

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
Investigator: Karla L. Gage, Ph.D.

<b>Trial Status:</b> F one-year/final <b>Initiation Date:</b> 5-22-16 <b>Completion Date:</b> 10-7-16	<b>Trial Location</b>
<b>City:</b> Carlyle <b>Country:</b> USA <b>State/Prov.:</b> Illinois IL <b>Postal Code:</b> 62231	

<b>Objectives:</b> Evaluate FMC herbicide concepts in Liberty Link soybean programs.
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<b>Study Director:</b> Karla Gage, Ph.D. <b>Title:</b> Assistant Professor of Weed Science <b>Organization:</b> Southern Illinois University Carbondale <b>Address:</b> 1205 Lincoln Drive MC 4415 <b>Phone No.:</b> 618-453-7679 <b>City+State/Prov:</b> Carbondale, IL <b>Postal Code:</b> 62901 <b>E-mail:</b> kgage@siu.edu <b>Country:</b> USA	<b>Contacts</b>
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<b>Crop 1:</b> GLXMA Glycine max    Soybean <b>Variety:</b> P37T09L <b>BBCH Scale:</b> BSOY <b>Description:</b> LL <b>Planting Rate, Unit:</b> 140000 S/A <b>Planting Date:</b> 5-22-16 <b>Depth, Unit:</b> 1 IN <b>Planting Method:</b> SEEDED <b>Row Spacing, Unit:</b> 30 IN	<b>Crop Description</b>
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<b>Pest 1 Type:</b> W <b>Code:</b> AMATA Amaranthus rudis Sauer <b>Common Name:</b> waterhemp, common <b>Description:</b> PPO-resistant waterhemp	<b>Pest Description</b>
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<b>Treated Plot Width:</b> 6.67 FT <b>Total Plot Width:</b> 10 FT <b>Treated Plot Length:</b> 30 FT <b>Total Plot Length:</b> 30 FT <b>Experimental Unit:</b> 1 PLOT <b>Replications:</b> 3 <b>Tillage Type:</b> REDTIL reduced-till <b>Untreated Arrangement:</b> INCLUDED single control randomized in each block <b>Study Design:</b> RACOB� Randomized Complete Block (RCB)	<b>Site and Design</b>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">No.</th> <th style="width: 15%;">Previous Crop</th> <th style="width: 10%;">Year</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>GLXMA</td> <td>2015</td> </tr> </tbody> </table>	No.	Previous Crop	Year	1.	GLXMA	2015	
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No.	Maintenance Product Name				
1.	N 0 LB/A, P2O5 0 LB/A, K2O 0 LB/A				

<b>Description Name:</b> Clinton PPO site 2016 <b>% Sand:</b> 6.5 <b>% OM:</b> 1.93 <b>Texture:</b> SIL silt loam <b>% Silt:</b> 75.56 <b>pH:</b> 6.2 <b>Soil Name:</b> Cisne-Huey complex <b>% Clay:</b> 17.94 <b>CEC:</b> 8.27	<b>Soil Description</b>									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Element</th> <th style="width: 15%;">Quantity</th> <th style="width: 15%;">Unit</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>144</td> <td>lb/A</td> </tr> <tr> <td>K</td> <td>212</td> <td>lb/A</td> </tr> </tbody> </table>	Element	Quantity	Unit	P1	144	lb/A	K	212	lb/A	<b>Additional Measured Elements</b>
Element	Quantity	Unit								
P1	144	lb/A								
K	212	lb/A								

<b>Overall Moisture Conditions:</b> NORMAL <b>Closest Weather Station:</b> Carlyle Reservoir	<b>Moisture and Weather Conditions</b>
	<b>Distance, Unit:</b> 6.75 MI

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No.	Date	Amount	Unit	Type	Type Description	Interval	Unit	Min Temp	Max Temp	Temp Unit
1.	4-29-16					7	DAY	46	75	F
2.	5-1-16	0.66	IN	RAIN	rain	4	DAY			
3.	5-6-16					7	DAY	44	87	F
4.	5-8-16	2.52	IN	RAIN	rain	7	DAY			
5.	5-13-16					7	DAY	41	76	F
6.	5-17-16	0.76	IN	RAIN	rain	2	DAY			
7.	5-20-16					7	DAY	51	83	F
8.	5-27-16					7	DAY	62	88	F
9.	5-27-16	0.89	IN	RAIN	rain	2	DAY			
10.	6-1-16	0.05	IN	RAIN	rain	4	DAY			
11.	6-3-16					7	DAY	55	89	F
12.	6-5-16	0.38	IN	RAIN	rain	1	DAY			
13.	6-10-16					7	DAY	65	96	F
14.	6-17-16					7	DAY	67	97	F
15.	6-24-16					7	DAY	57	95	F
16.	7-1-16					7	DAY	60	91	F
17.	7-1-16	0.05	IN	RAIN	rain	1	DAY			
18.	7-3-16	1.57	IN	RAIN	rain	5	DAY			
19.	7-8-16					7	DAY	67	93	F
20.	7-13-16	0.13	IN	RAIN	rain	1	DAY			
21.	7-15-16					7	DAY	68	93	F
22.	7-17-16	0.73	IN	RAIN	rain	1	DAY			
23.	7-20-16	0.59	IN	RAIN	rain	1	DAY			
24.	7-22-16					7	DAY	72	94	F
25.	7-22-16	0.39	IN	RAIN	rain	1	DAY			
26.	7-25-16	0.69	IN	RAIN	rain	3	DAY			
27.	7-29-16					7	DAY	69	91	F
28.	8-1-16	0.52	IN	RAIN	rain	4	DAY			
29.	8-5-16					7	DAY	66	93	F
30.	8-12-16					7	DAY	68	91	F
31.	8-13-16	5.38	IN	RAIN	rain	5	DAY			
32.	8-19-16					7	DAY	57	93	F
33.	8-20-16	0.05	IN	RAIN	rain	1	DAY			
34.	8-26-16					7	DAY	62	93	F
35.	9-1-16	0.13	IN	RAIN	rain	1	DAY			
36.	9-2-16					7	DAY	57	94	F
37.	9-9-16					7	DAY	54	89	F
38.	9-9-16	4.49	IN	RAIN	rain	2	DAY			
39.	9-16-16					7	DAY	59	89	F
40.	9-17-16	0.92	IN	RAIN	rain	1	DAY			
41.	9-23-16					7	DAY	48	91	F
42.	9-26-16	0.91	IN	RAIN	rain	1	DAY			
43.	9-30-16					7	DAY	55	87	F
44.	9-30-16	0.51	IN	RAIN	rain	3	DAY			
45.	10-7-16					7	DAY	42	81	F
46.	10-14-16					7	DAY	43	87	F
47.	10-20-16	1.93	IN	RAIN	rain	2	DAY			

**Comment:**

Rainfall was recorded 6.75 miles WNW and at the Carlyle Reservoir.  
Air temperature was recorded at Scott Air Force Base 33 miles WSW.  
Data provided by NOAA's National Centers for Environmental Information.  
Air temperatures given are summarized as weekly high and low,  
detailed weather data is available on request.

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
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## Application Description

	A	B	C	D	E
Application Date:	5-22-16	6-14-16	6-29-16	6-29-16	6-14-16
Appl. Start Time:	18:30	16:10	12:50	12:50	16:10
Appl. Stop Time:	18:50	16:35	13:10	13:10	16:35
Application Method:	Spray	Spray	Spray	Spray	Spray
Application Timing:	PRE	4"W-1	4"W-2	4"W-3	3T
Application Placement:	BROSOI	BROFOL	BROFOL	BROFOL	BROFOL
Applied By:	MCG	MCG	MCG	MCG	MCG
Air Temperature, Unit:	79 F	98 F	76 F	76 F	98 F
% Relative Humidity:	24	35	35	35	35
Wind Velocity, Unit:	2 MPH	6 MPH	5 MPH	5 MPH	6 MPH
Wind Direction:	NNW	S	N	N	S
Dew Presence (Y/N):	N	N	N	N	N
Soil Temperature, Unit:	70 F	90 F	80 F	80 F	90 F
Soil Moisture:	NORMAL	BELNOR	BELNOR	BELNOR	BELNOR
% Cloud Cover:	0	30	30	30	30
Next Moisture Occurred On:	5-27-16	7-1-16	7-1-16	7-1-16	7-1-16
Time to Next Moisture, Unit:	5 DAY	17 DAY	2 DAY	2 DAY	17 DAY

## Crop Stage At Each Application

	A	B	C	D	E
Crop 1 Code, BBCH Scale:	GLXMA	GLXMA	GLXMA	GLXMA	GLXMA
Stage Scale Used:	DESC	DESC	DESC	DESC	DESC
Stage Majority, Percent:	NA	V3	V6	V6	V3
Stage Minimum, Percent:		V2	V5	V5	V2
Stage Maximum, Percent:		V3	V6	V6	V3
Height, Unit:		4 IN	9 IN	9 IN	4 IN
Height Minimum, Maximum:		3 4	5 9	5 9	3 4

## Pest Stage At Each Application

	A	B	C	D	E
Pest 1 Code, Type, Scale:	AMATA W	AMATA W	AMATA W	AMATA W	AMATA W
Stage Majority, Percent:	NA	8	9	9	8
Stage Minimum, Percent:		COTY	4	4	COTY
Stage Maximum, Percent:		13	35	35	13
Height, Unit:		3 IN	4 IN	4 IN	3 IN
Height Minimum, Maximum:		0.25 9	0.5 10	0.5 10	0.25 9
Density, Unit:		20 FT2	0.02 FT2	0.02 FT2	20 FT2

## Application Equipment

	A	B	C	D	E
Appl. Equipment:	CO2 sprayer	CO2 sprayer	CO2 sprayer	CO2 sprayer	CO2 sprayer
Equipment Type:	BACSPR	BACSPR	BACSPR	BACSPR	BACSPR
Operation Pressure, Unit:	30 PSI	30 PSI	30 PSI	30 PSI	30 PSI
Nozzle Type:	XR	XR	XR	XR	XR
Nozzle Size:	8002	8002	8002	8002	8002
Boom Length, Unit:	6.67 FT	6.67 FT	6.67 FT	6.67 FT	6.67 FT
Spray Volume, Unit:	15 GPA	15 GPA	15 GPA	15 GPA	15 GPA

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Pest Code							GLXMA	GLXMA	GLXMA		
Crop Code							10-7-16	10-7-16	10-7-16		
Rating Date							Moisture	Test wt.	Yield		
Rating Type							Percent	lb/bu	bu/A		
Rating Unit											
Rating Timing											
Trt-Eval Interval											
Trt	Treatment	Form	Form	Rate	Other	Other	Growth	Appl			
No.	Name	Conc	Type	Rate	Rate	Rate	Stage	Code			
1	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-1	B	13.9 a	53.5 a	59 abc
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-1	B			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-2	C			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-2	C			
2	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a	26 fl oz/a	PRE	A	13.6 a	53.1 a	59 abc
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D			
3	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a	26 fl oz/a	PRE	A	13.6 a	53.3 a	60 a
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a	5 oz/a	PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D			
4	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a	26 fl oz/a	PRE	A	13.3 a	54.1 a	53 c
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E			
5	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a	5 oz/a	PRE	A	13.4 a	53.3 a	53 bc
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E			
6	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a	5 oz/a	PRE	A	13.2 a	53.7 a	54 abc
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a	5 oz/a	PRE	A			
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E			
7	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a	15 oz/a	PRE	A	13.0 a	53.9 a	56 abc
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E			
8	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a	15 oz/a	PRE	A	13.4 a	53.6 a	54 abc
	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a	4 fl oz/a	PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D			
9	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a	15 oz/a	PRE	A	13.2 a	53.5 a	59 abc
	PROWL H2O	3.8	CS	0.71 lb ai/a	1.5 pt/a	1.5 pt/a	PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D			
10	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a	4 fl oz/a	PRE	A	13.5 a	53.6 a	59 abc
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D			
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a	7.25 fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D			
11	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a	4 fl oz/a	PRE	A	14.1 a	53.8 a	58 abc
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a	5 oz/a	PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D			
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a	7.25 fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D			

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

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Missing data estimates are included in columns: Average=7,8,9

Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

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Pest Code							GLXMA	GLXMA	GLXMA			
Crop Code							10-7-16	10-7-16	10-7-16			
Rating Date							Moisture	Test wt.	Yield			
Rating Type							Percent	lb/bu	bu/A			
Rating Unit												
Rating Timing												
Trt-Eval Interval												
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Other Rate	Other Unit	Growth Stage	Appl Code			
12	ANTHEM MAXX	4.3	SC	0.134	lb ai/a	4	oz/a	PRE	A	13.4 a	53.5 a	60 abc
	PREFIX	5.29	EC	1.32	lb ai/a	2	pt/a	3T	E			
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E			
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E			
13	BOUNDARY	6.5	EC	1.22	lb ai/a	1.5	pt/a	PRE	A	13.5 a	53.4 a	60 ab
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D			
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D			
14	BOUNDARY	6.5	EC	1.22	lb ai/a	1.5	pt/a	PRE	A	13.7 a	55.2 a	57 abc
	PREFIX	5.29	EC	1.32	lb ai/a	2	pt/a	3T	E			
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E			
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E			
15	NONTREATED										29 d	
LSD P=.05							0.75	1.78	7.0			
Standard Deviation							0.44	1.05	4.2			
CV							3.3	1.96	7.58			
Replicate F							0.709	0.128	0.454			
Replicate Prob(F)							0.5032	0.8803	0.6405			
Treatment F							1.224	0.717	10.267			
Treatment Prob(F)							0.3267	0.7291	0.0001			

Means followed by same letter or symbol do not significantly differ (P=.05, LSD)  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

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Pest Code	Crop Code	Rating Date	Rating Type	Rating Unit	Rating Timing	Trt-Eval Interval	GLXMA 5-29-16 Injury Percent	GLXMA 6-5-16 Injury Percent	GLXMA 6-14-16 Injury Percent	GLXMA 6-19-16 Injury Percent			
							7 DA-A	14 DA-A	23 DA-A	28 DA-A			
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Form Rate	Other Rate	Other Unit	Growth Stage	Appl Code				
1	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-1	B				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-1	B				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-2	C				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-2	C				
2	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a			PRE	A	43 de	22 d	15 c	20 b
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-3	D				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-3	D				
3	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a			PRE	A	35 e	23 cd	12 c	20 b
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a			PRE	A				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-3	D				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-3	D				
4	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a			PRE	A	47 cd	22 d	13 c	
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a			3T	E				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			3T	E				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			3T	E				
5	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a			PRE	A	60 b	28 bc	28 b	
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a			3T	E				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			3T	E				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			3T	E				
6	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a			PRE	A	55 bc	30 b	23 b	
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a			PRE	A				
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a			3T	E				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			3T	E				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			3T	E				
7	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a			PRE	A	42 de	25 bcd	8 c	
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a			3T	E				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			3T	E				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			3T	E				
8	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a			PRE	A	77 a	65 a	58 a	58 a
	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a			PRE	A				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-3	D				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-3	D				
9	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a			PRE	A	37 de	20 d	10 c	25 b
	PROWL H2O	3.8	CS	0.71 lb ai/a	1.5 pt/a			PRE	A				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-3	D				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-3	D				
10	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a			PRE	A	0 f	0 e	0 d	0 c
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-3	D				
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a			4"W-3	D				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-3	D				
11	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a			PRE	A	0 f	0 e	0 d	0 c
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a			PRE	A				
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a			4"W-3	D				
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a			4"W-3	D				
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v			4"W-3	D				

Means followed by same letter or symbol do not significantly differ (P=0.05, LSD)  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
 Investigator: Karla L. Gage, Ph.D.

Pest Code							GLXMA	GLXMA	GLXMA	GLXMA			
Crop Code							5-29-16	6-5-16	6-14-16	6-19-16			
Rating Date							Injury	Injury	Injury	Injury			
Rating Type							Percent	Percent	Percent	Percent			
Rating Unit							0 DA-B+E	5 DA-B+E	23 DA-A	28 DA-A			
Rating Timing													
Trt-Eval Interval							7 DA-A	14 DA-A	23 DA-A	28 DA-A			
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Other Rate	Other Unit	Growth Stage	Appl Code				
12	ANTHEM MAXX	4.3	SC	0.134	lb ai/a	4	oz/a	PRE	A	0 f	0 e	0 d	
	PREFIX	5.29	EC	1.32	lb ai/a	2	pt/a	3T	E				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E				
13	BOUNDARY	6.5	EC	1.22	lb ai/a	1.5	pt/a	PRE	A	0 f	0 e	0 d	0 c
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				
14	BOUNDARY	6.5	EC	1.22	lb ai/a	1.5	pt/a	PRE	A	2 f	0 e	0 d	
	PREFIX	5.29	EC	1.32	lb ai/a	2	pt/a	3T	E				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E				
15	NONTREATED									0	0	0	0
LSD P=.05										10.4	5.0	8.1	10.2
Standard Deviation										6.2	3.0	4.8	5.7
CV										20.31	16.47	37.31	32.47
Replicate F										6.876	0.217	0.851	1.127
Replicate Prob(F)										0.0044	0.8066	0.4394	0.3559
Treatment F										57.040	118.072	35.112	40.545
Treatment Prob(F)										0.0001	0.0001	0.0001	0.0001

Means followed by same letter or symbol do not significantly differ (P=.05, LSD)  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
 Investigator: Karla L. Gage, Ph.D.

Pest Code							GLXMA	GLXMA	GLXMA		
Crop Code							6-21-16	6-28-16	7-12-16		
Rating Date							Injury	Injury	Injury		
Rating Type							Percent	Percent	Percent		
Rating Unit							7 DA-B+E	14 DA-B+E	28 DA-B+E		
Rating Timing							30 DA-A	-1 DA-C+D	13 DA-C+D		
Trt-Eval Interval											
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Other Rate	Other Rate Unit	Growth Stage	Appl Code			
1	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-1	B	0 e	0 f	0 f
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-1	B			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-2	C			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-2	C			
2	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a		PRE	A		8 de	12 cde
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			
3	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a		PRE	A		8 de	7 def
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a		PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			
4	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a		PRE	A	28 b	18 bc	15 bcd
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a		3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E			
5	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a		PRE	A	38 a	17 c	18 bc
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a		3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E			
6	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a		PRE	A	37 a	25 b	23 ab
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a		PRE	A			
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a		3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E			
7	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a		PRE	A	23 bc	12 cd	8 c-f
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a		3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E			
8	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a		PRE	A		38 a	30 a
	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a		PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			
9	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a		PRE	A		3 ef	2 ef
	PROWL H2O	3.8	CS	0.71 lb ai/a	1.5 pt/a		PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			
10	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a		PRE	A		0 f	8 c-f
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			
11	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a		PRE	A		2 ef	8 c-f
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a		PRE	A			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			

Means followed by same letter or symbol do not significantly differ (P=,05, LSD)  
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 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.



PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
 Investigator: Karla L. Gage, Ph.D.

Pest Code							GLXMA	GLXMA	GLXMA		
Crop Code							6-21-16	6-28-16	7-12-16		
Rating Date							Injury	Injury	Injury		
Rating Type							Percent	Percent	Percent		
Rating Unit							7 DA-B+E	14 DA-B+E	28 DA-B+E		
Rating Timing							30 DA-A	-1 DA-C+D	13 DA-C+D		
Trt-Eval Interval											
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Other Rate	Other Unit	Growth Stage	Appl Code			
12	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 oz/a		PRE	A	20 cd	13 cd	8 c-f
	PREFIX	5.29	EC	1.32 lb ai/a	2 pt/a		3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E			
13	BOUNDARY	6.5	EC	1.22 lb ai/a	1.5 pt/a		PRE	A		3 ef	7 def
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D			
14	BOUNDARY	6.5	EC	1.22 lb ai/a	1.5 pt/a		PRE	A	15 d	7 def	3 ef
	PREFIX	5.29	EC	1.32 lb ai/a	2 pt/a		3T	E			
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E			
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E			
15	NONTREATED								0	0	0
LSD P=.05							5.5	6.7	10.9		
Standard Deviation							3.1	4.0	6.5		
CV							13.36	35.95	60.84		
Replicate F							0.125	5.410	1.513		
Replicate Prob(F)							0.8836	0.0109	0.2390		
Treatment F							55.250	22.061	4.970		
Treatment Prob(F)							0.0001	0.0001	0.0003		

Means followed by same letter or symbol do not significantly differ (P=.05, LSD)  
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 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
 Investigator: Karla L. Gage, Ph.D.

							AMATA-HR	AMATA-HR	AMATA-HR
							6-5-16	6-14-16	6-19-16
							Control	Control	Control
							Percent	Percent	Percent
								0 DA-B+E	
							14 DA-A	23 DA-A	28 DA-A
Trt	Treatment	Form	Form	Rate	Other	Other	Growth	Appl	
No.	Name	Conc	Type	Unit	Rate	Rate	Stage	Code	
1	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-1	B	
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-1	B	
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-2	C	
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-2	C	
2	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a	26 fl oz/a	PRE	A	98 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D	97 a
3	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a	26 fl oz/a	PRE	A	99 a
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a	5 oz/a	PRE	A	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D	99 a
4	AUTHORITY ELITE	7	SC	1.42 lb ai/a	26 fl oz/a	26 fl oz/a	PRE	A	99 a
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E	99 a
5	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a	5 oz/a	PRE	A	96 a
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E	99 a
6	AUTHORITY MAXX	66	WG	0.206 lb ai/a	5 oz/a	5 oz/a	PRE	A	99 a
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a	5 oz/a	PRE	A	99 a
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E	99 a
7	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a	15 oz/a	PRE	A	99 a
	ANTHEM MAXX	4.3	SC	0.084 lb ai/a	2.5 fl oz/a	2.5 fl oz/a	3T	E	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	3T	E	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	3T	E	99 a
8	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a	15 oz/a	PRE	A	99 a
	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a	4 fl oz/a	PRE	A	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D	99 a
9	AUTHORITY MTZ	45	WG	0.42 lb ai/a	15 oz/a	15 oz/a	PRE	A	99 a
	PROWL H2O	3.8	CS	0.71 lb ai/a	1.5 pt/a	1.5 pt/a	PRE	A	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D	99 a
10	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a	4 fl oz/a	PRE	A	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D	99 a
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a	7.25 fl oz/a	4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D	99 a
11	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 fl oz/a	4 fl oz/a	PRE	A	99 a
	SENCOR DF	75	DF	0.234 lb ai/a	5 oz/a	5 oz/a	PRE	A	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a	29 fl oz/a	4"W-3	D	99 a
	MARVEL	3	SL	0.17 lb ai/a	7.25 fl oz/a	7.25 fl oz/a	4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v	2.5 % v/v	4"W-3	D	99 a

Means followed by same letter or symbol do not significantly differ (P=0.05, LSD)  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
 Investigator: Karla L. Gage, Ph.D.

							AMATA-HR	AMATA-HR	AMATA-HR
							6-5-16	6-14-16	6-19-16
							Control	Control	Control
							Percent	Percent	Percent
							14 DA-A	0 DA-B+E 23 DA-A	28 DA-A
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Other Rate	Other Unit	Growth Stage	Appl Code	
12	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 oz/a		PRE	A	99 a
	PREFIX	5.29	EC	1.32 lb ai/a	2 pt/a		3T	E	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E	
13	BOUNDARY	6.5	EC	1.22 lb ai/a	1.5 pt/a		PRE	A	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D	99 a
14	BOUNDARY	6.5	EC	1.22 lb ai/a	1.5 pt/a		PRE	A	99 a
	PREFIX	5.29	EC	1.32 lb ai/a	2 pt/a		3T	E	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E	99 a
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E	
15	NONTREATED								0
LSD P=.05							2.0	.	1.9
Standard Deviation							1.2	0.0	1.1
CV							1.22	0.0	1.15
Replicate F							0.866	0.000	0.850
Replicate Prob(F)							0.4334	1.0000	0.4398
Treatment F							1.588	0.000	0.965
Treatment Prob(F)							0.1618	1.0000	0.5053

Means followed by same letter or symbol do not significantly differ (P=.05, LSD)  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
 Missing data estimates are included in columns: Average=7,8,9  
 Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

## PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
Investigator: Karla L. Gage, Ph.D.

Pest Code	Crop Code	Rating Date	Rating Type	Rating Unit	Rating Timing	Trt-Eval Interval	AMATA-HR	AMATA-HR	AMATA-HR	AMATA-HR			
							6-28-16 Control Percent 14 DA-B+E -1 DA-C+D	7-12-16 Control Percent 28 DA-B+E 13 DA-C+D	7-17-16 Control Percent 56 DA-A	8-14-16 Control Percent 84 DA-A			
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code				
1	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-1	B	93 b	99 a	99 a	93 a
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-1	B				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-2	C				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-2	C				
2	AUTHORITY ELITE	7	SC	1.42	lb ai/a	26	fl oz/a	PRE	A	94 b	96 a	96 a	97 a
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				
3	AUTHORITY ELITE	7	SC	1.42	lb ai/a	26	fl oz/a	PRE	A	98 a	99 a	99 a	99 a
	SENCOR DF	75	DF	0.234	lb ai/a	5	oz/a	PRE	A				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				
4	AUTHORITY ELITE	7	SC	1.42	lb ai/a	26	fl oz/a	PRE	A	99 a	99 a	99 a	98 a
	ANTHEM MAXX	4.3	SC	0.084	lb ai/a	2.5	fl oz/a	3T	E				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E				
5	AUTHORITY MAXX	66	WG	0.206	lb ai/a	5	oz/a	PRE	A	99 a	98 a	98 a	97 a
	ANTHEM MAXX	4.3	SC	0.084	lb ai/a	2.5	fl oz/a	3T	E				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E				
6	AUTHORITY MAXX	66	WG	0.206	lb ai/a	5	oz/a	PRE	A	99 a	99 a	99 a	99 a
	SENCOR DF	75	DF	0.234	lb ai/a	5	oz/a	PRE	A				
	ANTHEM MAXX	4.3	SC	0.084	lb ai/a	2.5	fl oz/a	3T	E				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E				
7	AUTHORITY MTZ	45	WG	0.42	lb ai/a	15	oz/a	PRE	A	99 a	99 a	99 a	99 a
	ANTHEM MAXX	4.3	SC	0.084	lb ai/a	2.5	fl oz/a	3T	E				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	3T	E				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	3T	E				
8	AUTHORITY MTZ	45	WG	0.42	lb ai/a	15	oz/a	PRE	A	98 a	99 a	99 a	97 a
	ANTHEM MAXX	4.3	SC	0.134	lb ai/a	4	fl oz/a	PRE	A				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				
9	AUTHORITY MTZ	45	WG	0.42	lb ai/a	15	oz/a	PRE	A	97 a	99 a	99 a	98 a
	PROWL H2O	3.8	CS	0.71	lb ai/a	1.5	pt/a	PRE	A				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				
10	ANTHEM MAXX	4.3	SC	0.134	lb ai/a	4	fl oz/a	PRE	A	98 a	99 a	99 a	99 a
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	MARVEL	3	SL	0.17	lb ai/a	7.25	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				
11	ANTHEM MAXX	4.3	SC	0.134	lb ai/a	4	fl oz/a	PRE	A	99 a	99 a	99 a	99 a
	SENCOR DF	75	DF	0.234	lb ai/a	5	oz/a	PRE	A				
	LIBERTY 280	2.34	EC	0.53	lb ai/a	29	fl oz/a	4"W-3	D				
	MARVEL	3	SL	0.17	lb ai/a	7.25	fl oz/a	4"W-3	D				
	N-PAK AMS	100	SL	2.5	% v/v	2.5	% v/v	4"W-3	D				

Means followed by same letter or symbol do not significantly differ (P=0.05, LSD)

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Missing data estimates are included in columns: Average=7,8,9

Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

## PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB Location: Carlyle, IL Trial Year: 2016  
Investigator: Karla L. Gage, Ph.D.

							AMATA-HR	AMATA-HR	AMATA-HR	AMATA-HR
							6-28-16	7-12-16	7-17-16	8-14-16
							Control	Control	Control	Control
							Percent	Percent	Percent	Percent
							14 DA-B+E	28 DA-B+E	56 DA-A	84 DA-A
							-1 DA-C+D	13 DA-C+D		
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Other Rate	Other Unit	Growth Stage	Appl Code		
12	ANTHEM MAXX	4.3	SC	0.134 lb ai/a	4 oz/a		PRE	A	99 a	99 a
	PREFIX	5.29	EC	1.32 lb ai/a	2 pt/a		3T	E		
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E		
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E		
13	BOUNDARY	6.5	EC	1.22 lb ai/a	1.5 pt/a		PRE	A	98 a	99 a
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		4"W-3	D		
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		4"W-3	D		
14	BOUNDARY	6.5	EC	1.22 lb ai/a	1.5 pt/a		PRE	A	99 a	99 a
	PREFIX	5.29	EC	1.32 lb ai/a	2 pt/a		3T	E		
	LIBERTY 280	2.34	EC	0.53 lb ai/a	29 fl oz/a		3T	E		
	N-PAK AMS	100	SL	2.5 % v/v	2.5 % v/v		3T	E		
15	NONTREATED								0	0
LSD P=.05							2.9	2.6	2.6	4.2
Standard Deviation							1.7	1.5	1.5	2.5
CV							1.75	1.56	1.56	2.59
Replicate F							2.119	0.611	0.611	0.348
Replicate Prob(F)							0.1404	0.5502	0.5502	0.7095
Treatment F							4.043	0.917	0.917	1.383
Treatment Prob(F)							0.0012	0.5493	0.5493	0.2325

Means followed by same letter or symbol do not significantly differ (P=.05, LSD)  
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.  
Missing data estimates are included in columns: Average=7,8,9  
Could not calculate LSD (% mean diff) for columns 14 because error mean square = 0.

PPO-Resistant Waterhemp Strategies in Liberty Link Soybeans.

Trial ID: 16-PPO-LL-SB      Location: Carlyle, IL      Trial Year: 2016  
 Investigator: Karla L. Gage, Ph.D.

## Trial Comments

1. Protocol: FMC (PPO in LL SB).
2. Ratings:  
 CI 7, 14, and 28 DA-A; and 7, 14, and 28 DA-E.  
 WC 14, 28, 56, and 84 DA-A, but rate PREs prior to POST applications D+E.  
 Rate all plots each time.
3. Yield if possible.
4. Blanket to start clean if needed (was not needed, used tillage).
5. POST applications B-E between 8am and 5pm only.
6. Target wterhemp and rate other weeds.
7. Application E, 3T = 3 soybean trifoliates.
8. Photos of PREs prior to POSTs.
9. Rainfall following the PRE application A was 0.89 inch over 2 days beginning 5 days later.  
 Rainfall following the 4"W-1 application B was 0.48 inch over 2 days beginning 17 days later.  
 Rainfall following the 4"W-2 application C was 0.48 inch over 2 days beginning 2 days later.  
 Rainfall following the 4"W-3 application D was 0.48 inch over 2 days beginning 2 days later.  
 Rainfall following the 3T application E was 0.48 inch over 2 days beginning 17 days later.
10. AMATA-HR = Herbicide-resistant waterhemp (PPO).
11. Regarding soybean injury;

At 7 DA-A there was severe sulfentrazone damage, few soybeans in these treatments were fully emerged, and if emerged there was severe injury on the hypocotyl and cotyledons.  
 The nontreated, Anthem Maxx, and Boundary plots had 90% or better emergence with cotyledons unfolded.  
 Plots in replication 1 had more severe injury probably due to poorer drainage compared to the rest of the field. These fields are very flat and perhaps it took an extended period of time for them to drain.  
 At 14 DA-A soybean injury was stunt and stand reduction in treatments 2-9.

12. Harvested 10-7-16, (2) 30 inch rows by 27 ft.  
 Missing yield data was due to equipment malfunction.