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Preface

This report is intended for use by agronomists and weed science personnel, as well as companies or agencies providing support of weed science research at the University of Wyoming. Mention of company names, pesticides, adjuvants, or other products does not constitute an endorsement by the authors or by the University of Wyoming. The project summaries contained in this report are not intended to be used as recommendations for the use of pesticides, adjuvants, or other products, nor does it imply that the pesticide uses described have been registered for use in Wyoming or any other state. Always read and follow label directions when using pesticides.

Appreciation is extended to the following sources for providing financial support of weed science research at the University of Wyoming: University of Wyoming Agricultural Experiment Station, BASF, Bayer, DuPont, Dow, Loveland Products, Monsanto, Syngenta, Valent, Western Sugar Cooperative Grower Joint Research Committee, and Winfield Solutions.

This research could not have been completed without the cooperation of staff from the James C. Hageman Sustainable Agriculture Research and Extension Center near Lingle, and the Powell Research and Extension Center in Powell. In particular, we would like to recognize Bob Baumgartner, SAREC Farm Manger, for his tireless efforts in keeping the research plots maintained.

PRE/POST herbicide combinations for weed control in corn (2010_CN01)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate PRE/POST combinations for weed control in corn. Corn (Pioneer '38N88') was planted in 30-inch rows at a rate of 34,000 seeds per acre on May 7. Soils at the site were Haverson and McCook loams (40% sand, 37% silt and 23% clay, 1.6% organic matter, pH 7.7). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Corn populations were counted on June 1. Crop injury was visually rated on June 4, June 25, and July 22. Control of common lambsquarters, hairy nightshade, and redroot pigweed was evaluated visually on June 25 and July 21. Corn was harvested on November 4 from one row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Code:	A	B	C
Application Date:	05/11/10	06/09/10	06/30/10
Time of Day:	10:00 AM	09:30 AM	12:15:00 PM
Application Timing:	PRE	Early POST	Late POST
Air Temperature, Unit:	46 F	73 F	90 F
% Relative Humidity:	78	62	21
Wind Velocity, Unit:	7 MPH	6	13 MPH
Wind Direction:	E	SSE	SSE
Soil Temperature, Unit:	50 F	64 F	70 F

Results & Discussion

The treatment which resulted in the highest level of crop injury was Corvus + Roundup (Table 2). All other herbicide treatments caused less than 10% injury. Treatment resulting in no injury were Harness Xtra + Roundup, and Cadet + Roundup. Corn yields were not significantly different between herbicide treatments. Most treatments resulted in a high level of weed control on all evaluation dates except for those which contained Capreno and Cadet (Table 3).

Table 2. Corn response to PRE/POST herbicide combinations.

Treatment	Rate	App. Code	Stand 06-01	Corn injury 06-04	Corn injury 06-25	Corn injury 07-22	Corn yield 11-04
			plants/100 ft row	%	%	%	bu/A
Untreated Check			161 ab	0.0 c	0.0 b	0.0 b	89.7 b
Integrity	0.566 lb ai/a	A	144 b	4.3 bc	6.3 b	3.8 b	139.1 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Lumax	1.98 lb ai/a	A	168 ab	2.0 bc	2.8 b	0.0 b	157.3 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Corvus	0.115 lb ai/a	A	166 ab	12.0 a	16.3 a	11.3 a	145.4 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Balance Flexx	0.047 lb ai/a	A	173 ab	8.3 ab	4.3 b	0.0 b	161.9 a
Atrazine	1 lb ai/a	A					
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Sharpen	0.0557 lb ai/a	A	168 ab	2.0 bc	3.5 b	0.5 b	154.6 a
Harness Xtra 5.6 L	2.1 lb ai/a	A					
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Harness Xtra 5.6 L	2.1 lb ai/a	A	180 a	0.0 c	0.0 b	0.0 b	161.1 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Integrity	0.566 lb ai/a	A	165 ab	3.3 bc	5.3 b	0.0 b	159.7 a
Status	0.0875 lb ai/a	C					
Roundup PowerMax [1,2]	0.77 lb ae/a	C					
Corvus	0.0575 lb ai/a	A	174 ab	5.3 bc	3.8 b	1.8 b	153.3 a
Atrazine	1 lb ai/a	A					
Balance Flexx	0.047 lb ai/a	A	155 ab	6.5 bc	5.8 b	0.0 b	158.5 a
Atrazine	1 lb ai/a	A					
Capreno	0.054 lb ai/a	B	161 ab	2.5 bc	1.5 b	0.0 b	158.1 a
Roundup PowerMax	0.387 lb ae/a	B					
COC	0.75 % v/v	B					
Cadet	0.0064 lb ai/a	B	171 ab	1.3 bc	0.8 b	0.0 b	156.0 a
COC	1 % v/v	B					
Cadet	0.00356 lb ai/a	B	159 ab	0.0 c	0.0 b	0.0 b	148.6 a
Roundup PowerMax [1,2]	0.77 lb ae/a	B					
Cadet	0.0064 lb ai/a	B	180 a	0.0 c	0.0 b	0.0 b	153.2 a
Roundup PowerMax [1,2]	0.77 lb ae/a	B					
LSD (0.05)			*18*	*4.5*	*8.1*	*5.2*	*19.1*

[1] Non-ionic sufactant at 0.25% v/v. [2] Ammonium sulfate at2.04% w/v.

Table 3. Weed control from PRE/POST herbicide combinations in corn.

Treatment	Rate	App. Code	Weed control 06/25/10 CHEAL	06/25/10 AMARE	06/25/10 SOLSA	07/21/10 CHEAL	07/21/10 AMARE	07/21/10 SOLSA
			%					
Untreated Check			0 d	0 d	0 d	0 b	0 c	0 c
Integrity	0.566 lb ai/a	A	99 a	98 ab	98 ab	98 a	100 a	98 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Lumax	1.98 lb ai/a	A	100 a	100 a	100 a	100 a	100 a	100 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Corvus	0.115 lb ai/a	A	100 a	100 a	100 a	98 a	100 a	100 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Balance Flexx	0.047 lb ai/a	A	100 a	100 a	100 a	84 a	100 a	100 a
Atrazine	1 lb ai/a	A						
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Sharpen	0.0557 lb ai/a	A	100 a	100 a	100 a	98 a	100 a	100 a
Harness Xtra 5.6 L	2.1 lb ai/a	A						
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Harness Xtra 5.6 L	2.1 lb ai/a	A	100 a	100 a	100 a	100 a	97 a	100 a
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Integrity	0.566 lb ai/a	A	98 b	97 b	97 b	100 a	97 a	100 a
Status	0.0875 lb ai/a	C						
Roundup PowerMax [1,2]	0.77 lb ae/a	C						
Corvus	0.0575 lb ai/a	A	100 a	100 a	100 a	100 a	100 a	100 a
Atrazine	1 lb ai/a	A						
Balance Flexx	0.047 lb ai/a	A	100 a	100 a	100 a	100 a	100 a	100 a
Atrazine	1 lb ai/a	A						
Capreno	0.054 lb ai/a	B	100 a	100 a	100 a	100 a	97 a	100 a
Roundup Powermax	0.387 lb ae/a	B						
COC	0.75 % v/v	B						
Cadet	0.0064 lb ai/a	B	95 c	95 c	95 c	68 a	53 b	97 a
COC	1 % v/v	B						
Cadet	0.00356 lb ai/a	B	94 c	94 c	94 c	68 a	31 b	72 b
Roundup PowerMax [1,2]	0.77 lb ae/a	B						
Cadet	0.0064 lb ai/a	B	94 c	94 c	94 c	70 a	47 b	87 a
Roundup PowerMax [1,2]	0.77 lb ae/a	B						
LSD (0.05)			*2*	*2*	*2*	*23*	*26*	*14*

[1] Non-ionic sufactant at 0.25% v/v. [2] Ammonium sulfate at2.04% w/v.
Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, SOLSA = hairy nightshade.

Evaluation of LI 6342 and LI 6349 for tank-mixing with glyphosate in corn (2010_CN02)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate LI 6342 and LI 6349 for tank-mixing with glyphosate in corn. Corn (Pioneer '38N88') was planted in 30-inch rows at a rate of 34,000 seeds per acre on May 7. Soils at the site were Haverson & McCook loams (40% sand, 37% silt and 23% clay, 1.6% organic matter, pH 7.7). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Common lambsquarters and redroot pigweed control was evaluated visually on July 6. Corn was harvested on November 4 from one row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/25/10
Time of Day:	10:30:00 AM
Air Temperature, Unit:	83 F
% Relative Humidity:	35
Wind Velocity, Unit:	2 MPH
Wind Direction:	WSW
Soil Temperature, Unit:	92 F

Results & Discussion

Within treatments, control of common lambsquarters and redroot pigweed were very similar (Table 2). The highest level of weed control was achieved with 2 rates of LI 6349 + Makaze, however, seven of the nine herbicide treatments were not significantly different from each other. Lowest rate of weed control resulted from the LI 6342 (5%) + Makaze (.75 lb ae/acre). Although corn yields ranged from 91.7 to 142.9 bu/acre, most treatments were not significantly different from each other.

Table 2. Weed control and corn response to LI6342 and LI6349 applications with glyphosate.

Treatment	Rate	Weed control - July 6		Corn test weight	Corn yield
		CHEAL	AMARE		
		%		– lbs/bu –	– bu/A –
LI 6342 Makaze [1]	0.625 % v/v 0.75 lb ae/a	81 abc	78 ab	55.5 ab	125.8 ab
LI 6342 Makaze [1]	1.25 % v/v 0.75 lb ae/a	76 bc	78 ab	54.2 ab	125.5 ab
LI 6342 Makaze [1]	2.5 % v/v 0.75 lb ae/a	79 abc	79 ab	54.5 ab	125.5 ab
LI 6342 Makaze [1]	5 % v/v 0.75 lb ae/a	68 c	65 b	55.5 ab	125.5 ab
LI 6349 Makaze [1]	1.25 % v/v 0.75 lb ae/a	78 abc	78 ab	56.1 a	126.1 ab
LI 6349 Makaze [1]	2.5 % v/v 0.75 lb ae/a	85 ab	86 a	55.5 ab	142.9 a
LI 6349 Makaze [1]	5 % v/v 0.75 lb ae/a	91 ab	91 a	55.4 ab	117.8 ab
LI 6349 Makaze [1]	10 % v/v 0.75 lb ae/a	93 a	94 a	55.9 ab	132.2 ab
Makaze [1]	0.75 lb ae/a	93 a	91 a	56.2 a	140.2 a
Untreated Check		0 d	0 c	53.5 b	91.7 b
LSD (0.05)		*10*	*12*	*2*	*26.8*

[1] Weather Gard Complete at 0.5% v/v.

Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed.

Valor and Fierce for weed control in corn (2010_CN03)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate Valor and Fierce for early preplant burn-down in Roundup Ready corn for early season weed control. Corn (Pioneer '38N88') was planted in 30-inch rows at a rate of 34,000 seeds per acre on May 7. Soils at the site were Haverson & McCook loams (40% sand, 37% silt and 23% clay, 1.6% organic matter, pH 7.7). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Corn populations were counted on June 1. Crop injury was evaluated visually on June 4 and 25 and July 22. Common lambsquarters, hairy nightshade, redroot pigweed, green foxtail, and common sunflower control was evaluated visually on June 4 and June 25. Corn was harvested on November 4 from one row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	05/03/10	05/11/10	06/25/10
Time of Day:	10:00 AM	09:45 AM	11:00 AM
Application Timing:	EPP	PRE	POST
Air Temperature, Unit:	52 F	44 F	86 F
% Relative Humidity:	37	78	33
Wind Velocity, Unit:	15 MPH	9 MPH	3 MPH
Wind Direction:	W	E	NW
Soil Temperature, Unit:	44 F	50 F	67 F

Results & Discussion

Treatments resulting in the highest level of crop injury (Table 2) on June 4 contained Corvus and Valor SX (15.8 and 10.0%, respectively). The treatment containing Corvus had the highest crop injury ratings on June 25 and July 22 (13.3% and 10.0%, respectively). Herbicide treatments were not significantly different with regard to corn yield.

Six of the herbicide treatments were not significantly different when rated visually for weed control on June 4 (Table 3). Generally, the treatments which combined PRE and POST applications resulted in a higher level of weed control on June 25. There were no significant differences in weed control between herbicide treatments on July 6 and 21.

Table 2. Corn response to early preplant, preemergence, and postemergence herbicide treatments.

Treatment[1]	Rate	App. code	Corn Stand	Injury 06-04	Injury 06-25	Injury 07-22	Test weight	Yield
			#/100 ft row		%		– lbs/bu –	– bu/A –
Untreated check			169 a	0.0 b	0.0 b	0.0 b	53.3 b	59.0 b
Roundup Original Max	0.77 lb ae/a	A	164 a	0.0 b	0.0 b	2.5 b	55.3 a	146.8 a
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	A	165 a	5.0 b	5.3 b	2.0 b	56.4 a	154.3 a
Fierce	0.143 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
Aatrex	0.5 lb ai/a	C						
Roundup Original Max	0.77 lb ae/a	A	151 a	10.0 ab	1.3 b	0.8 b	55.6 a	141.1 a
Valor SX	0.064 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
Aatrex	1 lb ai/a	C						
Roundup Original Max	0.77 lb ae/a	B	163 a	0.0 b	6.5 b	0.0 b	56.1 a	143.9 a
Bicep II Magnum	2.06 lb ai/a	B						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	B	170 a	2.0 b	5.8 b	0.0 b	55.3 a	149.3 a
Lexar	1.39 lb ai/a	B						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	B	160 a	15.8 a	13.3 a	10.0 a	55.1 a	141.6 a
Corvus	0.0616 lb ai/a	B						
AAtrex	1 lb ai/a	B						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	A	171 a	5.3 b	2.5 b	0.8 b	55.5 a	158.8 a
Fierce	0.143 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	A	175 a	2.5 b	0.8 b	0.0 b	55.2 a	149.0 a
Integrity	0.566 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
LSD (0.05)			*ns*	*7.5*	*5.8*	*3.7*	*1.3*	*31.0*

[1]All herbicide treatments contained ammonium sulfate at 2% w/v at each application timing.

Table 3. Weed control with early preplant, preemergence, and postemergence herbicide treatments in corn.

Treatment	Rate	App. Code	Weed control					
			June 25			July 21		
			CHEAL	AMARE	SOLSA	CHEAL	AMARE	SOLSA
			%					
Untreated check			0 d	0 c	0 c	0 b	0 b	0 b
Roundup Original Max	0.77 lb ae/a	A	35 c	3 c	5 c	92 a	100 a	98 a
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	A	95 a	96 a	94 a	100 a	100 a	100 a
Fierce	0.143 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
Aatrex	0.5 lb ai/a	C						
Roundup Original Max	0.77 lb ae/a	A	92 a	81 b	95 a	100 a	100 a	100 a
Valor SX	0.064 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
Aatrex	1 lb ai/a	C						
Roundup Original Max	0.77 lb ae/a	B	100 a	100 a	100 a	94 a	100 a	98 a
Bicep II Magnum	2.06 lb ai/a	B						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	B	100 a	100 a	100 a	100 a	100 a	100 a
Lexar	1.39 lb ai/a	B						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	B	100 a	100 a	100 a	100 a	100 a	100 a
Corvus	0.061 lb ai/a 6	B						
AAtrex	1 lb ai/a	B						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	A	97 a	98 a	97 a	100 a	100 a	100 a
Fierce	0.143 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
Roundup Original Max	0.77 lb ae/a	A	85 b	81 b	84 b	93 a	97 a	100 a
Integrity	0.566 lb ai/a	A						
Roundup Original Max	0.77 lb ae/a	C						
LSD (0.05)			*5.7*	*11.3*	*7.0*	*9.2*	*5.8*	*3.5*

[1]All herbicide treatments contained ammonium sulfate at 2% w/v at each application timing.
Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, SOLSA = hairy nightshade.

Early POST herbicide applications for one-pass weed control in corn (2010_CN04)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate early POST weed control in corn. Corn (Pioneer '38N88') was planted in 30-inch rows at a rate of 34,000 seeds per acre on May 7. Soils at the site were Haverson & McCook loams (44% sand, 35% silt and 21% clay, 1.8% organic matter, pH 7.8). Herbicide treatments were applied with an air-pressurized tractor-mounted sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Corn populations were counted on June 21 and crop injury was visually rated on June 25. Common lambsquarters, hairy nightshade, redroot pigweed, and populations were counted on July 21. Weed control was visually evaluated on June 25 and was also calculated from July 21 weed counts. Corn was harvested on November 4 from one row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/09/10
Time of Day:	10:15:00 AM
Application Timing:	EPOST
Air Temperature, Unit:	74 F
% Relative Humidity:	50
Wind Velocity, Unit:	10 MPH
Wind Direction:	SSE
Soil Temperature, Unit:	64 F

Results & Discussion

The addition of crop oil concentrate to Corvus + Atrazine increased crop injury from 2.5 to 10% (Table 2). Corn yields did not vary significantly between herbicide treatments. Although weed control varied by herbicide treatment and species, these differences were not significantly different at the June 21 and July 6, and July 21 evaluations (Table 3). The addition of Atrazine improved weed control. Most herbicide treatments exceeded 93% control at the June 25 rating. Exceptions were Corvus + Laudis and Balance Flexx + Capreno.

Table 2. Corn response to early POST herbicide treatments.

Treatment	Rate	Stand	Injury 6-25	Test weight	Yield
		plants/A	—— % ——	— lbs/bu —	—— bu/A ——
Untreated Check		28,750	0 b	54.0 b	73 b
Corvus	0.068 lb ai/a	31,363	3 b	56.0 ab	146 a
Atrazine	1 lb ai/a				
Corvus	0.068 lb ai/a	31,363	10 a	52.0 b	155 a
Atrazine	1 lb ai/a				
COC	1 % v/v				
Corvus	0.068 lb ai/a	28,750	2 b	54.0 ab	155 a
Roundup Powermax	0.77 lb ae/a				
Ammonium Sulfate	0.9 % w/v				
Corvus	0.068 lb ai/a	27,007	0 b	54.0 ab	148 a
Laudis	0.0547 lb ai/a				
Ammonium Sulfate	0.9 % w/v				
Corvus	0.068 lb ai/a	29,621	2 b	56.0 ab	163 a
Clarity	0.125 lb ae/a				
Balance Flexx	0.047 lb ai/a	29,621	1 b	56.0 ab	152 a
Clarity	0.125 lb ae/a				
Capreno	0.081 lb ai/a	27,878	2 b	56.0 ab	159 a
Roundup Powermax	0.387 lb ae/a				
COC	1 % v/v				
Balance Flexx	0.0313 lb ai/a	27,007	0 b	55.0 ab	138 a
Capreno	0.054 lb ai/a				
Ammonium Sulfate	0.9 % w/v				
Corvus	0.068 lb ai/a	30,492	2 b	57.0 a	165 a
Ignite 280	0.402 lb ai/a				
LSD (0.05)		*ns*	*3.4*	*4.2*	*34*

Table 3. Weed control with early POST herbicide treatments.

Treatment	Rate	Weed control					
		June 25			July 21		
		CHEAL	AMARE	SOLSA	CHEAL	AMARE	SOLSA
		%					
Untreated Check		0 D	0 E	0 f	0 c	0 b	0 c
Corvus Atrazine	0.068 lb ai/a 1 lb ai/a	100 a	100 a	100 a	100 a	100 a	100 a
Corvus Atrazine COC	0.068 lb ai/a 1 lb ai/a 1 % v/v	100 a	100 a	100 a	100 a	100 a	100 a
Corvus Roundup Powermax Ammonium Sulfate	0.068 lb ai/a 0.77 lb ae/a 0.9 % w/v	98 ab	99 ab	99 ab	100 a	100 a	100 a
Corvus Laudis Ammonium Sulfate	0.068 lb ai/a 0.0547 lb ai/a 0.9 % w/v	83 c	94 cd	94 cd	43 b	93 a	98 ab
Corvus Clarity	0.068 lb ai/a 0.125 lb ae/a	94 b	96 bc	96 bc	93 a	100 a	100 a
Balance Flexx Clarity	0.047 lb ai/a 0.125 lb ae/a	93 b	96 c	92 de	75 ab	87 a	99 a
Capreno Roundup Powermax COC	0.081 lb ai/a 0.387 lb ae/a 1 % v/v	100 a	100 a	100 a	100 a	100 a	100 a
Balance Flexx	0.0313 lb ai/a	85 c	91 d	91 e	50 b	92 a	97 b
Capreno Ammonium Sulfate	0.054 lb ai/a 0.9 % w/v						
Corvus Ignite 280	0.068 lb ai/a 0.402 lb ai/a	95 ab	97 abc	95 cd	100 a	98 a	100 a
LSD (0.05)		*6.4*	*3.4*	*3.1*	*41.0*	*14.0*	*2.0*

Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, SOLSA = hairy nightshade.

Ignite for POST weed control in a Liberty Link/Roundup Ready stacked corn hybrid (2010_CN05)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate Ignite for POST weed control in corn. Corn (Pioneer '38N88') was planted in 30-inch rows at a rate of 34,000 seeds per acre on May 7. Soils at the site were Haverson & McCook loams (44% sand, 35% silt and 21% clay, 1.8% organic matter, pH 7.8). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Crop injury was visually rated on June 30. Common lambsquarters and hairy nightshade control was evaluated visually on June 23 and 30. Corn was harvested on November 4 from one row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

App Code:	A	B
Application Date:	06/16/10	06/23/10
Time of Day:	11:30 AM	02:00 PM
Application Timing:	4” weeds	7 d after 4” weeds
Air Temperature, Unit:	78 F	80 F
% Relative Humidity:	60	22
Wind Velocity, Unit:	7 MPH	6 MPH
Wind Direction:	SE	WNW
Soil Temperature, Unit:	64 F	74 F

Results & Discussion

Crop injury was 0% for all treatments (Table 2). Weed control ratings did not vary greatly between treatments or by species. Corn yields were not significantly different with respect to herbicide treatments.

Table 2. Corn response and weed control with Ignite herbicide.

Treatment	Rate	App code	Injury 6-30	Test weight	Yield	CHEAL	SOLSA	CHEAL
			%	lbs/bu	–bu/A–	% control		
Untreated Check			0	53.8	102 b	0.0 d	0	0.0 e
Ignite 280 [1]	0.402 lb ai/a	A	0	55.7	158 a	95.8 abc	100	93.5 bcd
Ignite 280[1]	0.53 lb ai/a	A	0	56.0	166 a	97.3 abc	100	94.0 bcd
Ignite 280[1]	0.66 lb ai/a	A	0	55.6	168 a	99.0 ab	100	95.3 a-d
Ignite 280[1]	0.402 lb ai/a	A	0	56.1	166 a	99.0 ab	100	99.8 a
Ignite 280[1]	0.402 lb ai/a	B						
Ignite 280	0.402 lb ai/a	A	0	55.8	158 a	95.5 abc	100	95.0 a-d
Coron	5 % v/v	A						
Ignite 280	0.402 lb ai/a	A	0	55.6	156 a	93.0 c	100	90.5 d
UAN 28%	2.5 % v/v	A						
Ignite 280[1]	0.402 lb ai/a	A	0	54.9	169 a	96.8 abc	100	94.5 a-d
Capreno	0.054 lb ai/a	A						
Ignite 280	0.402 lb ai/a	A	0	55.7	167 a	93.8 bc	100	91.8 cd
Laudis	0.0547 lb ai/a	A						
Coron	5 % v/v	A						
Ignite 280[1]	0.402 lb ai/a	A	0	56.3	168 a	99.3 ab	100	97.3 ab
Laudis	0.0547 lb ai/a	A						
Ignite 280[1]	0.402 lb ai/a	A	0	55.9	166 a	98.5 ab	100	97.5 ab
Laudis	0.0547 lb ai/a	A						
Coron	5 % v/v	A						
Roundup Powermax[1]	0.77 lb ae/a	A	0	55.8	164 a	99.8 a	100	97.8 ab
Roundup Powermax[1]	0.77 lb ae/a	A	0	55.6	159 a	99.8 a	100	96.8 abc
Ignite 280	0.402 lb ai/a	A						
Roundup Powermax	0.77 lb ae/a	A	0	55.7	155 a	98.5 ab	100	97.0 abc
Ignite 280	0.402 lb ai/a	A						
Coron	5 % v/v	A						
LSD (0.05)			*ns*	*ns*	*20*	*3.5*	*ns*	*3.4*

[1] Ammonium Sulfate at 2.04% w/v.

Abbreviations: CHEAL = common lambsquarters, SOLSA = hairy nightshade.

Valor SX for weed control in dry beans (2010_DB03)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming, in 2010 to evaluate Valor SX for weed control in dry beans. Great Northern beans ('Orion') were planted in 30-inch rows at a rate of 66,000 seeds/acre on June 2. Soils at the site were Haverson and McCook loams (56% sand, 31% silt, 13% clay, 1.8% organic matter, pH 8.0). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Bean populations were counted on June 16, 21, 30, and July 14 in 10 feet of row per plot. Redroot pigweed, hairy nightshade and green foxtail control was evaluated visually on June 30 and July 15. Ten feet of row from each plot was harvested on September 15 and yield and 100 seed weight were determined.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/02/10	06/02/10	06/23/10
Time of Day:	09:00 AM	02:30 PM	09:00 AM
Application Timing:	PPI	PRE	POST
Air Temperature, Unit:	60 F	74 F	67 F
% Relative Humidity:	77	37	43
Wind Velocity, Unit:	2 MPH	8 MPH	3 MPH
Wind Direction:	ENE	NNW	N
Soil Temperature, Unit:	58 F	67 F	65 F

Results & Discussion

Although bean yields for herbicide treatments ranged from 371 to 1198 lbs/A, these were not significantly different (Table 2). Weed control on June 30 was not significantly different between herbicide treatments (Table 3). Weed control on July 15 varied with species with a lower level of control for green foxtail than for the broadleaf weeds.

Table 2. Dry bean response to PPI, PRE, and POST herbicide treatments.

Treatment	Rate	Timing	Stand count				Yield
			Jun 16	Jun 21	Jun 30	Jul 14	
	– lbs ai/A –		plants / 100 ft row				– lbs/A –
Untreated check			260 a	239 a	145 a	170 a	170 b
Treflan Valor SX	0.5 0.048	PPI PRE	131 b	100 b	60 b	95 b	667 ab
Valor SX Prowl H2O	0.048 0.71	PRE PRE	150 b	74 b	58 b	70 b	370 ab
Valor SX Sonalan	0.048 0.75	PRE PRE	123 b	70 b	45 b	85 b	510 ab
Eptam Sonalan	2.19 0.75	PPI PPI	258 a	265 a	163 a	160 a	993 ab
Raptor Basagran	0.0313 0.5	POST POST	281 a	230 a	165 a	188 a	1,198 a
Handweeded check			271 a	264 a	145 a	145 a	723 ab
LSD (0.05)			*65*	*49*	*33*	*36*	*640*

Table 3. Weed control with PPI, PRE, and POST herbicide treatments in dry bean.

			Weed control					
			June 30			July 15		
Treatment	Rate	Timing	AMARE	SOLSA	SETVI	AMARE	SOLSA	SETVI
	– lbs ai/A –		%					
Treflan Valor SX	0.5 0.048	PPI PRE	100 a	100 a	100 a	97 a	97 a	92 a
Valor SX Prowl H2O	0.048 0.71	PRE PRE	98 a	100 a	92 a	86 b	91 ab	76 c
Valor SX Sonalan	0.048 0.75	PRE PRE	100 a	100 a	100 a	94 ab	95 ab	83 b
Eptam Sonalan	2.19 0.75	PPI PPI	100 a	92 a	100 a	88 b	88 b	88 ab
Raptor Basagran	0.0313 0.5	POST POST	100 a	100 a	61 b	98 a	97 a	89 ab
LSD (0.05)			*26*	*ns*	*26*	*7*	*8*	*6*

Abbreviations: AMARE = redroot pigweed, SOLSA = hairy nightshade, SETVI = green foxtail.

Weed control in fallow with various glyphosate formulations (2010_FA03)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate weed control in fallow with various glyphosate formulations. Soil at the site was an Mitchell silt loam (2.1% organic matter, pH 7.9). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Kochia and Russian thistle control was evaluated visually on June 23.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/09/10
Time of Day:	11:15:00 AM
Application Timing:	4 to 6 inch weeds
Air Temperature, Unit:	77 F
% Relative Humidity:	40
Wind Velocity, Unit:	4 MPH
Wind Direction:	SSW
Soil Temperature, Unit:	70 F

Results & Discussion

Touchdown Total and Roundup WeatherMax provided the highest level of kochia control, 91.5 and 82 %, respectively (Table 2). Highest rates of Russian thistle control were achieved with Touchdown Total, Roundup WeatherMax, Roundup PowerMax, and Makaze.

Table 2. Kochia and Russian thistle control from various glyphosate formulations in fallow.

Treatment	Rate	Kochia control	Russian thistle control
	— lbs ae/A —	%	
Untreated Check		0 d	0 f
Roundup PowerMax	0.5	66 b	80 abc
Roundup WeatherMax	0.5	82 a	82 ab
Touchdown Total	0.5	92 a	95 a
Durango DMA	0.5	48 c	65 c
AGH 09101	0.5	41 c	56 e
AGH 09102	0.5	41 c	59 d
Cornerstone Plus	0.5	40 c	60 d
AGH 09404	0.5	41 c	58 e
Makaze	0.5	61 b	75 bcd
Mad Dog Plus	0.5	46 c	66 bcde
LSD (0.05)		*11.4*	*15.7*

Residual weed control in fallow (2010_FA04)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate residual weed control in fallow. Soils at the site were Manter and Anselmo fine sandy loams (2.1% organic matter, pH 7.9). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Russian thistle control was evaluated visually on June 23. Russian thistle populations were counted on July 6, July 21, August 3, and August 18. Wild proso millet populations were counted on July 21 and August 3 and weed control was calculated from these counts.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/07/10
Time of Day:	01:00 PM
Application Timing:	FOLIAR, 2 to 4-inch weeds
Air Temperature, Unit:	72 F
% Relative Humidity:	71
Wind Velocity, Unit:	9 MPH
Wind Direction:	SE
Soil Temperature, Unit:	67 F
Soil Moisture:	
% Cloud Cover:	

Results & Discussion

The highest level of Russian thistle control at the June 23 evaluation was achieved by treatments which included Corvus (at 0.082 lb ai/A), Aatrex, Valor SX, and Sharpen (Table 2). On July 6, Aatrex and Sharpen treatments provided the greatest Russian thistle control. Roundup + Corvus or Valor SX provided maximum control of wild proso millet at the August 3 evaluation. Treatments which provided the highest levels of control on August 18 inlcuded those providing high levels early in the season.

Table 2. Residual weed control in fallow of Russian thistle and wild proso millet at five evaluation dates.

		Weed control						
		06-23	07-06	07-21		08-03		08-18
Treatment[1]	Rate	SASKR	SASKR	SASKR	PANMI	SASKR	PANMI	SASKR
		%						
Untreated Check		0	0	0	0	0	0	0
Roundup PowerMax	0.77 lb ae/a	80	16	23	55	36	63	33
Corvus Roundup PowerMax	0.0616 lb ai/a 0.77 lb ae/a	81	55	63	90	38	96	56
Corvus Roundup PowerMax	0.082 lb ai/a 0.77 lb ae/a	89	39	58	100	34	100	23
Roundup PowerMax AAtrex	0.77 lb ae/a 1.2 lb ai/a	94	86	91	95	81	92	83
Roundup PowerMax Sharpen[2]	0.77 lb ae/a 0.067 lb ai/a	99	85	91	75	83	71	88
Roundup PowerMax Sharpen[2]	0.77 lb ae/a 0.089 lb ai/a	99	95	98	60	94	50	99
Roundup PowerMax Valor SX[2]	0.77 lb ae/a 0.064 lb ai/a	98	52	53	95	38	100	65
Roundup PowerMax Tordon 22K	0.77 lb ae/a 0.0234 lb ai/a	83	58	58	45	48	83	89
LSD (P=.05)		*10.4*	*38.0*	*43.3*	*38.1*	*46.0*	*33.8*	*34.2*
CV		*8.9*	*47*	*49*	*36.7*	*58.9*	*30.5*	*38.5*

[1] All herbicide treatments included ammonium sulfate at 17 lbs/100gal.
[2] Crop oil concentrate included at 1% v/v.
Abbreviations: SASKR = Russian thistle, PANMI = wild proso millet.

Weed management system comparison in conventional and glyphosate-resistant sugarbeet (2010_SB01)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate weed management system comparison in conventional and glyphosate-resistant sugarbeet. Conventional and Roundup Ready sugarbeet was planted in 30-inch rows at a rate of 70,000 seeds per acre on April 14. Soils at the site were Haverson and McCook loams (51% sand, 34% silt and 15% clay, 1.1% organic matter, pH 7.9). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Sugarbeet populations were counted on May 18 and 26 and June 21. Common lambsquarters, redroot pigweed, and green foxtail control was evaluated visually on June 9. Crop injury was evaluated visually on June 9 and 25. Sugarbeet was harvested on October 5 from 10 ft of row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	05/03/10	05/18/10	05/25/10	06/02/10	06/09/10
Time of Day:	08:30 AM	08:30 AM	06:15 PM	12:31 PM	03:30 PM
Application Timing:	PRE	COT	2 TL	4 TL	6-8 TL
Air Temperature, Unit:	52 F	53 F	72 F	72 F	79 F
% Relative Humidity:	37	83	26	38	40
Wind Velocity, Unit:	13 MPH	11 MPH	3 MPH	5 MPH	3 MPH
Wind Direction:	W	SE	SE	NW	NE
Soil Temperature, Unit:	42 F	52 F	69 F	61 F	66 F
Soil Moisture:					
% Cloud Cover:		100			

Results and Discussion

Generally, there were no significant differences between herbicide treatments for the three weed species concerned. Control rates ranged from 93 to 99% (Table 2).

Sugarbeet populations varied somewhat between treatments and increased between the first and second evaluations (Table 3). On June 9, treatments 1 through 4 had significantly higher crop injury than treatments 5 through 11. Lower injury rates were observed on June 25 and Treatments 1 and 4 had the highest levels at that time. Sugarbeet root yield was not significantly different between herbicide treatments. Sugar content and SLM were not significantly different between treatments.

Table 2. Weed management system comparison in conventional and glyphosate-resistant sugarbeet: weed control.

No.	Treatment	Rate	Growth stage	Weed control 6/9/10		
				CHEAL	AMARE	SETVI
				%		
1	7341R703H	76,000 seeds/a		99	99	99
	Nortron SC	0.75 lb ai/a	PRE			
	Betamix	0.163 lb ai/a	COT			
	UpBeet	0.0078 lb ai/a	COT			
	Stinger[1]	0.056 lb ai/a	COT			
	Betamix	0.163 lb ai/a	2 TL			
	UpBeet	0.0078 lb ai/a	2 TL			
	Stinger[1]	0.056 lb ai/a	2 TL			
	Betamix	0.163 lb ai/a	4 TL			
	UpBeet	0.0078 lb ai/a	4 TL			
	Stinger[1]	0.056 lb ai/a	4 TL			
2	1634N703H	76,000 seeds/a		99	99	99
	Nortron SC	0.75 lb ai/a	PRE			
	Betamix	0.163 lb ai/a	COT			
	UpBeet	0.0078 lb ai/a	COT			
	Stinger[1]	0.056 lb ai/a	COT			
	Betamix	0.163 lb ai/a	2 TL			
	UpBeet	0.0078 lb ai/a	2 TL			
	Stinger[1]	0.056 lb ai/a	2 TL			
	Betamix	0.163 lb ai/a	4 TL			
	UpBeet	0.0078 lb ai/a	4 TL			
	Stinger[1]	0.056 lb ai/a	4 TL			
3	BTS 66RR60	76,000 seeds/a		99	99	99
	Nortron SC	0.75 lb ai/a	PRE			
	Betamix	0.163 lb ai/a	COT			
	UpBeet	0.0078 lb ai/a	COT			
	Stinger[1]	0.056 lb ai/a	COT			
	Betamix	0.163 lb ai/a	2 TL			
	UpBeet	0.0078 lb ai/a	2 TL			
	Stinger[1]	0.056 lb ai/a	2 TL			
	Betamix	0.163 lb ai/a	4 TL			
	UpBeet	0.0078 lb ai/a	4 TL			
	Stinger[1]	0.056 lb ai/a	4 TL			
4	BTS 66RR70	76,000 seeds/a		99	99	99
	Nortron SC	0.75 lb ai/a	PRE			
	Betamix	0.163 lb ai/a	COT			
	UpBeet	0.0078 lb ai/a	COT			
	Stinger[1]	0.056 lb ai/a	COT			
	Betamix	0.163 lb ai/a	2 TL			
	UpBeet	0.0078 lb ai/a	2 TL			
	Stinger[1]	0.056 lb ai/a	2 TL			
	Betamix	0.163 lb ai/a	4 TL			
	UpBeet	0.0078 lb ai/a	4 TL			
	Stinger[1]	0.056 lb ai/a	4 TL			

Table 2. Weed management system comparison in conventional and glyphosate-resistant sugarbeet: weed control.

No.	Treatment	Rate	Growth stage	Weed control 6/9/10		
				CHEAL	AMARE	SETVI
				---------- % ----------		
5	BTS 66RR60	76,000 seeds/a		98	93	99
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL			
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL			
6	BTS 66RR70	76,000 seeds/a		97	94	99
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL			
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL			
7	BTS 66RR60	76,000 seeds/a		99	99	99
	Nortron SC	1 lb ai/a	PRE			
	Roundup PowerMax[2]	0.77 lb ae/a	4 TL			
8	BTS 66RR60	76,000 seeds/a		97	93	97
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL			
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL			
	Stinger	0.07 lb ai/a	6-8 TL			
9	BTS 66RR60	76,000 seeds/a		99	94	98
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL			
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL			
	Outlook	0.75 lb ai/a	6-8 TL			
10	BTS 66RR60	76,000 seeds/a		97	95	99
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL			
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL			
	MON 63410	1.125 lb ai/a	6-8 TL			
11	BTS 66RR60	76,000 seeds/a		0	0	0
	Untreated Check					
	LSD (P=.05)			*1.7*	*3.9*	*1.6*
	CV			*1.35*	*3.05*	*1.23*

[1] MSO included at 1.5% v/v.
[2] Ammonium Sulfate included at 2% w/w.
Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, SETVI = green foxtail.

Table 3. Weed management system comparison in conventional and glyphosate-resistant sugarbeet: sugarbeet.

No.	Treatment	Rate	Growth Stage	Population			Injury		Yield	Sucrose	SLM	Recoverable Sucrose
				05-18	05-26	06-21	06-09	06-25				
				--------- plants/A --------			------ % ------		tons/A	------ % ------		lbs/A
1	7341R703H	76,000 seeds/a		36,155	54,668	51,401	22	15	17.7	16	2	4,376
	Nortron SC	0.75 lb ai/a	PRE									
	Betamix	0.163 lb ai/a	COT									
	UpBeet	0.0078 lb ai/a	COT									
	Stinger[1]	0.056 lb ai/a	COT									
	Betamix	0.163 lb ai/a	2 TL									
	UpBeet	0.0078 lb ai/a	2 TL									
	Stinger[1]	0.056 lb ai/a	2 TL									
	Betamix	0.163 lb ai/a	4 TL									
	UpBeet	0.0078 lb ai/a	4 TL									
	Stinger[1]	0.056 lb ai/a	4 TL									
2	1634N703H	76,000 seeds/a		33,541	59,459	60,113	20	6	23.4	18	2	7,964
	Nortron SC	0.75 lb ai/a	PRE									
	Betamix	0.163 lb ai/a	COT									
	UpBeet	0.0078 lb ai/a	COT									
	Stinger[1]	0.056 lb ai/a	COT									
	Betamix	0.163 lb ai/a	2 TL									
	UpBeet	0.0078 lb ai/a	2 TL									
	Stinger[1]	0.056 lb ai/a	2 TL									
	Betamix	0.163 lb ai/a	4 TL									
	UpBeet	0.0078 lb ai/a	4 TL									
	Stinger[1]	0.056 lb ai/a	4 TL									
3	BTS 66RR60	76,000 seeds/a		45,085	56,628	55,757	18	7	20.9	16	2	5,806
	Nortron SC	0.75 lb ai/a	PRE									
	Betamix	0.163 lb ai/a	COT									
	UpBeet	0.0078 lb ai/a	COT									
	Stinger[1]	0.056 lb ai/a	COT									
	Betamix	0.163 lb ai/a	2 TL									
	UpBeet	0.0078 lb ai/a	2 TL									
	Stinger[1]	0.056 lb ai/a	2 TL									
	Betamix	0.163 lb ai/a	4 TL									
	UpBeet	0.0078 lb ai/a	4 TL									
	Stinger[1]	0.056 lb ai/a	4 TL									

Table 3. Weed management system comparison in conventional and glyphosate-resistant sugarbeet: sugarbeet.

No.	Treatment	Rate	Growth Stage	Population			Injury		Yield	Sucrose	SLM	Recoverable Sucrose
				05-18	05-26	06-21	06-09	06-25				
				--------- plants/A --------			------ % ------		tons/A	------ % ------		lbs/A
4	BTS 66RR70	76,000 seeds/a		40,511	50,965	53,143	20	10	22.2	17	2	6,491
	Nortron SC	0.75 lb ai/a	PRE									
	Betamix	0.163 lb ai/a	COT									
	UpBeet	0.0078 lb ai/a	COT									
	Stinger[1]	0.056 lb ai/a	COT									
	Betamix	0.163 lb ai/a	2 TL									
	UpBeet	0.0078 lb ai/a	2 TL									
	Stinger[1]	0.056 lb ai/a	2 TL									
	Betamix	0.163 lb ai/a	4 TL									
	UpBeet	0.0078 lb ai/a	4 TL									
	Stinger[1]	0.056 lb ai/a	4 TL									
5	BTS 66RR60	76,000 seeds/a		44,649	58,370	52,272	0	0	21.7	15	2	5,296
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL									
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL									
6	BTS 66RR70	76,000 seeds/a		41,818	54,450	54,014	3	4	21.1	16	2	5,112
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL									
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL									
7	BTS 66RR60	76,000 seeds/a		49,658	59,677	58,370	3	0	30.5	17	2	8,826
	Nortron SC	1 lb ai/a	PRE									
	Roundup PowerMax[2]	0.77 lb ae/a	4 TL									
8	BTS 66RR60	76,000 seeds/a		49,876	60,113	54,886	0	0	26.2	16	2	6,925
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL									
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL									
	Stinger	0.07 lb ai/a	6-8 TL									
9	BTS 66RR60	76,000 seeds/a		47,480	54,450	62,726	0	0	33.8	16	2	8,461
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL									
	Roundup PowerMax[2]	0.77 lb ae/a	6-8 TL									
	Outlook	0.75 lb ai/a	6-8 TL									

Table 3. Weed management system comparison in conventional and glyphosate-resistant sugarbeet: sugarbeet.

No.	Treatment	Rate	Growth Stage	Population			Injury		Yield	Sucrose	SLM	Recoverable Sucrose
				05-18	05-26	06-21	06-09	06-25				
				--------- plants/A --------			------ % ------		tons/A	------ % ------		lbs/A
10	BTS 66RR60	76,000 seeds/a		51,836	54,668	63,598	1	0	32.6	16	2	8,294
	Roundup PowerMax[2]	0.77 lb ae/a	2 TL									
	Roundup PowerMax	0.77 lb ae/a	6-8 TL									
	MON 63410	1.125 lb ai/a	6-8 TL									
11	BTS 66RR60	76,000 seeds/a		48,352	59,459	57,499	0	0	9	17	1	2,669
	Untreated Check											
	LSD (P=.05)			*11,916*	*6,498*	*8,205*	*5.5*	*5.5*	*10.76*	*2.3*	*0.6*	*3,097*
	CV (%)			*18.6*	*8*	*10*	*49*	*101.8*	*31.7*	*989*	*20.4*	*33.4*

SLM = Sugar Loss to Molasses

[1] MSO included at 1.5% v/v

[2] Ammonium Sulfate included at 2% w/w

Effect of Weed Removal Timing on Weed Control and Yield of Roundup Ready Sugarbeets (2010_SB02)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate the effect of weed removal timing on weed control and yield of Roundup Ready sugarbeets. Sugarbeet ('Beta 66RR60') was planted in 30-inch rows at a rate of 70,000 seeds per acre on May 10. Soils at the site were Haverson and McCook loams (51% sand, 34% silt and 15% clay, 1.1% organic matter, pH 7.9). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Glyphosate was applied at either 0.75 or 1.125 lb ae/acre. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Sugarbeet was harvested on October 5 from 10 ft of row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/02/10	06/07/10	06/16/10	06/21/10	06/25/10	06/30/10	07/22/10
Time of Day:	12:45 PM	11:00 AM	09:00 AM	09:15 AM	08:15 AM	11:00 AM	11:30 AM
Application Timing:							
Air Temperature, Unit:	73 F	65 F	67 F	67 F	72 F	88 F	81 F
% Relative Humidity:	38	82	64	79	39	24	47
Wind Velocity, Unit:	5 MPH	6 MPH	4 MPH	4 MPH	3 MPH	12 MPH	5 MPH
Wind Direction:	NW	SE	SE	S	WNW	SSE	S
Soil Temperature, Unit:	63 F	63 F	58 F	63 F	72 F	69 F	70 F
Soil Moisture:			WET				
% Cloud Cover:			0				

Results and Discussion

Treatments were not significantly different with regard to yield, sucrose content or SLM (Table 2).

Table 2. Effect of weed removal timing on roundup ready sugarbeets yield and sucrose.

Treatment	Rate	Growth stage	Yield	Sucrose	SLM	Recoverable Sucrose
			tons/A	%	%	lbs/A
Roundup PowerMax	0.75 lb ae/a	1" weeds	24.7	19	2	6,689
Roundup PowerMax	0.75 lb ae/a	2nd app				
Roundup PowerMax	0.75 lb ae/a	4 DAA	25.8	18	1	7,114
Roundup PowerMax	0.75 lb ae/a	2nd app				
Roundup PowerMax	0.75 lb ae/a	8 DAA	27.4	18	1	7,483
Roundup PowerMax	0.75 lb ae/a	2nd app				
Roundup PowerMax	0.75 lb ae/a	12 DAA	20.6	19	1	6,564
Roundup PowerMax	0.75 lb ae/a	2nd app				
Roundup PowerMax	0.75 lb ae/a	16 DAA	15.9	18	2	4,817
Roundup PowerMax	0.75 lb ae/a	2nd app				
Roundup PowerMax	1.125 lb ae/a	1" weeds	20.9	19	1	5,990
Roundup PowerMax	1.125 lb ae/a	2nd app				
Roundup PowerMax	1.125 lb ae/a	4 DAA	23.0	19	1	6,251
Roundup PowerMax	1.125 lb ae/a	2nd app				
Roundup PowerMax	1.125 lb ae/a	8 DAA	21.9	19	1	7,085
Roundup PowerMax	1.125 lb ae/a	2nd app				
Roundup PowerMax	1.125 lb ae/a	12 DAA	30.3	19	1	9,125
Roundup PowerMax	1.125 lb ae/a	2nd app				
Roundup PowerMax	1.125 lb ae/a	16 DAA	23.2	19	1	6,932
Roundup PowerMax	1.125 lb ae/a	2nd app				
LSD (P=.05)						*2,889*
CV (%)						*29.1*

All treatments included ammonium sulfate at 2% w/w.

Safety/Efficacy of MON63410 in Roundup Ready Sugarbeets (2010_SB03)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate the safety/efficacy of MON63410 in Roundup Ready sugarbeets. Sugarbeet ('Beta 66RR60') were planted in 30-inch rows at a rate of 70,000 seeds per acre on May 10. Soils at the site were Haverson and McCook loams (51% sand, 34% silt and 15% clay, 1.1% organic matter, pH 7.9). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Hairy nightshade and redroot pigweed control was evaluated visually on June 2. Sugarbeet was harvested on October 5 from 10 ft of row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	04/15/10	06/02/10	06/09/10	06/16/10	06/21/10
Time of Day:	07:45 AM	11:30 AM	08:40 AM	09:20 AM	09:30 AM
Application Timing:	PRE	2 TL	4 TL	6 TL	8 TL
Air Temperature, Unit:	49 F	71 F	67 F	67 F	67 F
% Relative Humidity:	51	41	55	64	79
Wind Velocity, Unit:	9 MPH	6 MPH	6 MPH	4 MPH	4 MPH
Wind Direction:	NW	NW	SE	SE	S
Soil Temperature, Unit:	46 F	61 F	62 F	58 F	63 F
Soil Moisture:	DRY		MOIST	WET	
% Cloud Cover:	0				

Results and Discussion

Control of hairy nightshade ranged from 5 to 100% (Table 2). Redroot pigweed control ranged from 15 to 100%. Treatments which included MON63410 applied PRE provided the highest rates of weed control. Those treatments also resulted in the the highest rates of crop injury (Table 3). Yields for these treatments, however, were not significantly different than most other treatments. Crop injury for herbicide treatments ranged from 2 to 62.5% on June 9 and from 0.8 to 32.5% on June 30. Sucrose content and SLM were not different between treatments.

Table 2. Weed control of herbicide treatments on June 2, 2010.

Treatment	Rate	Timing	Hairy nightshade	Redroot pigweed
	lbs ae/A		%	%
Roundup PowerMax	0.75	2 TL	20	58
Roundup PowerMax	0.75	6 TL		
MON 63410	1.125	PRE	70	100
Roundup PowerMax	0.75	4 TL		
Roundup PowerMax	0.75	8 TL		
MON 63410	1.125	2 TL	30	15
Roundup PowerMax	0.75	2 TL		
Roundup PowerMax	0.75	6 TL		
Roundup PowerMax	0.75	2 TL	15	27
MON 63410	1.125	6 TL		
Roundup PowerMax	0.75	6 TL		
MON 63410	2.25	PRE	100	100
Roundup PowerMax	0.75	4 TL		
Roundup PowerMax	0.75	8TL		
MON 63410	2.25	2 TL	20	48
Roundup PowerMax	0.75	2 TL		
Roundup PowerMax	0.75	6 TL		
Roundup PowerMax	0.75	2 TL	5	31
MON 63410	2.25	6 TL		
Roundup PowerMax	0.75	6 TL		
Outlook	0.98	2 TL	30	35
Roundup PowerMax	0.75	2 TL		
Roundup PowerMax	0.75	6 TL		
Roundup PowerMax	0.75	2 TL	10	29
Outlook	0.98	6 TL		
Roundup PowerMax	0.75	6 TL		
Untreated Check			25	13
LSD (P=.05)			*50.7*	*35.1*
CV (%)			*107.49*	*53.07*

All treatments included 2% w/w ammonium sulfate.

Table 3. Response of sugarbeet to herbicide treatments.

Treatment	Rate	Timing	Population		Crop injury		Yield	Sucrose
			05-26	06-02	06-09	06-30		
	lbs ae/A		----- plants/A -----		----- % -----		tons/A	%
Roundup PowerMax	0.75	2 TL	44,431	50,530	8	2	30.7	18
Roundup PowerMax	0.75	6 TL						
MON 63410	1.125	PRE	13,286	15,682	58	33	28.7	18
Roundup PowerMax	0.75	4 TL						
Roundup PowerMax	0.75	8 TL						
MON 63410	1.125	2 TL	45,738	50,530	2	2	32.7	19
Roundup PowerMax	0.75	2 TL						
Roundup PowerMax	0.75	6 TL						
Roundup PowerMax	0.75	2 TL	43,560	51,401	6	3	31.2	18
MON 63410	1.125	6 TL						
Roundup PowerMax	0.75	6 TL						
MON 63410	2.25	PRE	16,771	20,909	63	28	26.8	17
Roundup PowerMax	0.75	4 TL						
Roundup PowerMax	0.75	8TL						
MON 63410	2.25	2 TL	39,640	41,818	26	8	28.1	19
Roundup PowerMax	0.75	2 TL						
Roundup PowerMax	0.75	6 TL						
Roundup PowerMax	0.75	2 TL	44,867	50,530	2	2	32.4	18
MON 63410	2.25	6 TL						
Roundup PowerMax	0.75	6 TL						
Outlook	0.98	2 TL	48,569	47,916	4	5	31.0	19
Roundup PowerMax	0.75	2 TL						
Roundup PowerMax	0.75	6 TL						
Roundup PowerMax	0.75	2 TL	44,649	43,560	5	1	30.3	18
Outlook	0.98	6 TL						
Roundup PowerMax	0.75	6 TL						
Untreated Check			49,658	47,916	0	0	21.3	18
LSD (P=.05)			*7,742*	*13,643*	*17*	*13*	*6.0*	*2.1*
CV (%)			*13.6*	*22.4*	*69.6*	*110.1*	*14.2*	*7.8*

All treatments included 2% w/w ammonium sulfate.

Loveland Glyphosate Formulations for Use in Roundup Ready Sugarbeet (2010_SB05)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate Loveland glyphosate formulations for use in Roundup Ready sugarbeet. Sugarbeet ('Beta 66RR60') was planted in 30-inch rows at a rate of 70,000 seeds per acre on May 10. Soils at the site were Haverson and McCook loams (42% sand, 41% silt and 17% clay, 1.4% organic matter, pH 8.0). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Sugarbeet populations were counted on June 18. Crop injury was evaluated visually on July 6. Common lambsquarters, hairy nightshade, redroot pigweed, and green foxtail were counted on June 18, June 30, and July 28. Sugarbeet was harvested on October 5 from 10 ft of row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/07/10	07/14/10
Time of Day:	11:45 AM	10:15 AM
Application Timing:	2” WEEDS	30 DAA
Air Temperature, Unit:	68 F	76 F
% Relative Humidity:	67	35
Wind Velocity, Unit:	3 MPH	4 MPH
Wind Direction:	SE	NW
Soil Temperature, Unit:	68 F	64 F
Soil Moisture:		
% Cloud Cover:		

Results & Discussion

At the June 18 evaluation (11 days after application), there were no significant differences in weed control between herbicide treatments except the Mad Dog Plus treatment which gave less green foxtail control than other treatments (Table 2). There also little difference between treatments at the June 30 evaluation and no significant difference between herbicide treatments at the July 28 evaluation.

Sugarbeet populations, crop injury, and yield were not significantly different between treatments (Table 3).

Table 2a. Weed control, June 18 and 30, for Loveland glyphosate formulations in Roundup Ready sugarbeet.

Treatment	Rate	Application date	Jun 18				Jun 30			
			CHEAL	AMARE	SOLSA	SETVI	CHEAL	AMARE	SOLSA	SETVI
			%							
LI 6285	32 fl oz/a	06-07	100	100	82	93	91	83	78	58
Makaze	32 fl oz/a	07-14								
Roundup Powermax	22 fl oz/a	06-07	95	98	80	98	95	88	80	58
Roundup Powermax	22 fl oz/a	07-14								
Mad Dog Plus	32 fl oz/a	06-07	100	98	89	70	100	92	85	53
Mad Dog Plus	32 fl oz/a	07-14								
Roundup Weathermax	22 fl oz/a	06-07	100	96	84	100	98	83	89	70
Roundup Weathermax	22 fl oz/a	07-14								
Makaze	22 fl oz/a	06-07	95	92	52	100	89	85	66	50
Makaze	22 fl oz/a	07-14								
Untreated Check			0	0	0	0	0	0	0	0
LSD (P=.05)			*7.5*	*7.4*	*27.6*	*18*	*6.9*	*19.9*	*22.3*	*45.2*
Treatment Prob(F)			*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0646*

All treatments included Weather Gard Complete at 0.5% v/v

Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, SOLSA = hairy nightshade, SETVI = green foxtail.

Table 2b. Weed control, July 28, for Loveland glyphosate formulations in Roundup Ready sugarbeet.

Treatment	Rate	Application	Jul 28			
		date	CHEAL	AMARE	SOLSA	SETVI
			---------- % ----------			
LI 6285	32 fl oz/a	06-07	100	100	98	93
Makaze	32 fl oz/a	07-14				
Roundup Powermax	22 fl oz/a	06-07	94	87	84	88
Roundup Powermax1	22 fl oz/a	07-14				
Mad Dog Plus	32 fl oz/a	06-07	100	96	95	90
Mad Dog Plus	32 fl oz/a	07-14				
Roundup Weathermax	22 fl oz/a	06-07	98	98	95	85
Roundup Weathermax	22 fl oz/a	07-14				
Makaze	22 fl oz/a	06-07	89	94	82	93
Makaze	22 fl oz/a	07-14				
Untreated Check			0	0	0	0
LSD (P=.05)			*9.5*	*13.3*	*12.2*	*19*
Treatment Prob(F)			*0.0001*	*0.0001*	*0.0001*	*0.0001*

All treatments included WeatherGard Complete at 0.5% v/v
Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, SOLSA = hairy nightshade, SETVI = green foxtail.

Table 3. Sugarbeet response to Loveland glyphosate formulations for use in Roundup Ready sugarbeet.

Treatment	Rate	Date	Population	Injury 7/6	Yield	Sucrose	SLM
	fl oz/a		plants/A	%	tons/A	%	%
LI 6285	32	06-07	16,553	0	29.7	16.135	1.6
Makaze	32	07-14					
Roundup Powermax	22	06-07	16,553	0	32.1	16.143	1.633
Roundup Powermax1	22	07-14					
Mad Dog Plus	32	06-07	15,682	0	34.5	16.998	1.858
Mad Dog Plus	32	07-14					
Roundup Weathermax	22	06-07	16,988	0	31.6	18.613	1.693
Roundup Weathermax	22	07-14					
Makaze	22	06-07	16,117	0	29.6	15.02	1.645
Makaze	22	07-14					
Untreated Check			16,117	0	1.5	15.94	1.72
LSD (P=.05)			*4451.8*	*0*	*5.73*	*2.7951*	*0.4377*
Treatment Prob(F)			*0.9915*	*1*	*0.0001*	*0.1841*	*0.826*

All treatments included WeatherGard Complete at 0.5% v/v

Evaluate efficacy, timing of application and crop response in sugarbeets (2010_SB06)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate efficacy, timing of application and crop response in sugarbeets. Sugarbeet ('Beta 66RR60') was planted in 30-inch rows at a rate of 70,000 seeds per acre on May 10. Soil at the site was Mitchell silt loam (36% sand, 52% silt and 12% clay, 0.9% organic matter, pH 7.9). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Crop injury was visually rated on June 30. Common lambsquarters, hairy nightshade, redroot pigweed, and kochia control was evaluated visually on June 30 and populations were counted on July 6, July 22, August 18, and September 1.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/07/10	06/18/10	06/25/10
Time of Day:	10:30 AM	09:15 AM	10:00 AM
Application Timing:	2 TL	6 TL	8-10 TL
Air Temperature, Unit:	69 F	76 F	84 F
% Relative Humidity:	68	28	33
Wind Velocity, Unit:	2 MPH	1 MPH	1 MPH
Wind Direction:	SE	W	WSW
Soil Temperature, Unit:	64 F	58 F	80 F
Soil Moisture:		GOOD	
% Cloud Cover:		0	

Results & Discussion

Weed control was generally higher for treatments with three applications rather than two (Table 2). Most treatments were not signifcantly different, however, two applications of Sequence at 1840 g ai/ha consistently provided a lower rate of control.

Sugarbeet injury ranged from 6.7 to 23.3% but the differences between treatments were not significantly different (Table 3).

Table 2. Efficacy, timing of application and crop response in sugarbeets: visual weed control for the June 30 evaluation.

Treatment	Rate	Application	Control			
		Date	CHEAL	AMARE	KCHSC	SOLSA
	g ai/ha		%			
Untreated check			0	0	0	0
Touchdown Total	880	06-07	100	100	100	100
Touchdown Total	880	06-18				
Sequence	1840	06-25				
Touchdown Total	880	06-07	100	100	100	100
Sequence	1840	06-18				
Touchdown Total	880	06-25				
Sequence	1840	06-07	98.3	100	100	100
Touchdown Total	880	06-18				
Touchdown Total	880	06-25				
Touchdown Total	880	06-07	100	100	100	100
Touchdown Total	880	06-18				
Touchdown Total	880	06-25				
Touchdown Total	880	06-07	100	100	100	100
Sequence	1840	06-18				
Sequence	1840	06-25				
Sequence	1840	06-07	68.3	93.3	90	95
Sequence	1840	06-25				
Sequence	1840	06-07	88.3	97.3	91.7	97.3
Touchdown Total	880	06-25				
Touchdown Total	880	06-07	86.7	95	98.3	98.3
Sequence	1840	06-25				
Touchdown Total	880	06-07	99	100	100	100
Touchdown Total	880	06-25				
LSD (P=.05)			*10.38*	*3.53*	*3.83*	*1.98*
Treatment Prob(F)			*0.0001*	*0.0001*	*0.0001*	*0.0001*

Ammonium Sulfate added to all treatments at 1% v/v.
Abbreviations: CHEAL = common lambsquarters, AMARE = redroot pigweed, KCHSC = kochia, SOLSA = hairy nightshade.

Table 3. Efficacy, timing of application and crop response in sugarbeets : visual weed control for July, August, and September and crop injury evaluation.

Treatment	Rate	Date	Common lambsquarters control				Sugarbeet injury
			07-06	07-22	08-18	09-01	06-30
	g ai/ha		%				
Untreated check			16	6	3	4	0
Touchdown Total	880	06-07	100	100	100	100	16.7
Touchdown Total	880	06-18					
Sequence	1840	06-25					
Touchdown Total	880	06-07	98	100	100	100	13.3
Sequence	1840	06-18					
Touchdown Total	880	06-25					
Sequence	1840	06-07	100	100	99	100	15
Touchdown Total	880	06-18					
Touchdown Total	880	06-25					
Touchdown Total	880	06-07	100	100	92	98	18.3
Touchdown Total	880	06-18					
Touchdown Total	880	06-25					
Touchdown Total	880	06-07	96	100	99	100	23.3
Sequence	1840	06-18					
Sequence	1840	06-25					
Sequence	1840	06-07	69	87	68	77	10
Sequence	1840	06-25					
Sequence	1840	06-07	92	97	95	95	18.3
Touchdown Total	880	06-25					
Touchdown Total	880	06-07	92	98	95	93	10
Sequence	1840	06-25					
Touchdown Total	880	06-07	98	99	99	100	6.7
Touchdown Total	880	06-25					
LSD (P=.05)			*14.2*	*5.8*	*9.9*	*7.8*	*21.84*
Treatment Prob(F)			*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.5911*

Ammonium Sulfate added to all treatments at 1% v/v.

UpBeet as a tank-mix partner with glyphosate for use in Roundup Ready sugarbeet (2010_SB13)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate UpBeet as a tank-mix partner with glyphosate for use in Roundup Ready sugarbeet. Sugarbeet ('Beta 66RR60') was planted in 30-inch rows at a rate of 70,000 seeds per acre on May 10. Soils at the site were Haverson & McCook loams (42% sand, 41% silt and 17% clay, 1.4% organic matter, pH 8.0). Herbicide treatments were applied using either an air-pressurized tractor-mounted sprayer or a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Crop injury was evaluated visually on June 25. Common lambsquarters and hairy nightshade control was evaluated visually on June 25, 30, and July 14. Sugarbeet was harvested on October 5 from 10 ft of row per plot and weighed in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	06/16/10
Time of Day:	01:00 PM
Application Timing:	4” WEEDS
Air Temperature, Unit:	79 F
% Relative Humidity:	54
Wind Velocity, Unit:	3 MPH
Wind Direction:	SE
Soil Temperature, Unit:	70 F
Soil Moisture:	WET
% Cloud Cover:	10

Results & Discussion

Most treatments gave 97% or higher weed control at the June 25 evaluation (Table 2). There was no significant difference in weed control between herbicide treatments at the June 30 and July 14 evaluations. Little or no crop injury was observed.

Table 2. UpBeet as a tank-mix partner with glyphosate for use in Roundup Ready sugarbeet: weed control and crop injury.

Treatment	Rate	Control					
		-------- 06-25 --------		-------- 06-30 ---------		-------- 07-14 --------	
		CHEAL	SOLSA	CHEAL	SOLSA	CHEAL	SOLSA
		---------- % ----------					
Roundup PowerMax	0.387 lb ae/a	96.8	99	94	98	96	95
Roundup PowerMax[1]	0.387 lb ae/a	92.3	98	72	97	78	90
Roundup PowerMax[2]	0.387 lb ae/a	94.8	99	94	99	79	89
Roundup PowerMax UpBeet	0.387 lb ae/a 0.0078 lb ai/a	96.5	98.5	85	99	86	94
Roundup PowerMax UpBeet[1]	0.387 lb ae/a 0.0078 lb ai/a	98	98.8	100	97	99	95
Roundup PowerMax UpBeet[2]	0.387 lb ae/a 0.0078 lb ai/a	98.5	98	94	99	100	82
Roundup PowerMax UpBeet	0.387 lb ae/a 0.0156 lb ai/a	98.5	99	99	95	91	85
Roundup PowerMax UpBeet[1]	0.387 lb ae/a 0.0156 lb ai/a	96.5	98.8	96	91	97	77
Roundup PowerMax UpBeet[2]	0.387 lb ae/a 0.0156 lb ai/a	98	99	96	95	99	89
Roundup PowerMax UpBeet	0.387 lb ae/a 0.0313 lb ai/a	96.5	98.8	99	89	95	84
Roundup PowerMax UpBeet[1]	0.387 lb ae/a 0.0313 lb ai/a	92.8	97	83	94	89	93
Roundup PowerMax UpBeet[2]	0.387 lb ae/a 0.0313 lb ai/a	99	98.8	99	97	99	94
Roundup PowerMax	0.77 lb ae/a	98.5	98.5	97	99	96	86
Roundup PowerMax[1]	0.77 lb ae/a	99	98.5	100	99	99	92
Roundup PowerMax[1]	0.77 lb ae/a	99	99	100	96	100	97
Roundup PowerMax UpBeet	0.77 lb ae/a 0.0078 lb ai/a	98.8	99	100	100	100	98
Roundup PowerMax UpBeet[1]	0.77 lb ae/a 0.0078 lb ai/a	99	98.5	97	100	99	95
Roundup PowerMax UpBeet[2]	0.77 lb ae/a 0.0078 lb ai/a	99	99	99	100	96	92

Table 2. UpBeet as a tank-mix partner with glyphosate for use in Roundup Ready sugarbeet: weed control and crop injury.

Treatment	Rate	Control					
		-------- 06-25 --------		-------- 06-30 ---------		-------- 07-14 --------	
		CHEAL	SOLSA	CHEAL	SOLSA	CHEAL	SOLSA
		---------- % ----------					
Roundup PowerMax UpBeet	0.77 lb ae/a 0.0156 lb ai/a	98.5	99	100	97	99	88
Roundup PowerMax UpBeet[1]	0.77 lb ae/a 0.0156 lb ai/a	98.5	99	99	97	93	89
Roundup PowerMax UpBeet[2]	0.77 lb ae/a 0.0156 lb ai/a	99	99	100	98	100	88
Roundup PowerMax UpBeet	0.77 lb ae/a 0.0313 lb ai/a	99	99	99	99	100	98
Roundup PowerMax UpBeet[1]	0.77 lb ae/a 0.0313 lb ai/a	99	99	100	99	100	98
Roundup PowerMax UpBeet[2]	0.77 lb ae/a 0.0313 lb ai/a	98.8	98.8	100	99	95	100
Untreated Check		0	0	36	12	34	34
LSD (P=.05)		*3.74*	*1*	*16.4*	*8.3*	*18.9*	*16.4*
Treatment Prob(F)		*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*

All herbicide treatments included Ammonium Sulfate @ 2% w/w
[1] Prime Oil 1 % v/v. [2] Superb HC 0.5 % v/v

Downy brome control in winter wheat with Fall, Spring, and Split herbicide treatments (2010_WW02)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming, in 2010 to evaluate downy brome control in winter wheat with fall, spring, and split herbicide treatments. Hard red winter wheat ('Genou') was drilled in 7.5-inch rows at a rate of 60 lbs/acre on September 24, 2009. Soil at the site was a Mitchell silt loam (1.7% organic matter). Herbicide treatments were applied with a CO_2-pressurized knapsack sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 3 replicates. Downy brome control was evaluated visually on May 26. Wheat injury was rated visually on November 17, April 15, April 28, and May 26. One square meter of wheat was harvested from each plot on July 10 and threshed for grain yield.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	11/05/09	03/31/10
Time of Day:	10:30 AM	01:50 PM
Application Timing:	FALL	SPRING
Air Temperature, Unit:	62 F	54 F
% Relative Humidity:		34
Wind Velocity, Unit:	5 MPH	13 MPH
Wind Direction:	S	SE
Soil Temperature, Unit:	40 F	52 F
Soil Moisture:		
% Cloud Cover:		

Results and Discussion

Downy brome control ranged from 56.7 to 86.7% for herbicide treatments (Table 2). No crop injury was observed on November 17. At the April 15, evaluation, crop injury ranged from 8.7 to 24.3%, with the highest rate occurring in the split application of Olympus. Crop injury for the April 28 and May 26 evaluations ranged from 3.7 to 13.3% and 0 to 10%, respectively. Wheat yields were not significantly different for all treatments including the unsprayed check.

Table 2. Downy brome control, crop injury, and yield in winter wheat with fall, spring, and split herbicide treatments.

Treatment	Rate	Application	Downy brome control	Winter wheat injury				
		date	05-26	11-17	04-15	04-28	05-26	Yield
	lbs ai/A		---------- % ----------					bu/A
Powerflex[1,2]	0.0164	11-05	63	0	17	9	0	19.0
Olympus[1]	0.0393	11-05	84	0	20	7	3	28.4
Maverick[1]	0.0312	11-05	82	0	20	11	7	24.7
Powerflex[1,2]	0.0164	03-31	70	0	23	13	5	20.6
Olympus[1,2]	0.0393	03-31	75	0	16	8	3	23.2
Maverick[1]	0.0312	03-31	84	0	9	8	3	21.0
Untreated Check			0	0	0	0	0	19.4
Olympus[1]	0.0393	11-05	87	0	13	7	0	19.3
Olympus[1,2]	0.0131	03-31						
Olympus[1]	0.0263	11-05	75	0	18	9	10	22.8
Olympus[1,2]	0.0263	03-31						
Powerflex[1,2]	0.0094	11-05	80	0	24	12	3	21.4
Powerflex[1,2]	0.0070	03-31						
Hoelon	0.7500	11-05	57	0	11	4	0	27.4
Define SC	0.2720	11-05						
LSD (P=.05)			*12*	*0*	*11*	*5*	*10*	*7.5*
Treatment Prob(F)			*0.0001*	*1*	*0.0047*	*0.0007*	*0.5214*	*0.1751*

[1] NIS 0.5 % v/v
[2] Ammonium Sulfate 1.5 lb/a

Broadleaf weed control in irrigated winter wheat (2010_WW04)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming, in 2010 to evaluate broadleaf weed control in irrigated winter wheat. Hard red winter wheat ('Jagalene') was drilled in 8-inch rows at a rate of 120 lbs/acre on October 24, 2009. Soils at the site were Haverson and McCook loams (42% sand, 37% silt, 21% clay, 1.4% organic matter, pH 7.8). Herbicide treatments were applied with an air-pressurized tractor-mounted sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Crop injury and common lambsquarters control were evaluated visually on June 1 and 16. A 5-ft swath from each plot was harvested on August 18 and yield was determined in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	05/25/10
Time of Day:	04:30 PM
Application Timing:	3-inch weeds
Air Temperature, Unit:	78 F
% Relative Humidity:	23
Wind Velocity, Unit:	2 MPH
Wind Direction:	E
Soil Temperature, Unit:	69 F
Soil Moisture:	
% Cloud Cover:	

Results & Discussion

Weed control on June 1 and 16 was not different between treatments at either evaluation (Table 2). Crop injury was not observed at the June 1 evaluation and slight injury was noted on June 16 but was not significantly different between treatments (Table 3). Wheat yields were not significantly different.

Table 2. Broadleaf weed control in irrigated winter wheat, 2010 WW04: common lambsquarters control.

Treatment	Rate	Control	
		06-01	06-16
		---------- % ----------	
Untreated check		37.5	49.5
Pulsar[1]	0.108 lb ae/a	48.3	92.7
Pulsar[1]	0.163 lb ae/a	53.3	95.7
Pulsar[1] MCPA-Ester	0.108 lb ae/a 0.27 lb ae/a	41.3	73.3
Harmony Express Pulsar[1]	0.0075 lb ai/a 0.00187 lb ai/a 0.108 lb ae/a	58.8	96.5
Peak Pulsar[1]	0.0089 lb ai/a 0.108 lb ae/a	53.8	95.5
Peak Pulsar[1]	0.0089 lb ai/a 0.163 lb ae/a	55	94.5
Starane Orion	0.125 lb ae/a 0.315 lb ae/a	35	71.3
Starane + Sword Axial TBC Adigor	0.333 lb ae/a 0.058 lb ai/a 0.375 % v/v	53.8	72.8
Huskie[2]	0.286 lb ai/a	67.5	97.5
Huskie[2] MCPA-Ester	0.242 lb ai/a 0.375 lb ae/a	80	99
Huskie[2] Starane	0.286 lb ai/a 0.047 lb ae/a	73.8	97.5
Huskie[2] 2,4-D Ester	0.286 lb ai/a 0.188 lb ae/a	67.5	96.5
Wolverine	0.295 lb ai/a	53.3	92.7
Wolverine Ammonium Sulfate	0.295 lb ai/a 0.3 % w/v	53.3	68.7
LSD (P=.05)		*25.15*	*39.99*
Treatment Prob(F)		*0.0369*	*0.3291*

[1] NIS 0.25 % v/v
[2] NIS 0.5 % v/v +UAN 2.5% v/v.

Table 3. Broadleaf weed control in irrigated winter wheat: crop injury, yield, and test weight.

Treatment	Rate	Crop injury 6-16	Yield	Test Weight
		%	bu/A	lbs/bu
Untreated check		0	26.8	34.7
Pulsar[1]	0.108 lb ae/a	0	22.2	38.0
Pulsar[1]	0.163 lb ae/a	0	24.2	37.7
Pulsar[1] MCPA-Ester	0.108 lb ae/a 0.27 lb ae/a	0	23.4	37.0
Harmony Express Pulsar[1]	0.0075 lb ai/a 0.00187 lb ai/a 0.108 lb ae/a	2	21.2	37.5
Peak Pulsar[1]	0.0089 lb ai/a 0.108 lb ae/a	2	21.3	36.9
Peak Pulsar[1]	0.0089 lb ai/a 0.163 lb ae/a	3	19.5	36.5
Starane Orion	0.125 lb ae/a 0.315 lb ae/a	0	20.6	38.4
Starane + Sword Axial TBC Adigor	0.333 lb ae/a 0.058 lb ai/a 0.375 % v/v	0	26.6	38.4
Huskie[2]	0.286 lb ai/a	0	24.4	38.9
Huskie[2] MCPA-Ester	0.242 lb ai/a 0.375 lb ae/a	0	22.4	39.4
Huskie[2] Starane	0.286 lb ai/a 0.047 lb ae/a	0	23.9	39.1
Huskie[2] 2,4-D Ester	0.286 lb ai/a 0.188 lb ae/a	2	23.0	39.0
Wolverine	0.295 lb ai/a	2	20.3	36.0
Wolverine Ammonium Sulfate	0.295 lb ai/a 0.3 % w/v	6	21.3	36.0
LSD (P=.05)		*4*	*5.9*	*3.5*
Treatment Prob(F)		*0.0697*	*0.3655*	*0.2535*

[1] NIS 0.25 % v/v
[2] NIS 0.5 % v/v +UAN 2.5% v/v.

Broadleaf weed control in irrigated winter wheat (2010_WW05)

Materials & Methods

A field study was conducted at the Sustainable Agriculture Research and Extension Center near Lingle, Wyoming in 2010 to evaluate broadleaf weed control in irrigated winter wheat. Hard red winter wheat ('Jagalene') was drilled in 8-inch rows at a rate of 120 lbs/acre on October 24, 2009. Soils at the site were Haverson and McCook loams (42% sand, 37% silt, 21% clay, 1.4% organic matter, pH 7.8). Herbicide treatments were applied using either a CO_2-pressurized knapsack sprayer or an air-pressurized tractor-mounted sprayer delivering 20 gallons of total volume per acre at 40 psi with TeeJet 11002DG nozzles. Environmental conditions at the time of application are provided in Table 1. Plots were 10 feet wide by 30 feet long and arranged in a randomized complete block design with 4 replicates. Crop injury and common lambsquarters control were evaluated visually on June 1 and 16. A 5-ft swath from each plot was harvested on August 18 and yield was determined in the field.

Table 1. Environmental conditions at the time of herbicide application.

Application Date:	05/25/10
Time of Day:	04:45 PM
Application Timing:	3-inch weeds
Air Temperature, Unit:	78 F
% Relative Humidity:	23
Wind Velocity, Unit:	2 MPH
Wind Direction:	E
Soil Temperature, Unit:	69 F
Soil Moisture:	
% Cloud Cover:	

Results & Discussion

Control of common lambsquarters averaged 67% on June 1 and 79% on June 16 (Table 2). Nine of eleven herbicide treatments were not significantly different in weed control on June 1 and 16. One treatment (Aim + 2,4,-D Ester) caused crop injury on June 1 (Table 3). Wheat yields were not significantly different between treatments.

Table 2. Broadleaf weed control in irrigated winter wheat: common lambsquarters control.

Treatment	Rate	---------- Common lambsquarters control ----------	
		06-01	06-16
		%	%
Untreated Check		0	0
AGH 09035	16 fl oz/a	69	91
AGH 09035 AG 02013	16 fl oz/a 4 fl oz/a	65	93
AGH 09035	24 fl oz/a	64	94
AGH 09035 AG 02013	24 fl oz/a 4 fl oz/a	69	94
Starane[1]	10.6 fl oz/a	41	8
Starane+Sword[1]	1.5 pt/a	69	93
Stinger[1] Starane	0.094 lb ai/a 0.094 lb ai/a	64	65
Stinger[1] Starane	0.125 lb ai/a 0.125 lb ai/a	64	67
Huskie[1] UAN	11 fl oz/a 2 qt/a	75	91
Aim[1] 2,4-D Ester	1 fl oz/a 8 fl oz/a	88	95
LSD (P=.05)		*16*	*19*
Treatment Prob(F)		*0.0001*	*0.0001*

[1] NIS 0.25 % v/v

Table 3. Broadleaf weed control in irrigated winter wheat (2010_WW05): wheat injury, yield and test weight.

Treatment	Rate	-------- Crop injury ---------		Yield	Test weight
		6/1/2010	6/16/2010		
		%	%	bu/A	lbs/bu
Untreated Check		0	0	30.1	38.8
AGH 09035	16 fl oz/a	0	0	18.6	36.2
AGH 09035 AG 02013	16 fl oz/a 4 fl oz/a	0	0	21.1	36.1
AGH 09035	24 fl oz/a	0	0	22.2	35.0
AGH 09035 AG 02013	24 fl oz/a 4 fl oz/a	0	0	22.4	35.1
Starane[1]	10.6 fl oz/a	0	0	21.3	36.9
Starane+Sword[1]	1.5 pt/a	0	0	27.5	40.7
Stinger[1] Starane	0.094 lb ai/a 0.094 lb ai/a	0	0	22.9	37.5
Stinger[1] Starane	0.125 lb ai/a 0.125 lb ai/a	0	0	23	37.1
Huskie[1] UAN	11 fl oz/a 2 qt/a	0	0	20.2	36.4
Aim[1] 2,4-D Ester	1 fl oz/a 8 fl oz/a	15.8	0	29.7	42.0
LSD (P=.05)		*0.65*	*0*	*14.21*	*7.8*
Treatment Prob(F)		*0.0001*	*1*	*0.7958*	*0.728*

[1] NIS 0.25 % v/v