

Evaluation of Herbicide Efficacy on a Waterhemp Population.

02-Pierron-S110

OBJECTIVE: Evaluate the efficacy of individual herbicide active ingredients on a population of waterhemp suspected to be resistant to PPO inhibiting herbicides.

SUMMARY: This study was initiated on a grower's field in Pierron where multiple applications of the PPO inhibiting herbicide lactofen (Cobra, Phoenix) had failed to control waterhemp the previous year. The three PPO inhibiting herbicides most commonly applied postemergence (POST) for waterhemp control in soybean were applied at 1 and 2X the maximum labeled used rate. Other PPO inhibiting herbicides evaluated in the study included Valor, Authority, Resource, Stellar, and Aim. Phoenix did not provide any control of waterhemp at either the 1 or 2X rate. Similarly, Ultra Blazer controlled less than 15% of waterhemp. Waterhemp control with the 2X rate of Flexstar at 14 DAT was only 23%. POST applications of Aim, Resource, Authority, and Stellar provided 0% control of waterhemp at 14 DAT while Valor POST provided only 30% control. Preemergence (PRE) applications of Valor controlled only 50% of waterhemp at the POST timing while Authority applied PRE controlled 98% of waterhemp. Waterhemp control in plots treated with Authority PRE decreased over time to 73% by 56 DAT. Raptor also failed to control any waterhemp in this study which indicates that this population is also resistant to the ALS-inhibiting herbicides. Only Gramoxone Max, Roundup UltraMax at 26 oz/A or greater, and Touchdown controlled over 90% of waterhemp at this site. Thus only glyphosate products will provide effective POST control of the waterhemp population at this site.

HERBICIDES

AIM 40 WG
 AUTHORITY 75 WG
 FLEXSTAR 1.88 EC
 GRAMOXONE MAX 3 SL
 LIBERTY 1.67 EC
 PHOENIX 2 EC
 RAPTOR 1 AS
 RESOURCE 0.86 EC
 ROUNDUP ULTRA MAX 3.7 SL
 STELLAR 3.1 EC
 TOUCHDOWN 3 SL
 ULTRA BLAZER 2 SL
 VALOR 51 WG

WEEDS

waterhemp, common

CROP

soybean

Bryan Young

PLANT, SOIL AND GENERAL AGRICULTURE DEPARTMENT

SOUTHERN ILLINOIS UNIVERSITY

Evaluation of Herbicide Efficacy on a Waterhemp Population.

Project Code: 02-Pierron-S110 Location: Pierron, IL

Investigator: Bryan Young, Assistant Professor, Southern Illinois University

City State Zip Country: Belleville IL 62221 USA
 Trial Status: Final Updated: 10-30-02

Objective:

Evaluate the efficacy of individual herbicide active ingredients on a population of waterhemp suspected to be resistant to PPO inhibiting herbicides.

Weed Code Common Name Scientific Name
 1. AMATA waterhemp, common Amaranthus rudis Sauer

Crop 1: GLXMA soybean
 Planting Method: Seeded Planting Date: 6-7-02
 Rate: 75 lb/A Depth: 1.0 IN
 Row Spacing: 15 IN

Plot Width, Unit: 10 FT Plot Length, Unit: 26 FT Reps: 4
 Tillage Type: Reduced-Till Study Design: Randomized complete block
 Previous Crop, Year: GLXMA, 2001

APPLICATION DESCRIPTION

	A	B
Application Date:	6-10-02	7-8-02
Time of Day:	13:00	16:00
Application Method:	Spray	Spray
Application Timing:	PRE	4-6"W
Applic. Placement:	BROSOI	BROFOL
Wind Velocity, Unit:	5-10	0 MPH
Soil Moisture:	ABONOR	BELNOR
% Cloud Cover:	75	5

CROP STAGE AT EACH APPLICATION

	A	B
Crop 1 Code, Stage:	GLXMA NA	GLXMA V2
Height, Unit:	NA NA	6 IN

WEED STAGE AT EACH APPLICATION

	A	B
Weed 1 Code:		AMATA
Stage(leaves):		8-12
Height(inches):		2-6
Density:		High

APPLICATION EQUIPMENT

	A	B
Appl. Equipment:	CO2 sprayer	CO2 sprayer
Operating Pressure:	40 PSI	40 PSI
Nozzle Type:	Flat fan	Flat fan
Nozzle Size:	8003	8002
Boom Length, Unit:	7.5 FT	7.5 FT
Spray Volume, Unit:	20 GPA	20 GPA

NOTES:

This study was not harvested.

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Weed Code						AMATA	AMATA	AMATA	AMATA	AMATA	AMATA						
Crop Code						GLXMA	GLXMA										
Rating Data Type						Injury	Height	Control	Control	Control	Control	Plants	Plants				
Rating Unit						Percent	cm	Percent	Percent	Percent	Percent	1.0 m2	1.0 m2				
Rating Date						7-8-02	9-2-02	7-8-02	7-22-02	8-5-02	9-2-02	7-8-02	8-5-02				
Trt-Eval Interval						0 DA-B	56 DA-B	0 DA-B	14 DA-B	28 DA-B	56 DA-B	0 DA-B	28 DA-B				
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code								
1	NONTREATED									0	56	0	0	0	754	597	
2	PHOENIX	2	EC	0.195	LB A/A	12.5	OZ/A	4-6"	W B		58	0	0	0		576	
2	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
2	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
3	PHOENIX	2	EC	0.39	LB A/A	25	OZ/A	4-6"	W B		58	0	0	0		571	
3	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
3	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
4	ULTRA BLAZER	2	SL	0.375	LB A/A	1.5	PT/A	4-6"	W B		55	5	5	10		739	
4	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
4	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
5	ULTRA BLAZER	2	SL	0.75	LB A/A	3	PT/A	4-6"	W B		58	10	10	11		647	
5	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
5	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
6	FLEXSTAR	1.88	EC	0.375	LB A/A	1.6	PT/A	4-6"	W B		58	15	13	13		676	
6	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
6	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
7	FLEXSTAR	1.88	EC	0.75	LB A/A	3.2	PT/A	4-6"	W B		62	23	20	21		459	
7	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
7	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
8	AIM	40	WG	0.025	LB A/A	1	OZ/A	4-6"	W B		59	0	0	0		790	
8	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	4-6"	W B								
8	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
9	RESOURCE	0.86	EC	0.081	LB A/A	12	OZ/A	4-6"	W B		58	0	0	0		862	
9	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
9	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
10	GRAMOXONE MAX	3	SL	0.75	LB A/A	2	PT/A	4-6"	W B			99	98	75		27	
10	ACTIVATOR 90	100	LIQ	0.25	% V/V	0.25	%V/V	4-6"	W B								
11	VALOR	51	WG	0.078	LB A/A	2.45	OZ/A	4-6"	W B		50	30	18	21		716	
11	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
12	AUTHORITY	75	WG	0.25	LB A/A	5.33	OZ/A	4-6"	W B		65	0	0	4		1000	
12	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
13	VALOR	51	WG	0.078	LB A/A	2.45	OZ/A	PRE	A	20	61	50	33	3	23	106	91

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Rating Unit										Percent	cm	Percent	Percent	Percent	1.0 m2	1.0 m2	
Rating Date										7-8-02	9-2-02	7-8-02	7-22-02	8-5-02	9-2-02	7-8-02	8-5-02
Trt-Eval Interval										0 DA-B	56 DA-B	0 DA-B	14 DA-B	28 DA-B	56 DA-B	0 DA-B	28 DA-B

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Prod Rate	Prod Unit	Grow Stg	Appl Code								
14	AUTHORITY	75	WG	0.25	LB A/A	5.33	OZ/A	PRE	A	0	67	98	90	83	73	9	18
15	RAPTOR	1	AS	0.039	LB A/A	5	OZ/A	4-6"	W B		54		0	0	0		614
15	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
15	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
16	ROUNDUP ULTRA MAX	3.7	SL	0.375	LB AE/A	13	OZ/A	4-6"	W B		64		78	85	83		87
16	AMS	100	DRY	2.0	% W/W	2	%W/W	4-6"	W B								
17	ROUNDUP ULTRA MAX	3.7	SL	0.75	LB AE/A	26	OZ/A	4-6"	W B		70		97	98	95		28
17	AMS	100	DRY	2.0	% W/W	2	%W/W	4-6"	W B								
18	ROUNDUP ULTRA MAX	3.7	SL	1.13	LB AE/A	39	OZ/A	4-6"	W B		64		99	99	98		3
18	AMS	100	DRY	2.0	% W/W	2	%W/W	4-6"	W B								
19	TOUCHDOWN	3	SL	0.75	LB AE/A	2	PT/A	4-6"	W B		67		99	98	93		34
19	AMS	100	DRY	2.0	% W/W	2	%W/W	4-6"	W B								
20	LIBERTY	1.67	EC	0.42	LB A/A	32.2	OZ/A	4-6"	W B				28	26	28		878
20	AMS	100	DRY	2.0	% W/W	2	%W/W	4-6"	W B								
21	STELLAR	3.1	EC	0.121	LB A/A	5	OZ/A	4-6"	W B		66		0	0	0		758
21	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
21	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
22	STELLAR	3.1	EC	0.242	LB A/A	10	OZ/A	4-6"	W B		58		0	0	0		552
22	PRIME OIL COC	100	LIQ	1.0	% V/V	1	%V/V	4-6"	W B								
22	28% UAN	100	LIQ	2.5	% V/V	2.5	%V/V	4-6"	W B								
LSD (P=.05)										5.8	11.3	8.0	4.1	5.6	10.3	281.5	312.4
Replicate F										1.000	18.946	1.156	1.498	1.671	0.594	0.910	2.752
Replicate Prob(F)										0.4547	0.0001	0.4008	0.2236	0.1821	0.6210	0.4901	0.0499
Treatment F										48.000	1.690	446.230	767.657	421.589	102.285	24.775	9.169
Treatment Prob(F)										0.0002	0.0656	0.0001	0.0001	0.0001	0.0001	0.0013	0.0001

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Trial Comments

1. Protocol: SIU (BGY).
2. Blanket EPOST application of Select + COC at 6 oz/A + 1 %v/v, applied at 2-4 inch grass, to all plots including the nontreated.
3. DA-B = days after 4-6"W application. 1.0 m² = 1.0 square meter.
4. At 14 days after the 4-6"W application, there was no crop injury except when postemergence treatments included either Liberty or Gramoxone.