MANAGEMENT OF WATERHEMP IN ROUNDUP READY® SUGARBEET - MOORHEAD, MN - 2013

Aaron L. Carlson

Sugarbeet Research Specialist
Plant Science Department, North Dakota State University – University of Minnesota, Fargo, ND

The objective of this study was to evaluate sugarbeet injury weed control from preemergence (PRE) and postemergence (POST) herbicide use in Roundup Ready sugarbeet.

MATERIALS AND METHODS

Plot area was worked with a Kongskilde 's-tine' field cultivator equipped with rolling baskets on May 17, 2013. 'Hilleshog 4022RR' sugarbeet was seeded 1.25 inches deep in 22 inch rows at 60,825 seeds per acre on May 17. Sugarbeet was treated with Tachigaren and Poncho Beta at 45 grams and 5.07 fl oz of product, respectively, per 100,000 seeds. Counter 20G insecticide at 8.9 pounds product per acre was applied in a 5-inch band and drag chain incorporated at planting. Herbicide treatments were applied May 17, June 12 and 18, July 2, 17, and 29. All treatments were applied with a bicycle sprayer in 17 gpa spray solution through 8002 XR flat fan nozzles pressurized with CO_2 at 40 psi to the center four rows of six row plots 30 feet in length. The 8" band application was made at planting with a planter mounted sprayer calibrated to deliver 12 gpa spray solution at 20 psi through an 8002 E flat fan nozzle. Quadris was broadcast at 16 fl oz/A June 13 to prevent Rhizoctonia root rot. Cercospora leaf spot was controlled with Proline at 5.7 fl oz/A and Headline EC at 9 fl oz/A broadcast July 29, August 19, respectively. Sugarbeet was harvested September 26 from the center two rows of each plot and weighed. Twenty to thirty pounds of sugarbeet was collected from each plot and analyzed for quality at American Crystal Sugar Quality Lab, East Grand Forks, MN.

Sugarbeet stand was counted in the center two rows of plots on June 18 and September 26. Sugarbeet injury was evaluated on June 12, July 30, and August 13. Waterhemp control was evaluated June 12, July 30, August 13, and September 4. All evaluations were a visual estimate of percent fresh weight reduction in the four treated rows compared to the adjacent untreated strip. Experimental design was randomized complete block with 4 replications. Data were analyzed with the ANOVA procedure of Agriculture Research Manager, version 8.5.0 software package.

Table 1. Application Information

Application code	A	B	C	D	E	F	G
Date	May 17	May 17	June 12	June 18	July 2	July 17	July 29
Time of Day	10:00 A	12:30 P	10:00 A	10:10 A	3:15 P	4:00 P	12:30 P
Air Temperature (F)	72	75	73	72	90	85	74
Relative Humidity (%)	39	32	58	41	29	60	48
Wind Velocity (mph)	2	3	5	2	2	2	2
Wind Direction	SE	SE	NE	SW	NE	N	S
Soil Temp. (F at 6")	57	57	66	69	78	74	73
Soil Moisture	Good	Good	Good	Good	Good	Good	Good
Cloud Cover	60	80	98	2	50	15	80
Sugarbeet stage (avg)	8" band (IF)	PRE	2 lf	2-5 lf	10 lf	15 lf	canopy
Waterhemp (untreated avg)	-	-	2 lf	4-6 lf	18" tall	24" tall	40" tall

SUMMARY

Three applications of Roundup PowerMax (glyphosate; 4.5 lbae/gal) gave 73% waterhemp control at the September 4 evaluation. This level of control indicates the presence of glyphosate-resistant waterhemp. Three applications of PowerMax that began when waterhemp were two leaf gave 73% waterhemp control which was greater than 62% waterhemp control from three applications of PowerMax that began when waterhemp were four to six leaf. Larger waterhemp were more difficult to control with glyphosate than smaller waterhemp. PowerMax at 28 fl oz followed by (fb) a micro-rate application of Betamix (desmedipham+phenmedipham; 0.65+0.65 lbai/gal) + Ethofumesate 4SC (ethofumesate; 4 lbai/gal) + UpBeet (triflusulfuron; 50%) + Stinger (clopyralid; 3 lbae/gal) + MSO (methylated seed oil) fb PowerMax at 28 fl oz fb Powermax at 22 fl oz gave 82% waterhemp control at the end of the growing season. This was not an adequate level of control. Three applications of Betamix + Ethofumesate + PowerMax gave 76% to 80% waterhemp control depending on Betamix rates applied. Broadcast applications of PRE Ethofumesate at either 3.5 pt/a or 7 pt/a gave 88% to 97% waterhemp control depending on the POST herbicide system used. PRE Ethofumesate always increased waterhemp control regardless of the POST herbicide system used. The greatest waterhemp control at 99% was from PRE Ethofumesate + Dual Magnum at 2pt/a + 1 pt/a, respectively, followed by (fb) PowerMax fb two applications of PowerMax + Betamix + Ethofumesate + Destiny HC (Trt 7).

Table 2. Management of Waterhemp in Sugarbeet – Moorhead, MN – 2013 (Carlson)

Trt No	Treatment Name	Rate	Rate Unit	Appl Code	June 12 sgbt inj	June 12 colq cntl	June 12 wahe cntl	July 30 sgbt inj	July 30 wahe cntl	Aug 13 sgbt inj	Aug 13 wahe cntl	Sept 4 wahe cntl	Jun 18 sgbt stand	September 26 sgbt stand	September 26 sgbt yield	September 26 sgbt sucr	September 26 ext sucr
					----------%----------								#/100'	#/100'	ton/a	%	lb/a
1	Untreated Check				0	0	0	0	0	0	0	0	187	74	1.9	14.1	451
2	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F	0	0	0	0	71	0	73	73	212	188	31.6	14.1	7454
	N Pak AMS	2.5	% v/v	CEF													
	NIS	0.25	% v/v	CEF													
3	Nortron	3.5	pt/a	B	0	14	16	0	93	0	92	93	204	181	35.6	13.6	8075
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
	NIS	0.25	% v/v	CEF													
4	RU PowerMax	28 / 28 / 22	fl oz/a	E/F/G	0	0	0	0	53	0	58	62	186	172	26.0	13.3	5787
	N Pak AMS	2.5	% v/v	EFG													
	NIS	0.25	% v/v	EFG													
5	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F	0	0	0	0	82	0	83	82	206	187	31.7	13.5	7181
	Betamix	7.8	fl oz/a	D													
	Nortron	4	fl oz/a	D													
	UpBeet	0.25	oz/a	D													
	Stinger	1.3	fl oz/a	D													
	MSO	1.5	% v/v	D													
	N Pak AMS	2.5	% v/v	CEF													
	NIS	0.25	% v/v	CEF													
6	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F	0	0	0	6	76	0	81	83	196	182	31.3	14.0	7489
	Betamix	10.5 / 14.4	fl oz/a	E/F													
	Nortron	5 / 7	fl oz/a	E/F													
	NIS	0.25	% v/v	C													
	N Pak AMS	2.5	% v/v	CEF													
	Destiny HC	1.5	pt/a	EF													
7	Nortron	2	pt/a	B	3	69	89	7	96	1	98	99	184	166	32.3	13.9	7657
	Dual Magnum	1	pt/a	B													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	Betamix	10.5 / 14.4	fl oz/a	E/F													
	Nortron	5 / 7	fl oz/a	E/F													
	NIS	0.25	% v/v	C													
	N Pak AMS	2.5	% v/v	CEF													
	Destiny HC	1.5	pt/a	EF													
8	Betamix	7.8 / 10.5 / 14.4	fl oz/a	C/E/F	0	0	0	7	82	2	81	80	180	167	29.8	14.4	7425
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
	Destiny HC	1.5	pt/a	CEF													
9	Nortron	3.5	pt/a	B	0	59	69	7	87	2	93	91	193	189	32.0	13.4	7172
	Betamix	7.8 / 10.5 / 14.4	fl oz/a	C/E/F													
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
	Destiny HC	1.5	pt/a	CEF													
10	Nortron	7	pt/a	B	0	64	83	6	95	1	96	97	186	171	32.8	13.5	7447
	Betamix	7.8 / 10.5 / 14.4	fl oz/a	C/E/F													
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
	Destiny HC	1.5	pt/a	CEF													
11	Betamix	16.4 / 21.7 / 32.9	fl oz/a	C/E/F	0	0	0	4	76	0	77	76	200	182	29.3	13.6	6605
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
12	Nortron	3.5	pt/a	B	1	53	73	2	92	0	91	91	183	182	32.7	13.1	7101
	Betamix	16.4 / 21.7 / 32.9	fl oz/a	C/E/F													
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													

Table 2. Management of Waterhemp in Sugarbeet – Moorhead, MN – 2013 (Carlson)

					June 12			July 30		Aug 13		Sept 4	Jun 18	September 26			
Trt No	Treatment Name	Rate	Rate Unit	Appl Code	sgbt inj	colq cntl	wahe cntl	sgbt inj	wahe cntl	sgbt inj	wahe cntl	wahe cntl	sgbt stand	sgbt stand	sgbt yield	sgbt sucr	ext sucr
					----------%----------								#/100'	#/100'	ton/a	%	lb/a
13	Nortron	7	pt/a	B	1	70	84	3	89	0	87	88	192	182	31.0	13.2	6708
	Betamix	16.4 / 21.7 / 32.9	fl oz/a	C/E/F													
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
14	Nortron	7.5	pt/a	A	11	20	38	8	80	1	81	85	167	156	31.1	14.2	7593
	Betamix	7.8 / 10.5 / 14.4	fl oz/a	C/E/F													
	Nortron	4	fl oz/a	CEF													
	RU PowerMax	28 / 28 / 22	fl oz/a	C/E/F													
	N Pak AMS	2.5	% v/v	CEF													
	Destiny HC	1.5	pt/a	CEF													
	LSD 5%				**1.9**	**14.0**	**15.5**	**2.2**	**12.4**	**NS**	**14.2**	**10.6**	**19.0**	**26.1**	**3.0**	**NS**	**939**
	CV %				**115**	**39**	**34**	**42**	**11**	**258**	**13**	**9**	**7**	**11**	**7**	**4**	**10**