

Influence of Soil Residual Herbicides on the Frequency of PPO Resistance in Waterhemp.

Trial ID: 11-Clinton-PPO Location: Clinton, IL

Investigator: Bryan Young, Professor, Southern Illinois University, bgyoung@siu.edu
City State Zip Country: Clinton IL USA
Trial Status: FINAL **Initiation Date:** 6-7-11

Objectives: Compare waterhemp resistance to Cobra for early and late emerging plants following a range of preemergence herbicide rates.

Crop 1: GLXMA Soybean

Planting Date: 6-7-11

Pest 1 Type: W **Code:** AMATA **Amaranthus rudis** Sauer waterhemp, common
Pest Description: PPO-resistant waterhemp

Plot Width, Unit: 10 FT **Site Type:** FIELD
Plot Length, Unit: 40 FT
Replications: 4 **Study Design:** Randomized Complete Block

Application Description

	A	B
Application Date:	6-8-11	7-11-11
Time of Day:	15:30	18:30
Application Method:	Spray	Spray
Application Timing:	PRE	POSTI
Application Placement:	BROSOI	BROSOI
Applied By:	BGY	
Air Temperature, Unit:	97 F	96 F
% Relative Humidity:	45	80
Wind Velocity, Unit:	4 MPH	5 MPH
Wind Direction:	S	S
Dew Presence (Y/N):	N	N
Soil Temperature, Unit:	90 F	90 F
Soil Moisture:	NORMAL	NORMAL
% Cloud Cover:	10	10

	8-6-11	11-7-11
Crop stage at application:	NA	V2-V3
Height Min, Max (inch):	10	11

Pest Stage At Each Application

	6-8-11	7-11-11
Application Date:	6-8-11	7-11-11
Weed Code:	AMATA	AMATA
Stage Majority (leaves):	10	
Stage Min, Max:	4	12
Height Majority:	10	IN
Height Min, Max:	2	14

Application Equipment

	CO2 sprayer	CO2 sprayer
Appl. Equipment:	CO2 sprayer	CO2 sprayer
Operating Pressure:	30 PSI	30 PSI
Nozzle Type:	Flat fan	Flat fan
Nozzle Size:	XR 8002	XR 8002
Boom Length, Unit:	6.67 FT	6.67 FT
Spray Volume, Unit:	15 GPA	15 GPA

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Pest Code	AMATA	AMATA	AMATA	AMATA	AMATA
Crop Code				OVERALL	OVERALL
Rating Date	6-22-11	7-6-11	6-22-11	7-18-11	7-25-11
Rating Data Type	Control	Control	Plants	Control	Control
Rating Unit	Percent	Percent	?	Percent	Percent
Rating Timing				Whole plot	Whole plot
Trt-Eval Interval	14 DA-A	28 DA-A	14 DA-A	7 DA-B	14 DA-B

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code						
1	NONTREATED										0 c	0 d	300 a	43 f	46 e
1	COBRA	2	EC					POST1	B						
2	REFLEX	2	EC	.059374	lb ai/a	3.8	fl oz/a	PRE	A	47 b	55 c	84 b	70 e	55 e	
2	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
3	REFLEX	2	EC	.118748	lb ai/a	7.6	fl oz/a	PRE	A	84 a	84 b	27 bc	74 de	68 d	
3	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
4	REFLEX	2	EC	.178122	lb ai/a	11.4	fl oz/a	PRE	A	93 a	95 ab	4 c	85 cd	84 bc	
4	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
5	REFLEX	2	EC	.237496	lb ai/a	15.2	fl oz/a	PRE	A	98 a	99 a	3 c	86 bc	78 c	
6	REFLEX	2	EC	0.29687	lb ai/a	19	fl oz/a	PRE	A	99 a	99 a	2 c	89 abc	86 bc	
7	REFLEX	2	EC	.059374	lb ai/a	3.8	fl oz/a	PRE	A	96 a	93 ab	7 c	88 abc	78 c	
7	DUAL MAGNUM	7.62	EC	0.2712	lb ai/a	4.56	fl oz/a	PRE	A						
7	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
8	REFLEX	2	EC	.118748	lb ai/a	7.6	fl oz/a	PRE	A	99 a	99 a	1 c	93 abc	89 ab	
8	DUAL MAGNUM	7.62	EC	0.5424	lb ai/a	9.1	fl oz/a	PRE	A						
9	REFLEX	2	EC	.178122	lb ai/a	11.4	fl oz/a	PRE	A	99 a	99 a	0 c	93 abc	90 ab	
9	DUAL MAGNUM	7.62	EC	0.8136	lb ai/a	13.7	fl oz/a	PRE	A						
10	REFLEX	2	EC	.237496	lb ai/a	15.2	fl oz/a	PRE	A	99 a	99 a	0 c	98 ab	97 a	
10	DUAL MAGNUM	7.62	EC	1.0848	lb ai/a	18.2	fl oz/a	PRE	A						
11	REFLEX	2	EC	0.29687	lb ai/a	19	fl oz/a	PRE	A	99 a	99 a	0 c	99 a	97 a	
11	DUAL MAGNUM	7.62	EC	1.356	lb ai/a	22.8	fl oz/a	PRE	A						
LSD (P=.05)										16.3	13.2	65.3	12.1	9.9	
Replicate F										2.240	2.054	0.209	2.485	2.019	
Replicate Prob(F)										0.1047	0.1282	0.8890	0.0798	0.1325	
Treatment F										31.390	45.356	15.949	14.886	22.963	
Treatment Prob(F)										0.0001	0.0001	0.0001	0.0001	0.0001	

Means followed by same letter do not significantly differ (P=.05, LSD)

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Pest Code	AMATA	AMATA	AMATA	AMATA	AMATA	AMATA
Crop Code	ANY SIZE	ANY SIZE	ANY SIZE	< 8 INCH	< 8 INCH	< 8 INCH
Rating Date	7-11-11	7-18-11	7-25-11	7-11-11	7-18-11	7-25-11
Rating Data Type	HT @ app	Control	Control	HT @ app	Control	Control
Rating Unit	Inch	Percent	Percent	Inch	Percent	Percent
Rating Timing	Marked Plts	Marked Plts	Marked Plts	Marked Plts	Marked Plts	Marked Plts
Trt-Eval Interval	0 DA-B	7 DA-B	14 DA-B	0 DA-B	7 DA-B	14 DA-B

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code						
1	NONTREATED														
1	COBRA	2	EC					POST1	B	7.7 a	64 a	62 a	6.6 a	67 a	62 a
2	REFLEX	2	EC	.059374	lb ai/a	3.8	fl oz/a	PRE	A	7.6 a	63 a	58 a	6.6 a	62 a	62 a
2	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
3	REFLEX	2	EC	.118748	lb ai/a	7.6	fl oz/a	PRE	A	7.8 a	60 a	53 a	6.7 a	62 a	57 a
3	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
4	REFLEX	2	EC	.178122	lb ai/a	11.4	fl oz/a	PRE	A	7.3 a	68 a	52 a	6.5 a	69 a	52 a
4	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
5	REFLEX	2	EC	.237496	lb ai/a	15.2	fl oz/a	PRE	A						
6	REFLEX	2	EC	0.29687	lb ai/a	19	fl oz/a	PRE	A						
7	REFLEX	2	EC	.059374	lb ai/a	3.8	fl oz/a	PRE	A	7.2 a	66 a	60 a	6.5 a	65 a	59 a
7	DUAL MAGNUM	7.62	EC	0.2712	lb ai/a	4.56	fl oz/a	PRE	A						
7	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B						
8	REFLEX	2	EC	.118748	lb ai/a	7.6	fl oz/a	PRE	A						
8	DUAL MAGNUM	7.62	EC	0.5424	lb ai/a	9.1	fl oz/a	PRE	A						
9	REFLEX	2	EC	.178122	lb ai/a	11.4	fl oz/a	PRE	A						
9	DUAL MAGNUM	7.62	EC	0.8136	lb ai/a	13.7	fl oz/a	PRE	A						
10	REFLEX	2	EC	.237496	lb ai/a	15.2	fl oz/a	PRE	A						
10	DUAL MAGNUM	7.62	EC	1.0848	lb ai/a	18.2	fl oz/a	PRE	A						
11	REFLEX	2	EC	0.29687	lb ai/a	19	fl oz/a	PRE	A						
11	DUAL MAGNUM	7.62	EC	1.356	lb ai/a	22.8	fl oz/a	PRE	A						
LSD (P=.05)										0.91	11.7	16.7	0.25	13.4	18.1
Replicate F										7.025	4.018	1.650	1.516	1.727	0.801
Replicate Prob(F)										0.0055	0.0342	0.2303	0.2607	0.2145	0.5167
Treatment F										0.764	0.602	0.639	0.966	0.430	0.455
Treatment Prob(F)										0.5685	0.6687	0.6448	0.4611	0.7843	0.7671

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Pest Code	AMATA	AMATA	AMATA	AMATA
Crop Code	> 8 INCH	> 8 INCH	> 8 INCH	SUS:RES
Rating Date	7-11-11	7-18-11	7-25-11	7-25-11
Rating Data Type	HT @ app	Control	Control	Resistant
Rating Unit	Inch	Percent	Percent	Percent
Rating Timing	Marked Plts	Marked Plts	Marked Plts	Marked Plts
Trt-Eval Interval	0 DA-B	7 DA-B	14 DA-B	14 DA-B

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code					
1	NONTREATED										11.1 ab	53 a	59 a	51 a
1	COBRA	2	EC					POST1	B					
2	REFLEX	2	EC	.059374	lb ai/a	3.8	fl oz/a	PRE	A	10.9 b	60 a	41 a	58 a	
2	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B					
3	REFLEX	2	EC	.118748	lb ai/a	7.6	fl oz/a	PRE	A	11.1 ab	52 a	37 a	62 a	
3	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B					
4	REFLEX	2	EC	.178122	lb ai/a	11.4	fl oz/a	PRE	A	11.5 a	52 a	41 a	48 a	
4	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B					
5	REFLEX	2	EC	.237496	lb ai/a	15.2	fl oz/a	PRE	A					
6	REFLEX	2	EC	0.29687	lb ai/a	19	fl oz/a	PRE	A					
7	REFLEX	2	EC	.059374	lb ai/a	3.8	fl oz/a	PRE	A	11.0 ab	68 a	54 a	43 a	
7	DUAL MAGNUM	7.62	EC	0.2712	lb ai/a	4.56	fl oz/a	PRE	A					
7	COBRA	2	EC	0.195	lb ai/a	12.5	fl oz/a	POST1	B					
8	REFLEX	2	EC	.118748	lb ai/a	7.6	fl oz/a	PRE	A					
8	DUAL MAGNUM	7.62	EC	0.5424	lb ai/a	9.1	fl oz/a	PRE	A					
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10	DUAL MAGNUM	7.62	EC	1.0848	lb ai/a	18.2	fl oz/a	PRE	A					
11	REFLEX	2	EC	0.29687	lb ai/a	19	fl oz/a	PRE	A					
11	DUAL MAGNUM	7.62	EC	1.356	lb ai/a	22.8	fl oz/a	PRE	A					
LSD (P=.05)										0.54	28.5	29.9	32.2	
Replicate F										1.114	2.055	1.121	1.048	
Replicate Prob(F)										0.3876	0.2231	0.3961	0.4070	
Treatment F										2.053	0.824	1.279	0.546	
Treatment Prob(F)										0.2057	0.5620	0.3889	0.7056	

Means followed by same letter do not significantly differ (P=.05, LSD)

Trial Comments

1. Protocol: SIU/UI/JW.

2. Ratings:

3. Special instructions:

Monitor each treatment for the first emergence of waterhemp.

When the first flush is 4-6 inch in height;

a.) Mark 10 plants (4-6") in the front 20 ft of the plot.

b.) Apply Gramoxone Inteon 2.5 pt/A to the back 20 ft of the plot.

c.) Collect leaf punch samples from 12 random plants, unmarked plants in the front 20 ft prior to the POST application.

d.) Apply Cobra 12.5 oz/A to the front 20 ft of the plots.

Monitor the back 20 ft of each treatment for emergence of the second waterhemp flush.

When the second flush is 4-6 inch in height;

a.) Mark 10 plants (4-6") in the back 20 ft of the plot.

b.) Collect leaf punch samples from 12 random, unmarked plants in the back 20 ft of the plot.

c.) Apply Cobra at 12.5 oz/A to the back 20 ft of the plots.

Leaf punch samples should be frozen ASAP after collection.

4. Blanket application of Select Max (12 fl oz/A) plus COC (0.5%) was applied to all plots on 7-11-11.