb/100gal	2	99	60	89	0	99	60	97
Harmony GT+Raptor+ NIS+AMS	0.33oz+1fl oz+ 0.25% v/v+17lb/100gal	0	99	35	91	0	99	53	94
Harmony GT+Pursuit+ NIS+AMS	0.33oz+2fl oz+ 0.25% v/v+17lb/100gal	0	99	35	78	0	99	50	99
Staple+AMS	1.2oz+17lb/100gal	28	99	30	89	0	99	60	99
Harmony GT+Staple+AMS	0.33oz+1.2oz+17lb/100gal	33	99	40	94	0	99	57	99
LSD (0.05)		4	0	8	5	0	0	12	4

[1]AMS = ammonium sulfate; PO = petroleum oil = Herbimax; Superb HC = petroleum oil concentrate; NIS = nonionic surfactant = R-11.
[2]V. Canola = volunteer canola.