

Giant ragweed control in Roundup Ready® sugarbeet, NW Hutchinson, MN, 2009. (Fisher, Stachler, and Luecke). 'Betaseed 95RR03' sugarbeet was seeded April 23, 2009 in 22 inch rows in a grower cooperater field having glyphosate-resistant giant ragweed NW of Hutchinson, MN. Sugarbeet seed was treated with Tachigaren at 45 grams dry product per 100,000 seeds. Herbicide treatment information is provided in the table below. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles with a bicycle sprayer to the center four rows of six row plots 40 feet in length. Glyphosate and/or clopyralid were applied according to the treatments in the data table below. Ammonium sulfate as AmStik from West Central was included in all treatments at 2.5 qt/A. Giant ragweed was evaluated 21 days after each application and at harvest. Only selected data is presented in the table below. Visual evaluations are an estimate of percent control in the treated plot area compared to the adjacent untreated strips and based upon a scale of 0 (no control) to 100% (complete control). Sugarbeet was harvested August 31 from one center row of each plot. Experiment designed as a randomized complete block having four replications.

Table. Application information.

Application Code	1	2	3	4	5	6	7	8	9
Date of Application	May 18	June 12	July 1	June 2	June 23	July 13	June 12	July 1	July 22
Time of Day	4:30 pm	10:00 am	5:30 pm	2:30 pm	11:30 am	4:45 pm	10:00 am	5:30 pm	1:15 pm
Air Temperature (°F)	86	66	74	69	88	76	66	74	78
Relative Humidity (%)	20	37	50	20	45	38	37	50	36
Soil Temp. (°F at 6")	60	50	74	60	72	70	50	74	76
Wind Velocity (mph)	3	2	4	8	3	2	2	4	2
Cloud Cover (%)	20	90	90	5	90	70	90	90	90
Sugarbeet (stage - range)	Cot.-V2	V4-V8.5	V8.5-V17.9	V4-V7.2	V4-V14.5	V5-V24	V4-V8.5	V8.5-V17.9	V6-V16.5
Giant Ragweed (stage/height -range)	Cot.-3N/ 0.25-2"	-	-	1N-5N/ 1-7.5"	-	-	1N-6N/ 1-13.5"	-	-
Giant Ragweed (avg. density)	8.5/ft ²	-	-	10.8/ft ²	-	-	6/ft ²	-	-

Summary: No appreciable injury was observed with any treatments. Glyphosate applied once and multiple times inadequately controlled giant ragweed, although multiple glyphosate applications controlled more giant ragweed and increased sugarbeet yield compared to a single application. The inadequate control is a result of the presence of glyphosate-resistant biotypes in the population. Sugarbeet yield declined as giant ragweed height increased indicating the competitive ability of giant ragweed.

Increasing the rate of clopyralid improved giant ragweed control at nearly all evaluations and timings. Clopyralid (totaling 0.28 lb ae/A) plus glyphosate (0.75 lb ae/A at each application) controlled the most giant ragweed at harvest for each timing, except clopyralid (totaling 0.188 lb/A) plus glyphosate applied three times starting at 1 inch giant ragweed.

Clopyralid plus glyphosate applied once or multiple times to 6 inch giant ragweed could not improve sugarbeet yield and extractable sucrose. Clopyralid (0.94 lb/A) plus glyphosate (0.75 lb/A) maximized sugarbeet yield and extractable sucrose when applied two or three times to 1 or 3 inch giant ragweed, except three applications to 1 inch giant ragweed. Clopyralid plus glyphosate applied multiple times to 1 and 3 inch giant ragweed improved sugarbeet yield and usually extractable sucrose compared to a single application, except clopyralid (0.188 lb/A) plus glyphosate (0.75 lb/A) applied once to 3 inch giant ragweed.

Experiment continued on next page.

Table. Giant ragweed control in Roundup Ready® sugarbeet, NW Hutchinson, MN (Fisher, Stachler, and Luecke).

Treatment*	Rate (lb ae/A)	Timing	21 DAT	21 DAT 9	Harvest		
			1,4,7	Girw cntl %	Root yield Ton/A	Extr Sucr lb/A	
Untreated	-	-	0	0	0	0.0	0
Weed Free Check-1"	-	-	100	100	100	19.5	4910
Glyt-PM	0.75	1	42	7	7	3.7	1132
Clpy + Glyt-PM	0.047 + 0.75	1	43	10	5	0.3	74
Clpy + Glyt-PM	0.094 + 0.75	1	51	19	16	2.7	585
Clpy + Glyt-PM	0.188 + 0.75	1	63	26	23	8.3	1883
Clpy + Glyt-PM	0.047 + 0.75	1,2	45	70	60	19.5	3979
Clpy + Glyt-PM	0.094 + 0.75	1,2	50	94	92	20.9	4429
Clpy + Glyt-PM	0.094 + 0.75	1					
Clpy + Glyt-PM	0.188 + 0.75	2	48	100	99	16.8	4068
Clpy + Glyt-PM	0.047 + 0.75	1,2					
Clpy + Glyt-PM	0.094 + 0.75	3	45	98	99	19.0	4157
Clpy + Glyt-PM	0.094 + 0.75	1,2,3	53	100	100	17.3	4033
Weed-Free Check-3"	-	-	100	100	100	12.7	2787
Glyt-PM	0.75	4	43	20	23	5.7	1333
Clpy + Glyt-PM	0.047 + 0.75	4	52	36	31	0.9	257
Clpy + Glyt-PM	0.094 + 0.75	4	60	51	40	5.3	1142
Clpy + Glyt-PM	0.188 + 0.75	4	68	92	84	18.0	4078
Clpy + Glyt-PM	0.047 + 0.75	4,5	54	83	75	17.2	4004
Clpy + Glyt-PM	0.094 + 0.75	4,5	62	97	96	22.1	5227
Clpy + Glyt-PM	0.094 + 0.75	4					
Clpy + Glyt-PM	0.188 + 0.75	5	60	99	98	15.4	3308
Clpy + Glyt-PM	0.047 + 0.75	4,5					
Clpy + Glyt-PM	0.094 + 0.75	6	52	91	95	16.6	3429
Clpy + Glyt-PM	0.094 + 0.75	4,5,6	62	99	99	22.0	4612
Glyt-PM	0.75	4,5	45	57	55	14.5	2832
Glyt-PM	0.75	4,5,6	43	65	61	10.6	2894
Weed-Free Check-6"	-	-	100	100	100	11.4	2567
Glyt-PM	0.75	7	33	19	19	1.0	223
Clpy + Glyt-PM	0.047 + 0.75	7	45	49	40	5.8	1215
Clpy + Glyt-PM	0.094 + 0.75	7	55	63	53	11.3	1927
Clpy + Glyt-PM	0.188 + 0.75	7	65	61	54	12.8	2620
Clpy + Glyt-PM	0.047 + 0.75	7,8	44	78	75	5.5	1005
Clpy + Glyt-PM	0.094 + 0.75	7,8	54	85	81	5.7	1288
Clpy + Glyt-PM	0.094 + 0.75	7					
Clpy + Glyt-PM	0.188 + 0.75	8	53	92	94	5.3	943
Clpy + Glyt-PM	0.047 + 0.75	7,8					
Clpy + Glyt-PM	0.094 + 0.75	9	47	84	92	5.6	1113
Clpy + Glyt-PM	0.094 + 0.75	7,8,9	57	92	98	7.0	1186
CV (%)			8	7	7	45	46
LSD (0.05)			6	6	7	6.9	1549

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; Amstik added to all treatments at 2.5 qt/A.

Giant ragweed control in Roundup Ready® sugarbeet, SW Hutchinson, MN, 2009. (Fisher, Stachler, and Luecke). 'Betaseed 95RR03' sugarbeet was seeded April 23, 2009 in 22 inch rows in a grower cooperator field having glyphosate-resistant giant ragweed SW of Hutchinson, MN. Sugarbeet seed was treated with Tachigaren at 45 grams dry product per 100,000 seeds. Herbicide treatment information is provided in the table below. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles with a bicycle sprayer to the center four rows of six row plots 40 feet in length. Glyphosate and/or clopyralid were applied according to the treatments in the data table below. Ammonium sulfate as AmStik from West Central was included in all treatments at 2.5 qt/A. Giant ragweed was evaluated 21 days after each application and at harvest. Only selected data is presented in the table below. Visual evaluations are an estimate of percent control in the treated plot area compared to the adjacent untreated strips and based upon a scale of 0 (no control) to 100% (complete control). Sugarbeet was harvested September 1 from one center row of each plot. Experiment designed as a randomized complete block having four replications.

Table. Application information.

Application Code	1	2	3	4	5	6	7	8	9
Date of Application	May 18	June 11	July 1	June 1	June 22	July 13	June 11	July 1	July 22
Time of Day	1:30 pm	5:00 pm	2:00 pm	4:00 pm	3:00 pm	1:00 pm	5:00 pm	2:00 pm	10:30 am
Air Temperature (°F)	76	70	78	75	89	76	70	78	77
Relative Humidity (%)	24	27	45	21	55	41	27	45	52
Soil Temp. (°F at 6")	60	50	76	67	82	70	50	76	72
Wind Velocity (mph)	8	5	8	6	3	3	5	8	2
Cloud Cover (%)	20	20	20	40	5	40	20	20	5
Sugarbeet (stage – range)	Cot.-V2	V4-V9	V8-V17.9	V2.5-V6	V7.3-V13.3	V8-V20	V4-V9	V8-V17.9	V8-V22
Giant Ragweed (stage/height - range)	Cot.-2.5N/ 0.25-1.25"	-	-	Cot.-4N/ 0.25-5"	-	-	Cot.-5.5N/ 0.5-10"	-	-
Giant Ragweed (avg. density)	12/ft ²	-	-	14/ft ²	-	-	23/ft ²	-	-

Summary: No appreciable injury was observed with any treatment. Glyphosate applied once and multiple times inadequately controlled giant ragweed, although multiple glyphosate applications controlled more giant ragweed and increased sugarbeet yield compared to a single application. The inadequate control is a result of the presence of glyphosate-resistant biotypes in the population. Sugarbeet yield and extractable sucrose was similar for each weed-free check indicating removal of giant ragweed at the three timings had not impact upon yield and sucrose.

Increasing the rate of clopyralid improved giant ragweed control at nearly all evaluations and timings. Clopyralid plus glyphosate applied three times and twice totaling 0.28 lb/A plus 0.75 lb/A, respectively, controlled the most giant ragweed at harvest for each timing.

Clopyralid plus glyphosate applied once or multiple times to 6 inch giant ragweed could not improve sugarbeet yield and extractable sucrose. Clopyralid (totaling 0.28 lb/A) plus glyphosate (0.75 lb/A/application) applied two times to 1 inch giant ragweed and clopyralid (0.094 lb/A) plus glyphosate (0.75 lb/A) applied two and three times to 3 inch giant ragweed maximized sugarbeet yield and extractable sucrose.

Experiment continued on next page.

Table. Giant ragweed control in Roundup Ready® sugarbeet, SW Hutchinson, MN (Fisher, Stachler, and Luecke).

Treatment*	Rate (lb ae/A)	Timing	21 DAT	21 DAT 9	Harvest		
			1,4,7			Root yield	Extr Sucr
				Girw cntl	%	Ton/A	lb/A
Untreated	-	-	0	0	0	0.0	0
Weed Free Check-1"	-	-	100	100	100	9.6	2132
Glyt-PM	0.75	1	34	8	5	0.0	0
Clpy + Glyt-PM	0.047 + 0.75	1	44	7	6	0.3	0
Clpy + Glyt-PM	0.094 + 0.75	1	48	25	19	0.1	0
Clpy + Glyt-PM	0.188 + 0.75	1	61	46	30	7.7	1884
Clpy + Glyt-PM	0.047 + 0.75	1,2	41	68	58	11.6	2614
Clpy + Glyt-PM	0.094 + 0.75	1,2	50	83	77	16.1	3425
Clpy + Glyt-PM	0.094 + 0.75	1					
Clpy + Glyt-PM	0.188 + 0.75	2	46	99	91	19.4	4389
Clpy + Glyt-PM	0.047 + 0.75	1,2					
Clpy + Glyt-PM	0.094 + 0.75	3	43	90	92	15.1	3234
Clpy + Glyt-PM	0.094 + 0.75	1,2,3	45	99	99	16.1	3531
Weed-Free Check-3"	-	-	100	100	100	11.4	2704
Glyt-PM	0.75	4	44	33	26	0.5	0
Clpy + Glyt-PM	0.047 + 0.75	4	49	47	35	0.6	-
Clpy + Glyt-PM	0.094 + 0.75	4	-	-	-	-	-
Clpy + Glyt-PM	0.188 + 0.75	4	66	76	66	10.5	2309
Clpy + Glyt-PM	0.047 + 0.75	4,5	49	80	76	10.3	2143
Clpy + Glyt-PM	0.094 + 0.75	4,5	58	87	80	18.0	3893
Clpy + Glyt-PM	0.094 + 0.75	4					
Clpy + Glyt-PM	0.188 + 0.75	5	57	94	90	13.7	2920
Clpy + Glyt-PM	0.047 + 0.75	4,5					
Clpy + Glyt-PM	0.094 + 0.75	6	57	98	99	13.3	2575
Clpy + Glyt-PM	0.094 + 0.75	4,5,6	68	100	100	17.0	3849
Glyt-PM	0.75	4,5	46	59	53	7.7	1615
Glyt-PM	0.75	4,5,6	49	71	67	7.9	1655
Weed-Free Check-6"	-	-	100	100	100	10.6	2567
Glyt-PM	0.75	7	34	23	20	0.0	0
Clpy + Glyt-PM	0.047 + 0.75	7	50	61	55	3.8	780
Clpy + Glyt-PM	0.094 + 0.75	7	55	74	66	2.4	1269
Clpy + Glyt-PM	0.188 + 0.75	7	65	82	78	4.3	1012
Clpy + Glyt-PM	0.047 + 0.75	7,8	48	80	80	2.5	777
Clpy + Glyt-PM	0.094 + 0.75	7,8	54	89	86	5.0	1288
Clpy + Glyt-PM	0.094 + 0.75	7					
Clpy + Glyt-PM	0.188 + 0.75	8	55	92	96	1.4	-
Clpy + Glyt-PM	0.047 + 0.75	7,8					
Clpy + Glyt-PM	0.094 + 0.75	9	44	85	96	3.1	2108
Clpy + Glyt-PM	0.094 + 0.75	7,8,9	55	89	96	4.2	972
CV (%)			9	7	7	45	46
LSD (0.05)			7	7	7	4.9	1196

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; Amstik added to all treatments at 2.5 qt/A.

Common ragweed control in Roundup Ready® sugarbeet, Mayville, ND, 2009 (Stachler and Luecke). 'Crystal 539RR' sugarbeet seed treated with 45 grams of Tachigaren per 100,000 seeds was seeded 1.25 inches deep in 22 inch rows May 7. Counter 15G insecticide at 12 pounds product per acre was applied modified in-furrow and drag chain incorporated at planting. Herbicide treatments were applied June 4, June 19, June 25, July 10, July 17, July 31 and August 6. All treatments were applied with a bicycle sprayer in 17 gpa water at 40 psi through 8002 nozzles to the center four rows of six row plots 25 feet in length. Ammonium sulfate as AmStik from West Central was included in all treatments at 2.5 qt/A. Sugarbeet injury, common ragweed, common lambsquarters, and redroot pigweed were evaluated 21 days after each application and at harvest. Only selected data is presented in the table below. Visual evaluations are an estimate of percent control in the treated plot area compared to the adjacent untreated strips and based upon a scale of 0 (no control) to 100% (complete control). Experiment designed as a randomized complete block having four replications.

Table. Application information

Application Code	1	2	3	4	5	6	7	8
Date of Application	June 4	June 19	June 25	June 25	July 10	July 17	July 31	Aug. 6
Time of Day	9:45 am	11:00 am	11:00 am	11:00 am	10:30 am	9:30 am	10:00 am	10:00 am
Air Temperature (°F)	70	73	76	76	65	58	65	69
Relative Humidity (%)	31	57	44	44	62	65	67	49
Soil Temp. (°F at 6")	54	65	70	70	68	60	67	65
Wind Velocity (mph)	11	3	8	8	4	7	4	2
Cloud Cover (%)	85	80	0	0	5	15	100	0
Soil Moisture	good	good	good	good	good	good	good	good
Sugarbeet (stage)	V2.0- V2.5	V7.0	V5.0- V10.3	V5.0- V10.3	V10	V12	V12- V18	V18
Redroot Pigweed (stage/height - range)	Cot.- 4lf/ 0.2-1"	4-6lf/ 0.5-2.5"	3-10lf/ 1-3.5"	-	-	-	-	-
Redroot Pigweed (avg. density)	-	1.1/ft ²	0.74/ft ²	-	-	-	-	-
C.Lambsquarters (stage/height - range)	Cot.-4 lf/ 0.2-1"	5-6 lf/ 1-3"	13-20 lf/ 3.2-14"	-	-	-	-	-
C.Lambsquarters (avg. density)	-	0.7/ft ²	1.0/ft ²	-	-	-	-	-
C. Ragweed (stage/height - range)	Cot.-2N/ 0.25- 1.5"	Cot.- 5.5N/ 0.75- 3.5"	Cot-9N/ 0.25-9"	-	-	-	-	-
C. Ragweed (avg. density)	2.5/ft ²	4.8/ft ²	4.9/ft ²	-	-	-	-	-

Summary: Increasing the rate of Clpy increased sugarbeet injury at all timings, especially at the V2 stage 21 days after the initial applications. Clpy applied at a total of 0.28 lb ae/A and applied three times caused the greatest sugarbeet injury on October 7 at all timings.

Glyt-PM ineffectively controlled common ragweed at all timings and number of applications at this location, although control improved as the number of applications increased. Glyphosate-resistant common ragweed biotypes exist in the population. Glyt-PM applied at 0.75 lb ae/A to 1 inch tall common ragweed maximized common ragweed control, but control declined with increasing plant height.

Clpy slowly controls common ragweed, especially as plant height increases. Clpy controlled more common ragweed when applied to 1 inch tall common ragweed compared to taller common ragweed at 21 days after initial applications. Clpy at ≥ 0.094 lb/A controlled common ragweed similarly when applied once to 1 and 3" tall common ragweed, but not to 6" tall common ragweed. Clpy applied two or three times to any size of common ragweed and totalling ≥ 0.188 lb/A maximized common ragweed control. The least sugarbeet injury and greatest common ragweed control was obtained when Clpy was applied twice at 0.047 lb/A/application to 1 inch common ragweed.

Clpy did not help nor hinder redroot pigweed control when mixed with glyphosate. Clpy at 0.094 and 0.188 lb/A plus Glyt-PM improved common lambsquarters control when applied once to < 3 inch tall common lambsquarters compared to Glyt-PM alone.

Experiment continued on next page.

Table. Control of common ragweed with rates, timing and number of clopyralid applications, Mayville, ND, 2009 (Stachler and Luecke).

Treatment*	Rate (lb ae/A)	Timing	21 DAT 1,2,3		Oct. 7			
			Sgbt	Cor	Sgbt	Rrpw	Colq	Cora
			Inju	cntl	inju	cntl	cntl	Cntl
			%					
Glyt-PM	0.75	1	0	71	0	61	52	31
Clpy + Glyt-PM	0.047 + 0.75	1	5	84	1	55	45	63
Clpy + Glyt-PM	0.094 + 0.75	1	13	92	2	62	66	90
Clpy + Glyt-PM	0.188 + 0.75	1	24	94	3	50	79	92
Clpy + Glyt-PM	0.047 + 0.75	1, 4	6	91	4	92	88	96
Clpy + Glyt-PM	0.094 + 0.75	1, 4	11	91	6	94	87	98
Clpy + Glyt-PM	0.094 + 0.75	1						
Clpy + Glyt-PM	0.188 + 0.75	4	12	92	12	86	88	99
Clpy + Glyt-PM	0.047 + 0.75	1, 4						
Clpy + Glyt-PM	0.094 + 0.75	6	5	86	10	100	99	100
Clpy + Glyt-PM	0.094 + 0.75	1, 4, 6	14	90	10	100	100	100
Glyt-PM	0.75	2	0	48	2	81	69	53
Clpy + Glyt-PM	0.047 + 0.75	2	1	56	1	63	83	79
Clpy + Glyt-PM	0.094 + 0.75	2	2	64	7	82	94	94
Clpy + Glyt-PM	0.188 + 0.75	2	4	72	8	80	90	98
Clpy + Glyt-PM	0.047 + 0.75	2, 5	0	50	5	100	96	93
Clpy + Glyt-PM	0.094 + 0.75	2, 5	1	59	8	98	97	100
Clpy + Glyt-PM	0.094 + 0.75	2						
Clpy + Glyt-PM	0.188 + 0.75	5	1	62	15	100	99	100
Clpy + Glyt-PM	0.047 + 0.75	2, 5						
Clpy + Glyt-PM	0.094 + 0.75	7	0	52	8	100	99	98
Clpy + Glyt-PM	0.094 + 0.75	2, 5, 7	3	60	15	100	100	100
Glyt-PM	0.75	2, 5	0	44	0	100	96	63
Glyt-PM	0.75	2, 5, 7	0	46	0	100	100	69
Glyt-PM	0.75	3	2	41	0	95	84	43
Clpy + Glyt-PM	0.047 + 0.75	3	5	55	3	90	84	70
Clpy + Glyt-PM	0.094 + 0.75	3	7	48	5	96	80	74
Clpy + Glyt-PM	0.188 + 0.75	3	9	59	9	89	83	88
Clpy + Glyt-PM	0.047 + 0.75	3, 6	6	58	6	96	100	92
Clpy + Glyt-PM	0.094 + 0.75	3, 6	4	55	8	100	98	98
Clpy + Glyt-PM	0.094 + 0.75	3						
Clpy + Glyt-PM	0.188 + 0.75	6	4	54	14	100	100	99
Clpy + Glyt-PM	0.047 + 0.75	3, 6						
Clpy + Glyt-PM	0.094 + 0.75	8	8	54	13	100	94	98
Clpy + Glyt-PM	0.094 + 0.75	3, 6, 8	6	60	17	100	100	100
CV (%)			41	8	56	14	12	6
LSD (0.05)			3	6.9	5	17.3	14.8	6.9

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; Amstik added to all treatments at 2.5 qt/A.

Control of Roundup Ready® canola in Roundup Ready sugarbeet, Prosper, ND, 2009. (Stachler and Luecke). 'Dekalb IS3057' Roundup Ready canola at 11 pounds per acre was seeded in 7.5 inch rows perpendicular to herbicide plots. 'SES 36711' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 27. Sugarbeet seed was treated with Tachigaren at 45 grams dry product per 100,000 seeds. Counter 15G insecticide at 12 pounds product per acre was applied modified in-furrow at planting. Herbicide treatments were applied June 15, June 23, June 25 and July 2. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles with a bicycle sprayer to the center four rows of six row plots 30 feet in length. Glyphosate (0.75 lb ae/A) plus AmStik (2.5 qt/A) was applied to the weed-free check as necessary. Glyphosate (1.0 lb ae/A) plus AmStik was applied on July 21 to all treatments except for the untreated treatment to control other weeds. All evaluations are a visual estimate of percent fresh weight reduction in the treated plot compared to the adjacent untreated strip. Sugarbeet from the center two rows of each plot was counted and harvested October 12. Experiment designed as a randomized complete block having four replications.

Table. Application information.

Application Code	1	2	3	4
Date of Application	June 15	June 23	June 25	July 2
Time of Day	9:00 am	4:30 pm	3:45 pm	11:15 am
Air Temperature (°F)	74	81	85	81
Relative Humidity (%)	50	47	28	57
Soil Temp. (°F at 6")	64	75	78	62
Wind Velocity (mph)	7	11	8	2
Cloud Cover (%)	100	0	0	0
Soil Moisture	good	good	good	Wet
Sugarbeet (stage – range)	Cot.-V2	V2.0-V8.3	V2.0-V7.8	V4.2-V11.5
RR Canola (stage/height - range)	Cot.-2.5 lf/ 0.25-2.25" tall	3-5.5 lf/ 2-6" tall	-	-
RR Canola (avg. density)	11/row foot	12/row foot	-	-

Summary: Herbicide treatments applied twice and containing De&Ph plus Etho usually caused the greatest sugarbeet injury. No appreciable injury was observed after July 18.

Glyt-PM alone did not control Roundup Ready canola as expected. Treatments containing De&Ph plus Etho seldomly improved Roundup Ready canola control whether applied once or twice compared to treatments with Tfsu alone. Multiple herbicide applications improved Roundup Ready canola control compared to a single application. Tfsu applied at least at a total of 0.047 lb ai/A plus Glyt-PM to 2-leaf canola maximized control. Tfsu applied first at 0.031 lb/A and followed with at least 0.016 lb/A to 5-leaf canola maximized control for that timing, although control was reduced compared to the 2-leaf stage.

Roundup Ready canola at 11 to 12 plants per foot of row caused a near complete loss of sugarbeet plant population, root yield, and extractable sucrose in the untreated treatment. Sugarbeet root yield and extractable sucrose were similar whether Glyt-PM was applied alone or not at all, indicating the Roundup Ready canola caused nearly all of the yield loss compared to other weeds. Sugarbeet yield and extractable sucrose declined as Roundup Ready canola grew beyond the 2-leaf stage based upon the weed-free checks. Only Tfsu applied at 0.31 lb/A with Glyt-PM at the 2-leaf canola stage and followed by Tfsu at least at 0.016 lb/A plus Glyt-PM 10 days later provided similar root yield and extractable sucrose compared to the 2-leaf weed-free check. Nearly all herbicide treatments applied to 5-leaf canola reduced sugarbeet plant population, root yield, and extractable sucrose compared to treatments applied to 2-leaf canola. No herbicide treatment applied to 5-leaf canola compared to the weed-free check at the 5-leaf stage for sugarbeet plant population, root yield, and extractable sucrose.

Experiment continued on next page.

**Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Prosper, ND, 2009
(Stachler and Luecke).**

Treatment*	Rate (lb ae or ai/A)	Timing	July 18		July 29	Sept. 21
			Sgbt inju	RR-Cano		
				%		
Weed-Free Check	-	1,3	0	100	100	100
Glyt-PM	0.75	1	0	0	0	1
Tfsu+Glyt-PM	0.008+0.75	1	0	20	10	13
Tfsu+Glyt-PM	0.016+0.75	1	3	39	24	18
Tfsu+Glyt-PM	0.031+0.75	1	0	55	48	37
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	2	25	0	20
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	5	39	29	29
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	5	61	43	43
Tfsu+Glyt-PM	0.008+0.75	1,3	5	67	61	57
Tfsu+Glyt-PM	0.016+0.75	1,3	8	78	74	64
Tfsu+Glyt-PM	0.016+0.75	1				
Tfsu+Glyt-PM	0.031+0.75	3	2	80	80	69
Tfsu+Glyt-PM	0.031+0.75	1				
Tfsu+Glyt-PM	0.016+0.75	3	3	87	87	73
Tfsu+Glyt-PM	0.031+0.75	1,3	4	87	89	71
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	8	77	81	68
Weed-Free Check	-	2,4	0	100	100	100
Glyt-PM	0.75	2	0	0	0	1
Tfsu+Glyt-PM	0.008+0.75	2	2	29	20	19
Tfsu+Glyt-PM	0.016+0.75	2	3	41	24	18
Tfsu+Glyt-PM	0.031+0.75	2	3	53	26	24
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	4	21	10	19
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	8	38	21	25
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	5	42	26	24
Tfsu+Glyt-PM	0.008+0.75	2,4	2	58	36	34
Tfsu+Glyt-PM	0.016+0.75	2,4	2	73	55	37
Tfsu+Glyt-PM	0.016+0.75	2				
Tfsu+Glyt-PM	0.031+0.75	4	3	72	63	39
Tfsu+Glyt-PM	0.031+0.75	2				
Tfsu+Glyt-PM	0.016+0.75	4	1	75	64	43
Tfsu+Glyt-PM	0.031+0.75	2,4	5	79	74	48
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	16	73	61	47
Untreated Check	0	-	0	0	0	0
CV (%)			105	9	14	14
LSD (0.05)			4.8	7.2	9	7.6

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer.

Experiment continued on next page.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Prosper, ND, 2009
(Stachler and Luecke).

Treatment*	Rate (lb ae or ai/A)	Timing	Oct. 12			
			Sgbt Popl. #/60'	Root Yield ton/A	Impur Index %	Extr Sucr lb/A
Weed-Free Check	-	1,3	91	29.0	483	8571
Glyt-PM	0.75	1	10	2.2	489	601
Tfsu+Glyt-PM	0.008+0.75	1	56	9.0	532	2467
Tfsu+Glyt-PM	0.016+0.75	1	74	13.0	515	3613
Tfsu+Glyt-PM	0.031+0.75	1	86	16.5	419	4933
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	71	13.3	520	3637
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	88	16.3	447	4658
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	79	18.1	513	5066
Tfsu+Glyt-PM	0.008+0.75	1,3	86	22.9	463	6660
Tfsu+Glyt-PM	0.016+0.75	1,3	92	23.6	398	7101
Tfsu+Glyt-PM	0.016+0.75	1				
Tfsu+Glyt-PM	0.031+0.75	3	96	24.8	415	7461
Tfsu+Glyt-PM	0.031+0.75	1				
Tfsu+Glyt-PM	0.016+0.75	3	88	26.4	428	7897
Tfsu+Glyt-PM	0.031+0.75	1,3	88	26.7	431	7984
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	96	24.1	416	7300
Weed-Free Check	-	2,4	85	24.3	416	7308
Glyt-PM	0.75	2	30	3.1	518	855
Tfsu+Glyt-PM	0.008+0.75	2	39	5.9	530	1575
Tfsu+Glyt-PM	0.016+0.75	2	51	8.1	494	2308
Tfsu+Glyt-PM	0.031+0.75	2	48	7.0	455	1976
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	52	6.5	459	1827
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	69	10.6	545	2888
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	55	8.1	423	2397
Tfsu+Glyt-PM	0.008+0.75	2,4	52	7.9	508	2198
Tfsu+Glyt-PM	0.016+0.75	2,4	51	9.7	442	2778
Tfsu+Glyt-PM	0.016+0.75	2				
Tfsu+Glyt-PM	0.031+0.75	4	53	7.0	431	2026
Tfsu+Glyt-PM	0.031+0.75	2				
Tfsu+Glyt-PM	0.016+0.75	4	55	8.8	434	2503
Tfsu+Glyt-PM	0.031+0.75	2,4	62	12.7	406	3775
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	61	9.5	415	2742
Untreated Check	0	-	13	2	452	548
CV (%)			16	17	14	17
LSD (0.05)			14.5	3.2	91	954

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer.

Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009. (Stachler and Luecke). 'Dekalb IS3057' Roundup Ready canola at 11 pounds per acre was seeded in 7.5 inch rows perpendicular to herbicide plots. 'SES 36711' sugarbeet was seeded 1.25 inches deep in 22 inch rows May 27. Sugarbeet seed was treated with Tachigaren at 45 grams dry product per 100,000 seeds. Counter 15G insecticide at 12 pounds product per acre was applied modified in-furrow at planting. Herbicide treatments were applied June 23, June 29, July 2, and July 8. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles with a bicycle sprayer to the center four rows of six row plots 30 feet in length. Glyphosate (0.75 lb ae/A) plus AmStik (2.5 qt/A) was applied to the weed-free check as necessary. Glyphosate (1.0 lb ae/A) plus AmStik was applied on July 21 to all treatments except for the untreated treatment to control other weeds. All evaluations are a visual estimate of percent fresh weight reduction in the treated plot compared to the adjacent untreated strip. Sugarbeet from the center two rows of each plot was counted and harvested September 29. Experiment designed as a randomized complete block having four replications.

Table. Application information.

Application Code	1	2	3	4
Date of Application	June 23	June 29	July 2	July 8
Time of Day	9:00 am	1:15 pm	9:00 am	10:00 am
Air Temperature (°F)	80	66	69	73
Relative Humidity (%)	87	60	74	51
Soil Temp. (°F at 6")	61	64	62	70
Wind Velocity (mph)	2	4	1	7
Cloud Cover (%)	15	95	0	0
Soil Moisture	good	wet	good	good
Sugarbeet (stage – range)	Cot.-V2	V2.0-V4.1	V2.0-V5.2	V4.2-9.4
RR Canola (stage/height - range)	Cot.-2 lf/0.5-2" tall	2-4 lf/0.75-1.5" tall	-	-
RR Canola (avg. density)	11/row foot	11/row foot	-	-
Redroot Pigweed (stage/height - range)	Cot.-1lf/ 0.125-0.5" tall	Cot.-5 lf/ 0.125-1.5" tall	-	-
Redroot Pigweed (avg. density)	2/ft ²	11.2/ft ²	-	-
C.Lambsquarters (stage/height - range)	Cot.-2lf/ 0.125-0.5" tall	Cot.-7 lf/ 0.25-1.25" tall	-	-
C.Lambsquarters (avg. density)	0.5/ft ²	1/ft ²	-	-

Summary: Herbicide treatments containing De&Ph plus Etho and applied twice caused the greatest sugarbeet injury. No appreciable injury was observed after July 23.

Glyt-PM alone did not control Roundup Ready canola as expected. Tfsu at 0.008 and 0.31 lb ai/A plus De&Ph plus Etho applied once improved control of redroot pigweed and common lambsquarters compared to other single application treatments on July 19. Treatments containing De&Ph plus Etho rarely improved Roundup Ready canola control whether applied once or twice compared to treatments with Tfsu alone. Multiple herbicide applications improved Roundup Ready canola control compared to a single application. Tfsu applied at least at a total of 0.047 lb/A plus Glyt-PM to 2-leaf canola maximized control. Treatments applied to 2-leaf canola usually improved control compared to treatments applied to 3-leaf canola. Herbicide treatments more effectively controlled canola at this Glyndon, MN location compared to the Prosper, ND location due to smaller and herbicide-injured plants.

Roundup Ready canola at 11 plants per foot of row caused a near complete loss of sugarbeet plant population, root yield, and extractable sucrose in the untreated treatment. Sugarbeet root yield and extractable sucrose were similar whether Glyt-PM was applied alone or not at all, indicating the Roundup Ready canola caused nearly all of the yield loss compared to other weeds. Weed-free checks did not differ for root yield and extractable sucrose based upon time of removal. Tfsu applied alone multiple times beginning at the 2-leaf canola stage maximized root yield and extractable sucrose compared to starting at the 3-leaf stage, except for one treatment. Root yield and extractable sucrose was higher at this location than at the Prosper, ND location.

Experiment continued on next page.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009.
(Stachler and Luecke).

Treatment*	Rate (lb ae or ai/A)	Timing	July 19			
			Sgbt	RR-Cano	Rrpw	Colq
			inju	cntl		
			%			
Weed-Free Check	-	1,3	0	100	100	100
Glyt-PM	0.75	1	0	3	23	23
Tfsu+Glyt-PM	0.008+0.75	1	2	50	45	25
Tfsu+Glyt-PM	0.016+0.75	1	0	63	40	32
Tfsu+Glyt-PM	0.031+0.75	1	6	76	42	35
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	6	59	56	48
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	6	66	42	38
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	8	69	54	45
Tfsu+Glyt-PM	0.008+0.75	1,3	3	77	93	83
Tfsu+Glyt-PM	0.016+0.75	1,3	2	86	97	90
Tfsu+Glyt-PM	0.016+0.75	1				
Tfsu+Glyt-PM	0.031+0.75	3	5	90	98	96
Tfsu+Glyt-PM	0.031+0.75	1				
Tfsu+Glyt-PM	0.016+0.75	3	7	94	98	96
Tfsu+Glyt-PM	0.031+0.75	1,3	8	83	97	96
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	15	70	93	95
Weed-Free Check	-	2,4	-	-	-	-
Glyt-PM	0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.008+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.016+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.031+0.75	2	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.008+0.75	2,4	-	-	-	-
Tfsu+Glyt-PM	0.016+0.75	2,4	-	-	-	-
Tfsu+Glyt-PM	0.016+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.031+0.75	4	-	-	-	-
Tfsu+Glyt-PM	0.031+0.75	2	-	-	-	-
Tfsu+Glyt-PM	0.016+0.75	4	-	-	-	-
Tfsu+Glyt-PM	0.031+0.75	2,4	-	-	-	-
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	-	-	-	-
Untreated Check	0	-	0	0	0	0
CV (%)			82	17	21	17
LSD (0.05)			5.5	16	20	14.6

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer.

Experiment continued on next page.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009.
(Stachler and Luecke).

Treatment*	Rate (lb ae or ai/A)	Timing	July 23		Aug. 5	Sept. 28
			Sgbt inju	RR-Cano		
				%		
Weed-Free Check	-	1,3	0	100	100	100
Glyt-PM	0.75	1	0	0	0	0
Tfsu+Glyt-PM	0.008+0.75	1	2	39	20	12
Tfsu+Glyt-PM	0.016+0.75	1	2	59	30	40
Tfsu+Glyt-PM	0.031+0.75	1	5	70	49	54
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	4	48	26	19
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	7	60	36	40
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	7	62	45	44
Tfsu+Glyt-PM	0.008+0.75	1,3	2	65	55	73
Tfsu+Glyt-PM	0.016+0.75	1,3	2	85	84	90
Tfsu+Glyt-PM	0.016+0.75	1				
Tfsu+Glyt-PM	0.031+0.75	3	2	88	89	96
Tfsu+Glyt-PM	0.031+0.75	1				
Tfsu+Glyt-PM	0.016+0.75	3	3	92	93	94
Tfsu+Glyt-PM	0.031+0.75	1,3	5	94	94	92
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	11	84	80	87
Weed-Free Check	-	2,4	0	100	100	100
Glyt-PM	0.75	2	0	0	0	0
Tfsu+Glyt-PM	0.008+0.75	2	1	39	22	28
Tfsu+Glyt-PM	0.016+0.75	2	7	53	33	27
Tfsu+Glyt-PM	0.031+0.75	2	1	70	46	56
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	1	35	22	34
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	5	46	34	51
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	5	50	39	53
Tfsu+Glyt-PM	0.008+0.75	2,4	3	72	54	73
Tfsu+Glyt-PM	0.016+0.75	2,4	5	79	62	74
Tfsu+Glyt-PM	0.016+0.75	2				
Tfsu+Glyt-PM	0.031+0.75	4	7	80	63	68
Tfsu+Glyt-PM	0.031+0.75	2				
Tfsu+Glyt-PM	0.016+0.75	4	5	84	71	75
Tfsu+Glyt-PM	0.031+0.75	2,4	5	84	71	71
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	11	77	62	78
Untreated Check	0	-	0	0	0	0
CV (%)			76	7	11	16
LSD (0.05)			4	5.8	8	12.6

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer.

Experiment continued on next page.

Table. Control of Roundup Ready® canola in Roundup Ready sugarbeet, Glyndon, MN, 2009.
(Stachler and Luecke).

Treatment*	Rate (lb ae or ai/A)	Timing	Sept. 29			
			Sgbt Popl. #/60'	Root Yield ton/A	Impur Index %	Extr Sucr lb/A
Weed-Free Check	-	1,3	78	23.6	656	6413
Glyt-PM	0.75	1	31	2.6	1112	526
Tfsu+Glyt-PM	0.008+0.75	1	80	9.7	749	2418
Tfsu+Glyt-PM	0.016+0.75	1	76	17.6	741	4584
Tfsu+Glyt-PM	0.031+0.75	1	73	18.9	907	4392
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	1	83	12.7	654	3314
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1	76	16.0	795	3911
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	1	72	18.2	764	4486
Tfsu+Glyt-PM	0.008+0.75	1,3	86	23.8	735	6055
Tfsu+Glyt-PM	0.016+0.75	1,3	92	23.9	678	6510
Tfsu+Glyt-PM	0.016+0.75	1				
Tfsu+Glyt-PM	0.031+0.75	3	87	23.8	750	6019
Tfsu+Glyt-PM	0.031+0.75	1				
Tfsu+Glyt-PM	0.016+0.75	3	88	25.9	730	6691
Tfsu+Glyt-PM	0.031+0.75	1,3	85	25.0	674	6654
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	1,3	90	22.1	601	6120
Weed-Free Check	-	2,4	85	24.0	694	6299
Glyt-PM	0.75	2	28	3.0	974	626
Tfsu+Glyt-PM	0.008+0.75	2	70	10.1	755	2527
Tfsu+Glyt-PM	0.016+0.75	2	68	11.4	678	2918
Tfsu+Glyt-PM	0.031+0.75	2	82	20.1	651	5481
Tfsu+De&Ph+Etho+Glyt-PM	0.008+0.22+0.11+0.75	2	76	10.9	796	2649
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2	78	15.4	810	3709
Tfsu+De&Ph+Etho+Glyt-PM	0.031+0.22+0.11+0.75	2	86	17.4	664	4706
Tfsu+Glyt-PM	0.008+0.75	2,4	87	20.2	693	5302
Tfsu+Glyt-PM	0.016+0.75	2,4	86	21.7	791	5434
Tfsu+Glyt-PM	0.016+0.75	2				
Tfsu+Glyt-PM	0.031+0.75	4	85	19.7	638	5392
Tfsu+Glyt-PM	0.031+0.75	2				
Tfsu+Glyt-PM	0.016+0.75	4	92	23.2	648	6451
Tfsu+Glyt-PM	0.031+0.75	2,4	84	20.5	643	5678
Tfsu+De&Ph+Etho+Glyt-PM	0.016+0.22+0.11+0.75	2,4	87	22.1	604	6271
Untreated Check	0	-	26	1.3	1058	276
CV (%)			11	13	16	13
LSD (0.05)			12	3.2	166	825

*Destiny HC (high surfactant oil [MSO] concentrate) at 1%v/v from Winfield Solutions and AmStik (AMS) at 2.5 qt/A from West Central was added to all treatments. Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; De&Ph = Betamix from Bayer; Etho = Nortron from Bayer.

Wild buckwheat control in Roundup Ready® sugarbeet, Foxhome, MN, 2009. (Stachler and Luecke). 'Hilleshog 4022' sugarbeet was seeded on May 10 in 22 inch rows in a grower cooperated field. Herbicide treatment and timing were arranged in a factorial design with four replications. Herbicide treatments were initially applied June 3 and June 11 to 1 and 3 inch wild buckwheat, respectively. All herbicide treatments were applied again at the same rate, except the initial glyphosate treatment at 1.125 lb ae/A on June 26. All treatments were applied in 17 gpa water at 40 psi through 8002 nozzles with a bicycle sprayer to the center four rows of six row plots 25 feet in length. The entire experiment was treated with Select Max (14 fl oz/A) + MSO (1.5% v/v) June 3 to control quackgrass. Sugarbeet injury could not be evaluated due to excessive moisture. Wild buckwheat and ladysthumb were evaluated on June 26 and July 18 and annual grass evaluated July 18. All evaluations are a visual estimate of percent fresh weight reduction in the treated plot compared to the adjacent untreated strip.

Table. Application information.

Application Code	1	2	3
Date of Application	June 3	June 11	June 26
Time of Day	12:00 pm	9:30 am	12:50 pm
Air Temperature (°F)	66	63	80
Relative Humidity (%)	25	51	46
Soil Temp. (°F at 6")	56	56	72
Wind Velocity (mph)	3	5	8
Cloud Cover (%)	30	0	5
Soil Moisture	good	good	wet
Sugarbeet	V 1.5-3.0	V 2.0-4.5	V 4.0-12.5
Wild Buckwheat (stage/height - range)	Cot.-3.5lf/0.5-1.75"	2-7 leaf/1-5"	-
Wild Buckwheat (avg. density)	5.7/ft ²	6/ft ²	-
Ladysthumb (stage/height - range)	Cot.-3.5lf/0.25-1.25"	2-6 leaf/2-5"	-
Ladysthumb (avg. density)	8.7/ft ²	10/ft ²	-
Redroot Pigweed (stage/height - range)	Cot.-4lf/0.2-0.75"	1-5 leaf/0.25-1"	-
Redroot Pigweed (avg. density)	2/ft ²	1.3/ft ²	-

Experiment continued on next page.

Table. Wild buckwheat control in Roundup Ready® sugarbeet, Foxhome, MN, 2009 (Stachler & Luecke) – Single application.

Factors	Rate (lb/A)	June 26		
		Wibw	Lath cntl	Rrpw
		%		
Timing				
1 inch wild buckwheat	-	90	90	87
3 inches wild buckwheat	-	89	91	91
LSD (0.05)		NS	NS	3
Herbicide treatment*				
Glyt-PM+DestinyHC	0.75+1%	83	84	80
Glyt-PM+Tfsu+DestinyHC	0.75+0.008+1%	83	91	85
Glyt-PM+Tfsu+DestinyHC	0.75+0.016+1%	84	90	93
Glyt-PM+Tfsu+DestinyHC	0.75+0.031+1%	85	90	93
Glyt-PM+Clpy+DestinyHC	0.75+0.047+1%	90	87	88
Glyt-PM+Clpy+DestinyHC	0.75+0.094+1%	94	89	83
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.008+0.047+1%	88	90	81
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.016+0.047+1%	89	90	91
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.031+0.047+1%	92	93	94
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.008+0.094+1%	93	92	93
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.016+0.094+1%	93	92	93
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.031+0.094+1%	95	94	94
Glyt-PM	1.125	96	94	84
LSD (0.05)		5	5	7.7

*Amstik (AMS) from West Central was included in all treatments at 2.5 qt/A; Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; Clpy = Stinger from Dow AgroSciences; Destiny HC is a high surfactant oil (MSO) concentrate from Winfield Solutions.

Experiment continued on next page.

Table. Wild buckwheat control in Roundup Ready® sugarbeet, Foxhome, MN, 2009 (Stachler & Luecke) – Two applications.

Factors	Rate (lb/A)	July 18			
		Wibw	Lath	Rrpw	Ann.Grs
		cntl %			
Timing					
1 inch wild buckwheat	-	90.6	88	53	24
3 inches wild buckwheat	-	93.2	93	58	25
LSD (0.05)		2	2	NS	NS
Herbicide treatment*					
Glyt-PM+DestinyHC	0.75+1%	84	82	0	0
Glyt-PM+Tfsu+DestinyHC	0.75+0.008+1%	83	92	45	10
Glyt-PM+Tfsu+DestinyHC	0.75+0.016+1%	87	89	82	40
Glyt-PM+Tfsu+DestinyHC	0.75+0.031+1%	86	91	87	48
Glyt-PM+Clpy+DestinyHC	0.75+0.047+1%	93	84	0	3
Glyt-PM+Clpy+DestinyHC	0.75+0.094+1%	97	87	0	3
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.008+0.047+1%	90	91	50	15
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.016+0.047+1%	95	92	78	33
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.031+0.047+1%	94	93	93	48
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.008+0.094+1%	97	90	71	16
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.016+0.094+1%	97	93	89	36
Glyt-PM+Tfsu+Clpy+DestinyHC	0.75+0.031+0.094+1%	98	94	93	48
Glyt-PM (app. 1&2)	1.125				
Glyt-PM (app. 3)	0.75	94	95	0	0
LSD (0.05)		5	4.7	11	13

*Amstik (AMS) from West Central was included in all treatments at 2.5 qt/A; Glyt-PM = Roundup PowerMAX from Monsanto; Tfsu = UpBeet from DuPont; Clpy = Stinger from Dow AgroSciences; Destiny HC is a high surfactant oil (MSO) concentrate from Winfield Solutions.

Summary: Sugarbeet injury was observed, but excessive rainfall prevented accurate evaluation. Mixtures with three herbicides seemed to increase injury.

No interaction was observed with any variable, therefore each factor is combined over the other for each evaluation period. After the initial applications, only redroot pigweed control was affected by herbicide timing. This difference is likely due to a longer period of time for pigweed to emerge after the 1 inch timing. After the sequential application, wild buckwheat and ladysthumb control was improved when plants were initially 3 inches in height.

Clopyralid and clopyralid plus triflurosulfuron mixed with glyphosate (0.75 lb ae/A) improved wild buckwheat control compared to glyphosate (0.75 lb/A) alone at both evaluations. The higher clopyralid rate tended to improve control. Triflurosulfuron, clopyralid (0.094 lb ae/A), and triflurosulfuron plus clopyralid mixed with glyphosate (0.75 lb/A) improved ladysthumb control compared to glyphosate (0.75 lb/A) alone at both evaluations. Glyphosate at 1.125 lb/A and followed by glyphosate at 0.75 lb/A improved wild buckwheat and ladysthumb control compared to glyphosate at 0.75 lb/A and followed by glyphosate at 0.75 lb/A. The difference is likely due to the increased glyphosate rate, but may also be due to antagonism with Destiny HC. Triflurosulfuron (≥ 0.016 lb ai/A) and triflurosulfuron (≥ 0.016 lb/A) plus clopyralid mixed with glyphosate (0.75 lb/A) improved redroot pigweed control compared to glyphosate alone, except for triflurosulfuron (0.016 lb/A) plus clopyralid (0.047 lb/A) mixed with glyphosate after the sequential application. Redroot pigweed was evaluated for knockdown and residual control on June 26 and for residual control only on July 18. Triflurosulfuron (≥ 0.016 lb ai/A) improved residual annual grass control compared to glyphosate alone and glyphosate plus clopyralid on July 18.