

MSU Weed Science Research Program

Glyphosate-resistant Palmer amaranth control in Liberty Link soybean

Trial ID: SOY23-14 Study Dir.: Sprague, Kohrt and Powell  
 Conducted: Gratiot County Investigator: Christy Sprague

Date Planted: May/29/2014 Row Spacing: 30 IN  
 Variety: MCIA2653NLL No. of Reps: 4  
 Population: 150,000 seeds/A % OM: 3.1  
 Soil Type: sandy loam pH: 7.0  
 Plot Size: 10 X 25 FT Design: RANDOMIZED COMPLETE BLOCK

Tillage: Spring disk and soil finish  
 Fertilizer: None

Crop and Weed Description

Weed	Code	Common Name	Scientific Name
1.	AMAPA	AMARANTH, PALMER	AMARANTHUS PALMERI S.WATS.
2.	CHEAL	LAMBSQUARTERS, COMMON	CHENOPODIUM ALBUM L.
Crop	Code	Common Name	
1.	GLXMA	SOYBEAN	

Application Description

	A	B	C	D	E
Application Timing:	PRE	EPOS	POST	LPOS1	LPOS2
Date Treated:	May/29/2014	Jun/19/2014	Jun/19/2014	Jul/11/2014	Jul/21/2014
Time Treated:	2:20 PM	10:30 AM	10:30 AM	11:00 AM	12:50 PM
% Cloud Cover:	25	50	50	10	10
Air Temp., Unit:	75 F	78 F	78 F	76 F	77 F
% Relative Humidity:	55	65	65	52	62
Wind Speed/Unit/Dir:	2 mph NE	6 mph NE	6 mph NE	3 mph SE	7 mph SW
Soil Temp., Unit:	72 F	73 F	73 F	70 F	74 F
Soil/Leaf Surface M:	5 -	3 5	3 5	3 5	4 5
Soil Moist (1=w 5=d):	5	2	2	3	5

Crop Stage at Each Application

	A	B	C	D	E
Crop Name:	GLXMA	GLXMA	GLXMA	GLXMA	GLXMA
Height (In.):	-	4.5"	4.5"	12-15"	16"
Stage (L):	-	V2	V2	V5-V6	R2

Weed Stage at Each Application

	A	B	C	D	E
Weed 1 Name:	AMAPA	AMAPA	AMAPA	AMAPA	AMAPA
Height (In.):	-	1-3"	1-3"	3-5"	2-5"
Stage (L):	-	4-8	4-8	12-16	12-16
Weed 2 Name:	CHEAL	CHEAL	CHEAL	CHEAL	CHEAL
Height (In.):	-	2-3"	2-3"	2-4"	2-4"
Stage (L):	-	4-6	4-6	12	12

Weed Density (plants/sq. ft.)

	1	2
Date:	Jul/29/2014	Jul/29/2014
Weed Name:	AMAPA	CHEAL
Density:	12	5

Application Equipment

Appl	Sprayer Type	Speed MPH	Nozzle Type	Nozzle Size	Nozzle Height	Nozzle Spacing	Boom Width	GPA	Carrier	PSI
A	Backpack	3.5	AIXR	11003	20"	20"	100"	19	Water	30
B	Backpack	3.5	AIXR	11003	24"	20"	100"	19	Water	30
C	Backpack	3.5	AIXR	11003	24"	20"	100"	19	Water	30
D	Backpack	3.5	AIXR	11003	26"	20"	100"	19	Water	30
E	Backpack	3.5	AIXR	11003	26"	20"	100"	19	Water	30

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Study Dir.: Sprague, Kohrt and Powell

Conducted: Gratiot County

Investigator: Christy Sprague

Weed Code								GLXMA	AMAPA	CHEAL	GLXMA	AMAPA
Crop Code								injury	conrol	conrol	injury	conrol
Rating Data Type								percent	percent	percent	percent	percent
Rating Unit								Jun/19/2014	Jun/19/2014	Jun/19/2014	Jun/27/2014	Jun/27/2014
Rating Date								21 DA-A	21 DA-A	21 DA-A	8 DA-B	8 DA-B
Trt-Eval Interval								0	0	0	0	0
# Subsamples, Dec.												
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code					
1	Untreated							0	0	0	0	0
2	Valor	51	WG	2.5	oz/a	PRE	A	0	75	86	1	99
2	Liberty	2.34	L	29	fl oz/a	POST	C					
2	AMS		WG	8.5	lb/100 gal	POST	C					
3	Valor	51	WG	2.5	oz/a	PRE	A	0	79	83	2	99
3	Liberty	2.34	L	29	fl oz/a	POST	C					
3	Warrant	3	L	3	pt/a	POST	C					
3	AMS		WG	8.5	lb/100 gal	POST	C					
4	Valor	51	WG	2.5	oz/a	PRE	A	0	81	77	19	99
4	Liberty	2.34	L	29	fl oz/a	POST	C					
4	Zidua	85	WG	2.5	oz/a	POST	C					
4	AMS		WG	8.5	lb/100 gal	POST	C					
5	Valor	51	WG	2.5	oz/a	PRE	A	0	70	83	6	99
5	Liberty	2.34	L	29	fl oz/a	POST	C					
5	Dual II Magnum	7.64	L	1.33	pt/a	POST	C					
5	AMS		WG	8.5	lb/100 gal	POST	C					
6	Valor	51	WG	2.5	oz/a	PRE	A	0	81	78	38	99
6	Liberty	2.34	L	29	fl oz/a	POST	C					
6	Prefix	5.29	L	2	pt/a	POST	C					
6	AMS		WG	8.5	lb/100 gal	POST	C					
7	Valor	51	WG	2.5	oz/a	PRE	A	0	78	79	30	99
7	Prefix	5.29	L	2	pt/a	POST	C					
7	COC		L	1	% v/v	POST	C					
7	AMS		WG	8.5	lb/100 gal	POST	C					
8	Valor	51	WG	2.5	oz/a	PRE	A	0	79	84	41	99
8	Cobra	2	L	12.5	fl oz/a	POST	C					
8	Warrant	3	L	3	pt/a	POST	C					
8	COC		L	0.5	% v/v	POST	C					
8	AMS		WG	8.5	lb/100 gal	POST	C					
9	Liberty	2.34	L	29	fl oz/a	EPOS	B				2	98
9	AMS		WG	8.5	lb/100 gal	EPOS	B					
9	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
9	AMS		WG	8.5	lb/100 gal	LPOS1	D					
10	Liberty	2.34	L	29	fl oz/a	EPOS	B				36	99
10	Prefix	5.29	L	2	pt/a	EPOS	B					
10	AMS		WG	8.5	lb/100 gal	EPOS	B					
10	Liberty	2.34	L	29	fl oz/a	LPOS2	E					
10	AMS		WG	8.5	lb/100 gal	LPOS2	E					
11	Liberty	2.34	L	29	fl oz/a	EPOS	B				3	99
11	Warrant	3	L	3	pt/a	EPOS	B					
11	AMS		WG	8.5	lb/100 gal	EPOS	B					
11	Liberty	2.34	L	29	fl oz/a	LPOS2	E					
11	AMS		WG	8.5	lb/100 gal	LPOS2	E					
12	Liberty	2.34	L	29	fl oz/a	POST	C				0	99
12	AMS		WG	8.5	lb/100 gal	POST	C					
12	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
12	AMS		WG	8.5	lb/100 gal	LPOS1	D					

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Glyphosate-resistant Palmer amaranth control in Liberty Link soybean

Trial ID: SOY23-14 Study Dir.: Sprague, Kohrt and Powell  
 Conducted: Gratiot County Investigator: Christy Sprague

Weed Code	Crop Code	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	# Subsamples, Dec.	GLXMA injury percent Jun/19/2014 21 DA-A 0	AMAPA conrol percent Jun/19/2014 21 DA-A 0	CHEAL conrol percent Jun/19/2014 21 DA-A 0	GLXMA injury percent Jun/27/2014 8 DA-B 0	AMAPA conrol percent Jun/27/2014 8 DA-B 0
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Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate	Rate Unit	Grow Stg	Appl Code				
13	Liberty	2.34	L	36	fl oz/a	POST	C			1	99
13	AMS		WG	8.5	lb/100 gal	POST	C				
13	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
13	AMS		WG	8.5	lb/100 gal	LPOS1	D				
14	Cobra	2	L	12.5	fl oz/a	POST	C			38	99
14	COC		L	0.5	% v/v	POST	C				
14	AMS		WG	8.5	lb/100 gal	POST	C				
14	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
14	AMS		WG	8.5	lb/100 gal	LPOS1	D				
15	Flexstar	1.88	L	1	pt/a	POST	C			25	99
15	COC		L	1	% v/v	POST	C				
15	AMS		WG	8.5	lb/100 gal	POST	C				
15	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
15	AMS		WG	8.5	lb/100 gal	LPOS1	D				
16	Ultra Blazer	2	L	1.5	pt/a	POST	C			58	99
16	Surfactant		L	0.25	% v/v	POST	C				
16	AMS		WG	8.5	lb/100 gal	POST	C				
16	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
16	AMS		WG	8.5	lb/100 gal	LPOS1	D				
LSD (P=.05)							0.0	12.4	9.6	8.4	0.8
CV							0.0	12.37	9.17	31.46	0.58

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

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Conducted: Gratiot County

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Weed Code								CHEAL	GLXMA	AMAPA	CHEAL	GLXMA
Crop Code								conrol	injury	conrol	conrol	injury
Rating Data Type								percent	percent	percent	percent	percent
Rating Unit								Jun/27/2014	Jul/09/2014	Jul/09/2014	Jul/09/2014	Jul/21/2014
Rating Date								8 DA-B	20 DA-B	20 DA-B	20 DA-B	10 DA-D
Trt-Eval Interval								0	0	0	0	0
# Subsamples, Dec.												
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code					
1	Untreated							0	0	0	0	0
2	Valor	51	WG	2.5	oz/a	PRE	A	99	3	95	99	0
2	Liberty	2.34	L	29	fl oz/a	POST	C					
2	AMS		WG	8.5	lb/100 gal	POST	C					
3	Valor	51	WG	2.5	oz/a	PRE	A	99	20	99	99	4
3	Liberty	2.34	L	29	fl oz/a	POST	C					
3	Warrant	3	L	3	pt/a	POST	C					
3	AMS		WG	8.5	lb/100 gal	POST	C					
4	Valor	51	WG	2.5	oz/a	PRE	A	99	20	99	99	20
4	Liberty	2.34	L	29	fl oz/a	POST	C					
4	Zidua	85	WG	2.5	oz/a	POST	C					
4	AMS		WG	8.5	lb/100 gal	POST	C					
5	Valor	51	WG	2.5	oz/a	PRE	A	99	9	99	99	4
5	Liberty	2.34	L	29	fl oz/a	POST	C					
5	Dual II Magnum	7.64	L	1.33	pt/a	POST	C					
5	AMS		WG	8.5	lb/100 gal	POST	C					
6	Valor	51	WG	2.5	oz/a	PRE	A	99	30	99	99	14
6	Liberty	2.34	L	29	fl oz/a	POST	C					
6	Prefix	5.29	L	2	pt/a	POST	C					
6	AMS		WG	8.5	lb/100 gal	POST	C					
7	Valor	51	WG	2.5	oz/a	PRE	A	99	24	98	96	12
7	Prefix	5.29	L	2	pt/a	POST	C					
7	COC		L	1	% v/v	POST	C					
7	AMS		WG	8.5	lb/100 gal	POST	C					
8	Valor	51	WG	2.5	oz/a	PRE	A	94	31	99	89	25
8	Cobra	2	L	12.5	fl oz/a	POST	C					
8	Warrant	3	L	3	pt/a	POST	C					
8	COC		L	0.5	% v/v	POST	C					
8	AMS		WG	8.5	lb/100 gal	POST	C					
9	Liberty	2.34	L	29	fl oz/a	EPOS	B	99	0	59	71	0
9	AMS		WG	8.5	lb/100 gal	EPOS	B					
9	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
9	AMS		WG	8.5	lb/100 gal	LPOS1	D					
10	Liberty	2.34	L	29	fl oz/a	EPOS	B	99	23	99	93	15
10	Prefix	5.29	L	2	pt/a	EPOS	B					
10	AMS		WG	8.5	lb/100 gal	EPOS	B					
10	Liberty	2.34	L	29	fl oz/a	LPOS2	E					
10	AMS		WG	8.5	lb/100 gal	LPOS2	E					
11	Liberty	2.34	L	29	fl oz/a	EPOS	B	97	10	98	85	5
11	Warrant	3	L	3	pt/a	EPOS	B					
11	AMS		WG	8.5	lb/100 gal	EPOS	B					
11	Liberty	2.34	L	29	fl oz/a	LPOS2	E					
11	AMS		WG	8.5	lb/100 gal	LPOS2	E					
12	Liberty	2.34	L	29	fl oz/a	POST	C	99	1	70	73	0
12	AMS		WG	8.5	lb/100 gal	POST	C					
12	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
12	AMS		WG	8.5	lb/100 gal	LPOS1	D					

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Weed Code								CHEAL	GLXMA	AMAPA	CHEAL	GLXMA
Crop Code								conrol	injury	conrol	conrol	injury
Rating Data Type								percent	percent	percent	percent	percent
Rating Unit								Jun/27/2014	Jul/09/2014	Jul/09/2014	Jul/09/2014	Jul/21/2014
Rating Date								8 DA-B	20 DA-B	20 DA-B	20 DA-B	10 DA-D
Trt-Eval Interval								0	0	0	0	0
# Subsamples, Dec.												
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code					
13	Liberty	2.34	L	36	fl oz/a	POST	C	99	0	66	68	0
13	AMS		WG	8.5	lb/100 gal	POST	C					
13	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
13	AMS		WG	8.5	lb/100 gal	LPOS1	D					
14	Cobra	2	L	12.5	fl oz/a	POST	C	77	23	93	58	20
14	COC		L	0.5	% v/v	POST	C					
14	AMS		WG	8.5	lb/100 gal	POST	C					
14	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
14	AMS		WG	8.5	lb/100 gal	LPOS1	D					
15	Flexstar	1.88	L	1	pt/a	POST	C	98	12	92	88	11
15	COC		L	1	% v/v	POST	C					
15	AMS		WG	8.5	lb/100 gal	POST	C					
15	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
15	AMS		WG	8.5	lb/100 gal	LPOS1	D					
16	Ultra Blazer	2	L	1.5	pt/a	POST	C	98	35	79	84	28
16	Surfactant		L	0.25	% v/v	POST	C					
16	AMS		WG	8.5	lb/100 gal	POST	C					
16	Liberty	2.34	L	29	fl oz/a	LPOS1	D					
16	AMS		WG	8.5	lb/100 gal	LPOS1	D					
LSD (P=.05)								5.2	12.1	7.2	16.1	9.5
CV								3.97	56.29	6.0	13.89	68.14

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

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								AMAPA	CHEAL	AMAPA	AMAPA
								conrol	conrol	conrol	conrol
								percent	percent	percent	percent
								Jul/21/2014	Jul/21/2014	Aug/04/2014	Sep/12/2014
								10 DA-D	10 DA-D	14 DA-E	53 DA-E
								0	0	0	0
								# Subsamples, Dec.			
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code				
1	Untreated							0	0	0	0
2	Valor	51	WG	2.5	oz/a	PRE	A	94	99	91	88
2	Liberty	2.34	L	29	fl oz/a	POST	C				
2	AMS		WG	8.5	lb/100 gal	POST	C				
3	Valor	51	WG	2.5	oz/a	PRE	A	99	99	93	92
3	Liberty	2.34	L	29	fl oz/a	POST	C				
3	Warrant	3	L	3	pt/a	POST	C				
3	AMS		WG	8.5	lb/100 gal	POST	C				
4	Valor	51	WG	2.5	oz/a	PRE	A	99	99	97	93
4	Liberty	2.34	L	29	fl oz/a	POST	C				
4	Zidua	85	WG	2.5	oz/a	POST	C				
4	AMS		WG	8.5	lb/100 gal	POST	C				
5	Valor	51	WG	2.5	oz/a	PRE	A	98	99	94	88
5	Liberty	2.34	L	29	fl oz/a	POST	C				
5	Dual II Magnum	7.64	L	1.33	pt/a	POST	C				
5	AMS		WG	8.5	lb/100 gal	POST	C				
6	Valor	51	WG	2.5	oz/a	PRE	A	99	98	96	95
6	Liberty	2.34	L	29	fl oz/a	POST	C				
6	Prefix	5.29	L	2	pt/a	POST	C				
6	AMS		WG	8.5	lb/100 gal	POST	C				
7	Valor	51	WG	2.5	oz/a	PRE	A	98	90	96	83
7	Prefix	5.29	L	2	pt/a	POST	C				
7	COC		L	1	% v/v	POST	C				
7	AMS		WG	8.5	lb/100 gal	POST	C				
8	Valor	51	WG	2.5	oz/a	PRE	A	99	84	86	83
8	Cobra	2	L	12.5	fl oz/a	POST	C				
8	Warrant	3	L	3	pt/a	POST	C				
8	COC		L	0.5	% v/v	POST	C				
8	AMS		WG	8.5	lb/100 gal	POST	C				
9	Liberty	2.34	L	29	fl oz/a	EPOS	B	97	99	84	83
9	AMS		WG	8.5	lb/100 gal	EPOS	B				
9	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
9	AMS		WG	8.5	lb/100 gal	LPOS1	D				
10	Liberty	2.34	L	29	fl oz/a	EPOS	B	96	89	99	99
10	Prefix	5.29	L	2	pt/a	EPOS	B				
10	AMS		WG	8.5	lb/100 gal	EPOS	B				
10	Liberty	2.34	L	29	fl oz/a	LPOS2	E				
10	AMS		WG	8.5	lb/100 gal	LPOS2	E				
11	Liberty	2.34	L	29	fl oz/a	EPOS	B	93	80	99	99
11	Warrant	3	L	3	pt/a	EPOS	B				
11	AMS		WG	8.5	lb/100 gal	EPOS	B				
11	Liberty	2.34	L	29	fl oz/a	LPOS2	E				
11	AMS		WG	8.5	lb/100 gal	LPOS2	E				
12	Liberty	2.34	L	29	fl oz/a	POST	C	97	99	91	95
12	AMS		WG	8.5	lb/100 gal	POST	C				
12	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
12	AMS		WG	8.5	lb/100 gal	LPOS1	D				

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								AMAPA	CHEAL	AMAPA	AMAPA
Weed Code											
Crop Code											
Rating Data Type								conrol	conrol	conrol	conrol
Rating Unit								percent	percent	percent	percent
Rating Date								Jul/21/2014	Jul/21/2014	Aug/04/2014	Sep/12/2014
Trt-Eval Interval								10 DA-D	10 DA-D	14 DA-E	53 DA-E
# Subsamples, Dec.								0	0	0	0
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code				
13	Liberty	2.34	L	36	fl oz/a	POST	C	97	99	87	86
13	AMS		WG	8.5	lb/100 gal	POST	C				
13	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
13	AMS		WG	8.5	lb/100 gal	LPOS1	D				
14	Cobra	2	L	12.5	fl oz/a	POST	C	99	99	75	63
14	COC		L	0.5	% v/v	POST	C				
14	AMS		WG	8.5	lb/100 gal	POST	C				
14	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
14	AMS		WG	8.5	lb/100 gal	LPOS1	D				
15	Flexstar	1.88	L	1	pt/a	POST	C	98	99	94	95
15	COC		L	1	% v/v	POST	C				
15	AMS		WG	8.5	lb/100 gal	POST	C				
15	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
15	AMS		WG	8.5	lb/100 gal	LPOS1	D				
16	Ultra Blazer	2	L	1.5	pt/a	POST	C	99	99	81	65
16	Surfactant		L	0.25	% v/v	POST	C				
16	AMS		WG	8.5	lb/100 gal	POST	C				
16	Liberty	2.34	L	29	fl oz/a	LPOS1	D				
16	AMS		WG	8.5	lb/100 gal	LPOS1	D				
LSD (P=.05)								3.4	4.6	9.7	12.5
CV								2.58	3.56	7.96	10.73

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