MANAGEMENT OF WATERHEMP IN ROUNDUP READY SUGARBEET WITH PREEMERGENCE AND PREPLANT INCORPORATED HERBICIDES NEAR HECTOR, MINNESOTA – 2010

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Introduction

Glyphosate-resistant waterhemp is increasing in prevalence in Minnesota and likely North Dakota. Management of waterhemp is necessary to preserve sugarbeet production.

Materials and Methods

'Betaseed 87RR38' Roundup Ready sugarbeet at 63,360 seeds per acre (4.5" spacing in 22 inch rows) was seeded in six row plots 30 feet long in a cooperator's field having glyphosate-resistant waterhemp on May 10. Sugarbeet seed was treated with Tachigaren at 45 grams dry product per 100,000 seeds. Preplant incorporated treatments were applied May 5. A C-shank field cultivator with tine harrow was set to a depth of 2 to 3" and driven once at approximately 4 to 5 mph through the center of all plots to incorporate the applied herbicides. Preemergence treatments were applied May 10. Postemergence treatments were applied June 18 and July 2. All treatments were applied in 17 gpa water at 40 psi through XR8002 nozzles to the center four rows of six row plots. Sugarbeet injury was evaluated June 3 and July 2. Waterhemp control was evaluated June 18, July 2, July 16 and July 28. All evaluations are a visual estimate of percent weed control or percent sugarbeet injury in the treated plot compared to the adjacent untreated strips and plots. Study designed as a randomized complete block with 4 replications originally, but one was lost due to an extremely low waterhemp density. Sugarbeet from 10 feet of the center two rows in each plot was counted and harvested September 9.

Table 1. Application information.

Date of Application	May 5	May 10	June 18	July 2
Time of Day	4:00 pm	2:00 pm	4:30 pm	5:00 pm
Air Temperature (^{o}F)	53	55	82	85
Relative Humidity (%)	56	54	35	56
Soil Temp. (^{o}F at 6")	56	41	64	70
Wind Velocity (mph)	24	10	17	14
Cloud Cover (%)	90	100	0	0
Soil Moisture	fair	good	good	good
Sugarbeet Stage (range/Avg)	PPI	PRE	V 5 – V12.5/V 10.2	V 6.0 – V 18.5/V 16.8
Waterhemp (range/Avg)	PPI	PRE	Cot-18 lf/10 lf; 0.25-6.5"/3"	4-16lf/14 lf; 1-15.5"/13"
Waterhemp (avg. density)	PPI	PRE	20/M^2	7/M^2

Summary

No substantial sugarbeet injury was observed with any treatments on June 3rd and July 2nd.

On July 28th, Roundup PowerMAX applied twice controlled 73% of waterhemp and caused 78% mortality of 10 plants flagged prior to the initial application, indicating the presence of glyphosate-resistant biotype(s) in the population.

At the time of the first postemergence application (June 18th), Ro-Neet and Nortron applied preplant incorporated controlled more waterhemp than applied preemergence. Waterhemp control was similar for Eptam plus Ro-Neet, Dual 8 EC, and Warrant regardless of type of application. Incorporated Ro-Neet followed by Outlook plus Roundup PowerMAX and followed by Roundup PowerMAX and incorporated Ro-Neet plus Eptam followed by Roundup PowerMAX and followed by Roundup PowerMAX controlled the most waterhemp on July 28th. All treatments controlled waterhemp similarly on July 28th, except Warrant followed by Roundup PowerMAX, Ro-Neet applied preemergence and followed by Roundup PowerMAX, and Roundup PowerMAX alone.

Treatment differences could not be determined for sugarbeet population, root yield, sucrose, and extractable sucrose. Preplant incorporated treatments tended to have reduced root yield compared to preemergence treatments.

Table 2. Management of waterhemp in Roundup Ready sugarbeet with preemergence and preplant incorporated herbicides near Hector, Minnesota – 2010. (Stachler and Luecke)

Treatment[1]	Rate	Date of Applic.	June 3 Sgbt Inju	June 18 Wahe Cntl	July 2 Sgbt Inju	July 2 Wahe Cntl	July 16 Wahe Cntl	July 28 Wahe Cntl
	lb ai/A or lb ae/A		---------- % ----------					
Untreated Check	0	---	0	0	0	0	0	0
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	0	1	78	81	73
Ro-Neet (PPI)	4	May 5						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	65	2	89	88	87
Ro-Neet (PRE)	4	May 10						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	7	2	79	83	80
Ro-Neet (PPI)	4	May 5						
RUPowerMAX+Outlook+AMS	1.125 + 0.984 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	65	0	97	95	94
Ro-Neet (PRE)	4	May 10						
RUPowerMAX+Outlook+AMS	1.125 + 0.984 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	12	3	93	92	92
Ro-Neet (PPI)	4	May 5						
RUPowerMAX+Warrant+AMS	1.125 + 1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	70	2	93	93	91
Ro-Neet (PRE)	4	May 10						
RUPowerMAX+Warrant+AMS	1.125 + 1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	10	1	89	88	88
Ro-Neet+Eptam (PPI)	2.5 + 2	May 5						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	83	2	94	94	95
Ro-Neet+Eptam (PRE)	2.5 + 2	May 10						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	63	2	88	88	88
Nortron (PPI)	3.75	May 5						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	87	0	90	90	89
Nortron (PRE)	3.75	May 10						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	60	0	96	95	90
Dual 8 EC (PPI)	1.4	May 5						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	73	0	88	90	88
Dual 8 EC (PRE)	1.4	May 10						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	77	2	89	86	87
Warrant (PPI)	1.4	May 5						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	33	2	81	80	78
Warrant (PRE)	1.4	May 10						
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18						
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	0	20	1	76	81	80
LSD (5%)			0	27	3	15	10	10

[1]AMS=N-Pak AMS (liquid ammonium sulfate from Winfield Solutions), RUPowerMAX=Roundup PowerMAX.

Table 2b. Management of waterhemp in Roundup Ready sugarbeet with preemergence and preplant incorporated herbicides near Hector, Minnesota – 2010. (Stachler and Luecke) (continued)

			September 9			
Treatment[1]	Rate	Date of Applic.	Sgbt Popl	Sucrose	Extract Sucrose	Root Yield
	lb ai/A or lb ae/A		plts/20ft	%	lb/A	ton/A
Untreated Check	0	---	---	---	---	---
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	34	14.0	5115	22.2
Ro-Neet (PPI)	4	May 5				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	29	12.7	3461	16.7
Ro-Neet (PRE)	4	May 10				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	34	14.2	5319	22.6
Ro-Neet (PPI)	4	May 5				
RUPowerMAX+Outlook+AMS	1.125 + 0.984 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	32	13.3	4090	18.7
Ro-Neet (PRE)	4	May 10				
RUPowerMAX+Outlook+AMS	1.125 + 0.984 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	34	13.7	4748	20.6
Ro-Neet (PPI)	4	May 5				
RUPowerMAX+Warrant+AMS	1.125 + 1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	32	13.9	4435	19.2
Ro-Neet (PRE)	4	May 10				
RUPowerMAX+Warrant+AMS	1.125 + 1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	32	13.9	4429	19.1
Ro-Neet+Eptam (PPI)	2.5 + 2	May 5				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	36	13.8	4846	21.4
Ro-Neet+Eptam (PRE)	2.5 + 2	May 10				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	35	13.5	5050	22.9
Nortron (PPI)	3.75	May 5				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	32	13.8	4409	19.4
Nortron (PRE)	3.75	May 10				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	35	13.4	4706	21.5
Dual 8 EC (PPI)	1.4	May 5				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	30	12.9	3983	18.9
Dual 8 EC (PRE)	1.4	May 10				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	36	14.7	5691	23.0
Warrant (PPI)	1.4	May 5				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	31	13.6	5448	24.7
Warrant (PRE)	1.4	May 10				
RUPowerMAX+AMS	1.125 + 2.5% v/v	June 18				
RUPowerMAX+AMS	0.75 + 2.5% v/v	July 2	29	13.5	4558	20.9
LSD (5%)			NS	NS	NS	NS

[1]AMS=N-Pak AMS (liquid ammonium sulfate from Winfield Solutions), RUPowerMAX=Roundup PowerMAX.