COMMON RAGWEED CONTROL IN ROUNDUP READY® SUGARBEET, MAYVILLE, NORTH DAKOTA - 2010.

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Introduction

Glyphosate-resistant common ragweed continues to increase in Minnesota and North Dakota. Proper management in Roundup Ready sugarbeet is necessary to control this resistant biotype.

Materials and Methods

'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 12. 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 16, June 23, June 25, July 7, July 15, July 28 and August 4. All treatments were applied with a bicycle sprayer in 17 gpa water at 40 psi through XR8002 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 2.5qt/A. Sugarbeet injury and common ragweed, common lambsquarters and pigweed control were evaluated 21 days after each application and at harvest. Pigweed species was 60% redroot pigweed and the other 40% a mixture of tumble pigweed and prostrate pigweed. 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. Sugarbeet from the center two rows of 25 foot long plots was counted and harvested September 13.

Table 1. Application information

Application Code	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Date of Application	June 4	June 16	June 23	June 25	July 7	July 15	July 28	Aug. 4
Time of Day	12:45 pm	3:00 pm	1:00 pm	11:00 am	9:45 am	10:00 am	10:45 am	10:00 am
Air Temperature (^{o}F)	73	78	72	76	68	71	73	75
Relative Humidity (%)	32	57	58	76	79	61	80	77
Soil Temp. (^{o}F at 6")	59	66	66	62	64	57	59	66
Wind Velocity (mph)	14	8	11	3	2	6	5	4
Cloud Cover (%)	5	50	95	95	100	0	0	0
Soil Moisture	good	good	good	good	fair	good	good	fair
Sugarbeet (stage)	V2.0-V5.0	V7.0-V9.0	V6.0-V12.5	V6.0-V13.5	V6-V17	---	---	---
C. Ragweed (stage/height - range)	Cot.-4N/ 0.75-1.0"	Cot.- 6N/0.5-8"	1-14N/ 0.5-15"	---	---	---	---	---
C. Ragweed (avg. density)	214/M^2	246/M^2	216/M^2	---	---	---	---	---
Pigweed (stage/height - range)	Cot.- 8lf/ 0.125-1.5"	2-14lf/ 0.25-7"	2-21lf/ 0.25-12"	---	---	---	---	---
Pigweed (avg. density)	94/M^2	53/M^2	22/M^2	---	---	---	---	---
C.Lambsquarters (stage/height - range)	Cot.-9 lf/ 0.25-2.5"	Cot.-20 lf/0.25-13"	2-27 lf/ 0.5-15"	---	---	---	---	---
C.Lambsquarters (avg. density)	52/M^2	108/M^2	87/M^2	---	---	---	---	---

Summary

See last page of report.

Table 2. Common ragweed control in Roundup Ready® sugarbeet, Mayville, ND, 2010. (Fisher, Luecke, and Stachler)

			21 DAT 1, 2, 3			
			Sgbt	Corw	Colq	Pigw
Treatment*	Rate	Timing	Inju	Cntl	Cntl	Cntl
	(lb ae/A)		---------- % ----------			
Untreated Check	0	---	0	0	0	0
Weed Free Check – 1”	0	1	0	100	100	100
Glyt-PM + AMS	0.75	1	0	63	92	94
Clpy + Glyt-PM + AMS	0.047 + 0.75	1	4	82	94	96
Clpy + Glyt-PM + AMS	0.094 + 0.75	1	14	90	93	96
Clpy + Glyt-PM + AMS	0.188 + 0.75	1	28	95	95	96
Clpy + Glyt-PM + AMS	0.047 + 0.75	1, 4	7	85	96	97
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4	14	88	95	94
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	1 4	14	88	95	95
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	1, 4 6	4	81	95	96
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4, 6	13	88	96	93
Weed Free Check – 3”	0	2	0	100	100	100
Glyt-PM + AMS	0.75	2	0	64	95	95
Clpy + Glyt-PM + AMS	0.047 + 0.75	2	1	71	91	97
Clpy + Glyt-PM + AMS	0.094 + 0.75	2	4	77	97	97
Clpy + Glyt-PM + AMS	0.188 + 0.75	2	9	83	94	94
Clpy + Glyt-PM + AMS	0.047 + 0.75	2, 5	3	71	94	97
Clpy + Glyt-PM + AMS	0.094 + 0.75	2, 5	5	72	96	98
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	2 5	5	77	94	95
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	2, 5 7	2	72	95	97
Clpy + Glyt-PM+ AMS	0.094 + 0.75	2, 5, 7	8	77	95	94
Glyt-PM+ AMS	0.75	2, 5	0	60	93	94
Glyt-PM + AMS	0.75	2, 5, 7	0	66	89	91
Weed Free Check – 6”	0	3	3	99	100	100
Glyt-PM + AMS	0.75	3	0	35	98	100
Clpy + Glyt-PM + AMS	0.047 + 0.75	3	3	50	92	99
Clpy + Glyt-PM + AMS	0.094 + 0.75	3	3	51	98	100
Clpy + Glyt-PM + AMS	0.188 + 0.75	3	9	68	93	100
Clpy + Glyt-PM + AMS	0.047 + 0.75	3, 6	3	50	99	100
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6	5	58	98	100
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	3 6	4	54	95	100
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	3, 6 8	2	50	98	100
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6, 8	5	55	97	100
LSD (0.05)			3	5	5	5

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; AMS = AmStik from West Central at 2.5qt/A.

Table 2b. Common ragweed control in Roundup Ready® sugarbeet, Mayville, ND, 2010. (Fisher, Luecke, and Stachler) (continued)**.**

			August 25			
			Sgbt	Corw	Colq	Pigw
Treatment*	Rate	Timing	Inju	Cntl	Cntl	Cntl
	(lb ae/A)		---------- % ----------			
Untreated Check	0	---	0	0	0	0
Weed Free Check – 1”	0	1	0	100	100	100
Glyt-PM + AMS	0.75	1	0	16	34	61
Clpy + Glyt-PM + AMS	0.047 + 0.75	1	0	59	29	36
Clpy + Glyt-PM + AMS	0.094 + 0.75	1	2	76	21	33
Clpy + Glyt-PM + AMS	0.188 + 0.75	1	4	97	53	35
Clpy + Glyt-PM + AMS	0.047 + 0.75	1, 4	4	95	94	94
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4	9	99	99	96
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	1 4	16	100	96	93
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	1, 4 6	7	98	98	99
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4, 6	14	100	100	99
Weed Free Check – 3 “	0	2	0	100	100	100
Glyt-PM + AMS	0.75	2	0	31	71	79
Clpy + Glyt-PM + AMS	0.047 + 0.75	2	0	55	58	73
Clpy + Glyt-PM + AMS	0.094 + 0.75	2	2	69	64	60
Clpy + Glyt-PM + AMS	0.188 + 0.75	2	6	86	80	56
Clpy + Glyt-PM + AMS	0.047 + 0.75	2, 5	4	88	99	99
Clpy + Glyt-PM + AMS	0.094 + 0.75	2, 5	6	96	99	96
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	2 5	9	98	100	95
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	2, 5 7	15	96	100	100
Clpy + Glyt-PM+ AMS	0.094 + 0.75	2, 5, 7	17	99	100	100
Glyt-PM+ AMS	0.75	2, 5	0	46	100	99
Glyt-PM + AMS	0.75	2, 5, 7	0	63	100	100
Weed Free Check – 6”	0	3	0	100	100	100
Glyt-PM + AMS	0.75	3	0	23	99	99
Clpy + Glyt-PM + AMS	0.047 + 0.75	3	0	44	75	90
Clpy + Glyt-PM + AMS	0.094 + 0.75	3	2	55	88	96
Clpy + Glyt-PM + AMS	0.188 + 0.75	3	4	73	75	83
Clpy + Glyt-PM + AMS	0.047 + 0.75	3, 6	3	74	100	100
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6	7	87	98	88
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	3 6	13	91	100	99
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	3, 6 8	11	82	100	100
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6, 8	18	92	100	100
LSD (0.05)			3	6	15	15

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; AMS = AmStik from West Central at 2.5qt/A.

Table 2c. Common ragweed control in Roundup Ready® sugarbeet, Mayville, ND, 2010. (Fisher, Luecke, and Stachler) (continued)**.**

			September 13			
			Sgbt	Corw	Colq	Pigw
Treatment*	Rate	Timing	Inju	Cntl	Cntl	Cntl
	(lb ae/A)		---------- % ----------			
Untreated Check	0	---	0	0	0	0
Weed Free Check – 1”	0	1	0	100	100	100
Glyt-PM + AMS	0.75	1	0	15	49	73
Clpy + Glyt-PM + AMS	0.047 + 0.75	1	1	53	35	40
Clpy + Glyt-PM + AMS	0.094 + 0.75	1	0	82	28	40
Clpy + Glyt-PM + AMS	0.188 + 0.75	1	0	96	48	45
Clpy + Glyt-PM + AMS	0.047 + 0.75	1, 4	1	91	94	90
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4	3	98	98	97
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	1 4	8	99	96	97
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	1, 4 6	6	99	98	98
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4, 6	12	100	100	100
Weed Free Check – 3”	0	2	0	100	100	100
Glyt-PM + AMS	0.75	2	0	30	76	84
Clpy + Glyt-PM + AMS	0.047 + 0.75	2	0	51	50	63
Clpy + Glyt-PM + AMS	0.094 + 0.75	2	1	67	66	60
Clpy + Glyt-PM + AMS	0.188 + 0.75	2	2	89	79	58
Clpy + Glyt-PM + AMS	0.047 + 0.75	2, 5	1	86	98	97
Clpy + Glyt-PM + AMS	0.094 + 0.75	2, 5	5	99	98	96
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	2 5	9	99	97	94
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	2, 5 7	9	99	99	99
Clpy + Glyt-PM+ AMS	0.094 + 0.75	2, 5, 7	15	100	99	99
Glyt-PM+ AMS	0.75	2, 5	0	46	98	98
Glyt-PM + AMS	0.75	2, 5, 7	0	62	100	100
Weed Free Check – 6”	0	3	0	100	100	100
Glyt-PM + AMS	0.75	3	0	25	96	96
Clpy + Glyt-PM + AMS	0.047 + 0.75	3	0	45	74	88
Clpy + Glyt-PM + AMS	0.094 + 0.75	3	0	52	77	93
Clpy + Glyt-PM + AMS	0.188 + 0.75	3	3	75	71	83
Clpy + Glyt-PM + AMS	0.047 + 0.75	3, 6	2	76	98	97
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6	5	85	97	88
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.094 + 0.75 0.188 + 0.75	3 6	5	95	99	97
Clpy + Glyt-PM + AMS Clpy + Glyt-PM + AMS	0.047 + 0.75 0.094 + 0.75	3, 6 8	11	87	100	100
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6, 8	12	97	99	99
LSD (0.05)			2	7	16	14

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; AMS = AmStik from West Central at 2.5qt/A.

Table 2d. Common ragweed control in Roundup Ready® sugarbeet, Mayville, ND, 2010. (Fisher, Luecke, and Stachler) (continued)**.**

			September 13				
Treatment*	Rate	Timing	Sgbt Popl	Root Yield	Impurity Index	Sucrose	Extract Sucrose
	(lb ae/A)		(plts/60ft)	(ton/A)		(%)	(lb/A)
Untreated Check	0	---	0	0	---	---	0
Weed Free Check – 1”	0	1	96	11.9	616	14.2	3049
Glyt-PM + AMS	0.75	1	31	2.1	817	13.0	478
Clpy + Glyt-PM + AMS	0.047 + 0.75	1	79	7.3	757	12.9	1748
Clpy + Glyt-PM + AMS	0.094 + 0.75	1	79	8.2	762	13.2	1986
Clpy + Glyt-PM + AMS	0.188 + 0.75	1	79	7.6	719	13.7	1875
Clpy + Glyt-PM + AMS	0.047 + 0.75	1, 4	94	10.1	599	13.9	2572
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4	98	10.6	688	13.8	2621
Clpy + Glyt-PM + AMS	0.094 + 0.75	1					
Clpy + Glyt-PM + AMS	0.188 + 0.75	4	101	11.8	622	13.9	2966
Clpy + Glyt-PM + AMS	0.047 + 0.75	1, 4					
Clpy + Glyt-PM + AMS	0.094 + 0.75	6	92	10.8	650	13.8	2702
Clpy + Glyt-PM + AMS	0.094 + 0.75	1, 4, 6	95	10.1	696	13.9	2508
Weed Free Check – 3”	0	2	52	5.4	606	13.7	1356
Glyt-PM + AMS	0.75	2	21	1.7	773	12.9	378
Clpy + Glyt-PM + AMS	0.047 + 0.75	2	38	4.2	615	13.3	1033
Clpy + Glyt-PM + AMS	0.094 + 0.75	2	36	3.2	690	12.8	759
Clpy + Glyt-PM + AMS	0.188 + 0.75	2	58	5.2	705	12.9	1213
Clpy + Glyt-PM + AMS	0.047 + 0.75	2, 5	64	6.3	639	13.2	1498
Clpy + Glyt-PM + AMS	0.094 + 0.75	2, 5	67	6.5	695	13.0	1513
Clpy + Glyt-PM + AMS	0.094 + 0.75	2					
Clpy + Glyt-PM + AMS	0.188 + 0.75	5	70	6.5	720	13.0	1517
Clpy + Glyt-PM + AMS	0.047 + 0.75	2, 5					
Clpy + Glyt-PM + AMS	0.094 + 0.75	7	74	6.7	673	12.7	1542
Clpy + Glyt-PM+ AMS	0.094 + 0.75	2, 5, 7	78	6.5	677	12.7	1492
Glyt-PM+ AMS	0.75	2, 5	26	2.5	744	12.9	557
Glyt-PM + AMS	0.75	2, 5, 7	44	4.2	604	13.2	1223
Weed Free Check – 6”	0	3	53	5.5	562	13.5	1358
Glyt-PM + AMS	0.75	3	7	0	---	---	0
Clpy + Glyt-PM + AMS	0.047 + 0.75	3	7	0.2	873	12.5	50
Clpy + Glyt-PM + AMS	0.094 + 0.75	3	8	0.5	---	---	0
Clpy + Glyt-PM + AMS	0.188 + 0.75	3	8	0.6	900	10.5	39
Clpy + Glyt-PM + AMS	0.047 + 0.75	3, 6	24	2.2	706	12.2	487
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6	19	0.9	814	11.5	175
Clpy + Glyt-PM + AMS	0.094 + 0.75	3					
Clpy + Glyt-PM + AMS	0.188 + 0.75	6	25	1.5	766	11.3	305
Clpy + Glyt-PM + AMS	0.047 + 0.75	3, 6					
Clpy + Glyt-PM + AMS	0.094 + 0.75	8	29	2.5	792	11.5	529
Clpy + Glyt-PM + AMS	0.094 + 0.75	3, 6, 8	23	1.3	859	11.6	259
LSD (0.05)			24	3.2	119	0.8	817

*Glyt-PM = Roundup PowerMAX from Monsanto; Clpy = Stinger from Dow AgroSciences; AMS = AmStik from West Central at 2.5qt/A.

Summary

Sugarbeet injury 21 days after the initial treatment increased with increasing rate of clopyralid (Stinger). The greatest injury at this time was observed with the 1" in height common ragweed timing. At harvest, the longer the period of time from the last application, the lower the injury rating. Stinger applied three times and two times totaling 0.282 lb ai/A (12 fl oz/A) caused the greatest sugarbeet injury at harvest regardless of timing of the initial application.

At 21 days after treatment, glyphosate (0.75 lb ae/A) controlled common ragweed similarly when applied to 1 and 3" ragweed with maximum control of 66%, but control decreased when applied to 6" common ragweed. Based upon the poor results of glyphosate at 21 days after treatment and glyphosate applied three times only controlling 62% of common ragweed at harvest, a glyphosate-resistant biotype exists at this location.

Stinger applied once improved common ragweed control as plant size decreased and Stinger rates increased at 21 days after treatment. Maximum common ragweed control 21 days after Stinger was applied once to 1" plants was 95% with the 0.188 lb ae/A (8 fl oz/A) rate. Stinger applied once at the lowest rate and higher improved control of common ragweed 21 days after application compared to glyphosate applied alone at 0.75 lb/A.

Maximum common ragweed control was achieved at harvest when Stinger was applied at a total of 0.188 or 0.282 lb/A (8 or 12 fl oz/A) in two or three applications to 1 and 3" common ragweed. For 6" common ragweed, similar control was only achieved when Stinger was applied at a total of 0.282 lb/A.

Common lambsquarters and pigweed does not appear to be antagonized by Stinger when mixed with glyphosate at 21 days after application. The more times and the later in the season glyphosate plus Stinger is applied, the greater the common lambsquarters and pigweed control.

Maximum sugarbeet root yield and extractable sucrose was achieved when weeds were removed at the 1" timing. Three applications of glyphosate improved extractable sucrose compared to one or two applications of glyphosate. Stinger plus glyphosate applied two or three times to 1" common ragweed maximized sugarbeet root yield and extractable sucrose. Sugarbeet population, root yield, and extractable sucrose decreased as the size of common ragweed at the time of the Stinger plus glyphosate application increased. Stinger plus glyphosate applied two or three times to 1" common ragweed improved sugarbeet root yield and extractable sucrose compared to a single application of Stinger plus glyphosate.