

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15 Study Dir.: Sprague and Powell
 Conducted: Gratiot Co. Investigator: Christy Sprague

Date Planted: May/22/2015 Row Spacing: 30 IN
 Variety: Crystal 059 No. of Reps: 4
 Population: 49,200 seeds/A % OM: 3.1
 Soil Type: Sandy loam pH: 7.0
 Plot Size: 10 X 23 FT Design: RANDOMIZED COMPLETE BLOCK

Tillage: Spring disk and soil finish

Crop and Weed Description

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

Application Description

	A	B	C	D
Application Timing:	PRE	2 LEAF	6 LEAF	Canopy
Date Treated:	May/22/2015	Jun/17/2015	Jun/29/2015	Jul/15/2015
Time Treated:	9:50 AM	4:45 PM	10:45 AM	10:30 A
% Cloud Cover:	0	100	20	5
Air Temp., Unit:	55 F	72 F	72 F	66 F
% Relative Humidity:	43	76	62	63
Wind Speed/Unit/Dir:	4 mph N	4 mph S	1 mph S	7 mph NE
Soil Temp., Unit:	50 F	73 F	71 F	70 F
Soil/Leaf Surface M:	5 5	2 4	5 5	4 5
Soil Moist (1=w 5=d):	3	2	3	3

Crop Stage at Each Application

	A	B	C	D
Crop Name:	BETVU	BETVU	BETVU	BETVU
Height (In.):	-	4"	5"	10-14"
Stage (L):	-	2-4	6	10-14

Weed Stage at Each Application

	A	B	C	D
Weed 1 Name:	CHEAL	CHEAL	CHEAL	CHEAL
Height (In.):	-	1"	1"	-
Stage (L):	-	6	4	-
Weed 2 Name:	AMAPA	AMAPA	AMAPA	AMAPA
Height (In.):	-	0.5"	0.5-1"	2-8"
Stage (L):	-	4	4-8	many

Weed Density (plants/sq. ft.)

1
 Weed Name: AMAPA
 Density: 10

Application Equipment

Appl	Sprayer	Speed	Nozzle	Nozzle	Nozzle	Nozzle	Boom	GPA	Carrier	PSI
	Type	MPH	Type	Size	Height	Spacing	Width			
A	Backpack	3.5	AIXR	11003	18"	20"	100"	19	Water	28
B	Backpack	3.5	AIXR	11003	20"	20"	100"	19	Water	28
C	Backpack	3.5	AIXR	11003	23"	20"	100"	19	Water	28
D	Backpack	3.8	AIXR	11003	28"	20"	100"	19	Water	28

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Crop Code								BETVU		BETVU			
Rating Data Type								injury	control	injury	control	control	control
Rating Unit								percent	percent	percent	percent	percent	percent
Rating Date								Jun/24/2015	Jun/24/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015
Trt-Eval Interval								7 DA-B	7 DA-B	9 DA-C	9 DA-C	9 DA-C	9 DA-C
# Subsamples, Dec.								0	0	0	0	0	0
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code						
1	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	0	0	99	28	
1	AMS		WG	17	lb/100 gal	2-leaf	B						
1	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
1	AMS		WG	17	lb/100 gal	6-leaf	C						
1	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
1	AMS		WG	17	lb/100 gal	canopy	D						
2	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	8	98	1	99	79	
2	Betamix	1.3	L	2	pt/a	2-leaf	B						
2	Warrant	3	L	3	pt/a	2-leaf	B						
2	AMS		WG	17	lb/100 gal	2-leaf	B						
2	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
2	AMS		WG	17	lb/100 gal	6-leaf	C						
2	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
2	AMS		WG	17	lb/100 gal	canopy	D						
3	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	1	95	5	99	94	
3	Betamix	1.3	L	2	pt/a	2-leaf	B						
3	Dual II Magnum	7.64	L	1.33	pt/a	2-leaf	B						
3	AMS		WG	17	lb/100 gal	2-leaf	B						
3	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
3	AMS		WG	17	lb/100 gal	6-leaf	C						
3	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
3	AMS		WG	17	lb/100 gal	canopy	D						
4	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	88	3	99	96	
4	Betamix	1.3	L	2	pt/a	2-leaf	B						
4	AMS		WG	17	lb/100 gal	2-leaf	B						
4	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
4	Betamix	1.3	L	3	pt/a	6-leaf	C						
4	AMS		WG	17	lb/100 gal	6-leaf	C						
4	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
4	AMS		WG	17	lb/100 gal	canopy	D						
5	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	91	2	99	96	
5	Betamix	1.3	L	2	pt/a	2-leaf	B						
5	AMS		WG	17	lb/100 gal	2-leaf	B						
5	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
5	Betamix	1.3	L	3	pt/a	6-leaf	C						
5	Warrant	3	L	3	pt/a	6-leaf	C						
5	AMS		WG	17	lb/100 gal	6-leaf	C						
5	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
5	AMS		WG	17	lb/100 gal	canopy	D						
6	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	84	4	99	85	
6	Betamix	1.3	L	2	pt/a	2-leaf	B						
6	AMS		WG	17	lb/100 gal	2-leaf	B						
6	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
6	Betamix	1.3	L	3	pt/a	6-leaf	C						
6	Dual II Magnum	7.64	L	1.33	pt/a	6-leaf	C						
6	AMS		WG	17	lb/100 gal	6-leaf	C						
6	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
6	AMS		WG	17	lb/100 gal	canopy	D						

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Crop Code								BETVU		BETVU			
Rating Data Type								injury	control	injury	control	control	control
Rating Unit								percent	percent	percent	percent	percent	percent
Rating Date								Jun/24/2015	Jun/24/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015
Trt-Eval Interval								7 DA-B	7 DA-B	9 DA-C	9 DA-C	9 DA-C	9 DA-C
# Subsamples, Dec.								0	0	0	0	0	0
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code						
7	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	93	6	99	99	
7	Betamix	1.3	L	2	pt/a	2-leaf	B						
7	AMS		WG	17	lb/100 gal	2-leaf	B						
7	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
7	Betamix	1.3	L	3	pt/a	6-leaf	C						
7	Outlook	6	L	18	fl oz/a	6-leaf	C						
7	AMS		WG	17	lb/100 gal	6-leaf	C						
7	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
7	AMS		WG	17	lb/100 gal	canopy	D						
8	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	93	6	99	98	
8	Betamix	1.3	L	2	pt/a	2-leaf	B						
8	AMS		WG	17	lb/100 gal	2-leaf	B						
8	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
8	Betamix	1.3	L	3	pt/a	6-leaf	C						
8	AMS		WG	17	lb/100 gal	6-leaf	C						
8	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
8	Betamix	1.3	L	3	pt/a	canopy	D						
8	AMS		WG	17	lb/100 gal	canopy	D						
9	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	85	0	99	94	
9	Betamix	1.3	L	2	pt/a	2-leaf	B						
9	AMS		WG	17	lb/100 gal	2-leaf	B						
9	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
9	Betamix	1.3	L	4	pt/a	6-leaf	C						
9	AMS		WG	17	lb/100 gal	6-leaf	C						
9	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
9	Betamix	1.3	L	6	pt/a	canopy	D						
9	AMS		WG	17	lb/100 gal	canopy	D						
10	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	3	0	0	99	15	
10	Nortron	4	L	4	fl oz/a	2-leaf	B						
10	AMS		WG	17	lb/100 gal	2-leaf	B						
10	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
10	Nortron	4	L	4	fl oz/a	6-leaf	C						
10	AMS		WG	17	lb/100 gal	6-leaf	C						
10	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
10	Nortron	4	L	4	fl oz/a	canopy	D						
10	AMS		WG	17	lb/100 gal	canopy	D						
11	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	3	13	1	99	48	
11	Nortron	4	L	4	fl oz/a	2-leaf	B						
11	Destiny HC		L	1.5	pt/a	2-leaf	B						
11	AMS		WG	17	lb/100 gal	2-leaf	B						
11	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
11	Nortron	4	L	4	fl oz/a	6-leaf	C						
11	Destiny HC		L	1.5	pt/a	6-leaf	C						
11	AMS		WG	17	lb/100 gal	6-leaf	C						
11	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
11	Nortron	4	L	4	fl oz/a	canopy	D						
11	Destiny HC		L	1.5	pt/a	canopy	D						
11	AMS		WG	17	lb/100 gal	canopy	D						

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Rating Unit								percent	percent	percent	percent	percent	percent
Rating Date								Jun/24/2015	Jun/24/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015
Trt-Eval Interval								7 DA-B	7 DA-B	9 DA-C	9 DA-C	9 DA-C	9 DA-C
# Subsamples, Dec.								0	0	0	0	0	0
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code						
12	Nortron	4	L	3	pt/a	PRE	A	2	99	5	99	99	
12	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B						
12	Betamix	1.3	L	2	pt/a	2-leaf	B						
12	AMS		WG	17	lb/100 gal	2-leaf	B						
12	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
12	Betamix	1.3	L	3	pt/a	6-leaf	C						
12	Warrant	3	L	3	pt/a	6-leaf	C						
12	AMS		WG	17	lb/100 gal	6-leaf	C						
12	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
12	AMS		WG	17	lb/100 gal	canopy	D						
13	Nortron	4	L	3	pt/a	PRE	A	5	65	1	99	87	
13	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B						
13	Nortron	4	L	4	fl oz/a	2-leaf	B						
13	Destiny HC		L	1.5	pt/a	2-leaf	B						
13	AMS		WG	17	lb/100 gal	2-leaf	B						
13	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
13	Nortron	4	L	4	fl oz/a	6-leaf	C						
13	Warrant	3	L	3	pt/a	6-leaf	C						
13	Destiny HC		L	1.5	pt/a	6-leaf	C						
13	AMS		WG	17	lb/100 gal	6-leaf	C						
13	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
13	AMS		WG	17	lb/100 gal	canopy	D						
14	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	9	0	1	99	35	
14	Nortron	4	L	4	fl oz/a	2-leaf	B						
14	Destiny HC		L	1.5	pt/a	2-leaf	B						
14	AMS		WG	17	lb/100 gal	2-leaf	B						
14	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
14	Nortron	4	L	4	fl oz/a	6-leaf	C						
14	Warrant	3	L	3	pt/a	6-leaf	C						
14	Destiny HC		L	1.5	pt/a	6-leaf	C						
14	AMS		WG	17	lb/100 gal	6-leaf	C						
14	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
14	AMS		WG	17	lb/100 gal	canopy	D						
15	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	11	50	3	99	80	
15	Nortron	4	L	4	fl oz/a	2-leaf	B						
15	Warrant	3	L	3	pt/a	2-leaf	B						
15	Destiny HC		L	1.5	pt/a	2-leaf	B						
15	AMS		WG	17	lb/100 gal	2-leaf	B						
15	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
15	Nortron	4	L	4	fl oz/a	6-leaf	C						
15	Warrant	3	L	3	pt/a	6-leaf	C						
15	Destiny HC		L	1.5	pt/a	6-leaf	C						
15	AMS		WG	17	lb/100 gal	6-leaf	C						
15	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
15	AMS		WG	17	lb/100 gal	canopy	D						

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								BETVU		BETVU			
								injury	control	injury	control	control	control
								percent	percent	percent	percent	percent	percent
								Jun/24/2015	Jun/24/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015	Jul/08/2015
								7 DA-B	7 DA-B	9 DA-C	9 DA-C	9 DA-C	9 DA-C
								0	0	0	0	0	0
Trt	Treatment	Form	Form	Rate	Grow	Appl							
No.	Name	Conc	Type	Unit	Stg	Code							
16	Roundup PowerMax	4.5	SL	32 fl oz/a	2-leaf	B	8	48	10	99	71		
16	Nortron	4	L	4 fl oz/a	2-leaf	B							
16	Dual II Magnum	7.64	L	1.33 pt/a	2-leaf	B							
16	Destiny HC		L	1.5 pt/a	2-leaf	B							
16	AMS		WG	17 lb/100 gal	2-leaf	B							
16	Roundup PowerMax	4.5	SL	22 fl oz/a	6-leaf	C							
16	Nortron	4	L	4 fl oz/a	6-leaf	C							
16	Dual II Magnum	7.64	L	1.33 pt/a	6-leaf	C							
16	Destiny HC		L	1.5 pt/a	6-leaf	C							
16	AMS		WG	17 lb/100 gal	6-leaf	C							
16	Roundup PowerMax	4.5	SL	22 fl oz/a	canopy	D							
16	AMS		WG	17 lb/100 gal	canopy	D							
LSD (P=.05)								3.8	16.5	6.3	0.0	14.9	
CV								87.82	18.46	146.75	0.0	13.91	

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

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Weed Code	Crop Code	Rating Data Type	Rating Unit	Rating Date	Trt-Eval Interval	# Subsamples, Dec.	BETVU injury percent Jul/15/2015 16 DA-C	AMAPA control percent Jul/15/2015 16 DA-C	BETVU injury percent Jul/21/2015 6 DA-D	AMAPA control percent Jul/21/2015 6 DA-D	BETVU injury percent Aug/07/2015 23 DA-D
							0	0	0	0	0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	BETVU injury percent Jul/15/2015 16 DA-C	AMAPA control percent Jul/15/2015 16 DA-C	BETVU injury percent Jul/21/2015 6 DA-D	AMAPA control percent Jul/21/2015 6 DA-D	BETVU injury percent Aug/07/2015 23 DA-D
1	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	5	0	0	0
1	AMS		WG	17	lb/100 gal	2-leaf	B					
1	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
1	AMS		WG	17	lb/100 gal	6-leaf	C					
1	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
1	AMS		WG	17	lb/100 gal	canopy	D					
2	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	80	0	78	0
2	Betamix	1.3	L	2	pt/a	2-leaf	B					
2	Warrant	3	L	3	pt/a	2-leaf	B					
2	AMS		WG	17	lb/100 gal	2-leaf	B					
2	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
2	AMS		WG	17	lb/100 gal	6-leaf	C					
2	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
2	AMS		WG	17	lb/100 gal	canopy	D					
3	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	91	0	85	4
3	Betamix	1.3	L	2	pt/a	2-leaf	B					
3	Dual II Magnum	7.64	L	1.33	pt/a	2-leaf	B					
3	AMS		WG	17	lb/100 gal	2-leaf	B					
3	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
3	AMS		WG	17	lb/100 gal	6-leaf	C					
3	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
3	AMS		WG	17	lb/100 gal	canopy	D					
4	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	82	0	85	1
4	Betamix	1.3	L	2	pt/a	2-leaf	B					
4	AMS		WG	17	lb/100 gal	2-leaf	B					
4	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
4	Betamix	1.3	L	3	pt/a	6-leaf	C					
4	AMS		WG	17	lb/100 gal	6-leaf	C					
4	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
4	AMS		WG	17	lb/100 gal	canopy	D					
5	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	90	0	89	1
5	Betamix	1.3	L	2	pt/a	2-leaf	B					
5	AMS		WG	17	lb/100 gal	2-leaf	B					
5	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
5	Betamix	1.3	L	3	pt/a	6-leaf	C					
5	Warrant	3	L	3	pt/a	6-leaf	C					
5	AMS		WG	17	lb/100 gal	6-leaf	C					
5	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
5	AMS		WG	17	lb/100 gal	canopy	D					
6	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	71	0	68	1
6	Betamix	1.3	L	2	pt/a	2-leaf	B					
6	AMS		WG	17	lb/100 gal	2-leaf	B					
6	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
6	Betamix	1.3	L	3	pt/a	6-leaf	C					
6	Dual II Magnum	7.64	L	1.33	pt/a	6-leaf	C					
6	AMS		WG	17	lb/100 gal	6-leaf	C					
6	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
6	AMS		WG	17	lb/100 gal	canopy	D					

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Crop Code								BETVU		BETVU		BETVU	
Rating Data Type								injury percent		injury percent		injury percent	
Rating Unit								Jul/15/2015		Jul/21/2015		Aug/07/2015	
Rating Date								16 DA-C		6 DA-D		23 DA-D	
Trt-Eval Interval								0		0		0	
# Subsamples, Dec.								0		0		0	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code						
7	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	97	0	95	0	
7	Betamix	1.3	L	2	pt/a	2-leaf	B						
7	AMS		WG	17	lb/100 gal	2-leaf	B						
7	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
7	Betamix	1.3	L	3	pt/a	6-leaf	C						
7	Outlook	6	L	18	fl oz/a	6-leaf	C						
7	AMS		WG	17	lb/100 gal	6-leaf	C						
7	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
7	AMS		WG	17	lb/100 gal	canopy	D						
8	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	98	0	98	0	
8	Betamix	1.3	L	2	pt/a	2-leaf	B						
8	AMS		WG	17	lb/100 gal	2-leaf	B						
8	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
8	Betamix	1.3	L	3	pt/a	6-leaf	C						
8	AMS		WG	17	lb/100 gal	6-leaf	C						
8	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
8	Betamix	1.3	L	3	pt/a	canopy	D						
8	AMS		WG	17	lb/100 gal	canopy	D						
9	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	85	0	88	0	
9	Betamix	1.3	L	2	pt/a	2-leaf	B						
9	AMS		WG	17	lb/100 gal	2-leaf	B						
9	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
9	Betamix	1.3	L	4	pt/a	6-leaf	C						
9	AMS		WG	17	lb/100 gal	6-leaf	C						
9	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
9	Betamix	1.3	L	6	pt/a	canopy	D						
9	AMS		WG	17	lb/100 gal	canopy	D						
10	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	0	0	0	0	
10	Nortron	4	L	4	fl oz/a	2-leaf	B						
10	AMS		WG	17	lb/100 gal	2-leaf	B						
10	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
10	Nortron	4	L	4	fl oz/a	6-leaf	C						
10	AMS		WG	17	lb/100 gal	6-leaf	C						
10	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
10	Nortron	4	L	4	fl oz/a	canopy	D						
10	AMS		WG	17	lb/100 gal	canopy	D						
11	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	25	0	18	0	
11	Nortron	4	L	4	fl oz/a	2-leaf	B						
11	Destiny HC		L	1.5	pt/a	2-leaf	B						
11	AMS		WG	17	lb/100 gal	2-leaf	B						
11	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
11	Nortron	4	L	4	fl oz/a	6-leaf	C						
11	Destiny HC		L	1.5	pt/a	6-leaf	C						
11	AMS		WG	17	lb/100 gal	6-leaf	C						
11	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
11	Nortron	4	L	4	fl oz/a	canopy	D						
11	Destiny HC		L	1.5	pt/a	canopy	D						
11	AMS		WG	17	lb/100 gal	canopy	D						

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15
 Conducted: Gratiot Co.

Study Dir.: Sprague and Powell
 Investigator: Christy Sprague

Weed Code								AMAPA		AMAPA		BETVU	
Crop Code								BETVU		BETVU		BETVU	
Rating Data Type								injury percent		injury percent		injury percent	
Rating Unit								control percent		control percent		control percent	
Rating Date								Jul/15/2015		Jul/21/2015		Aug/07/2015	
Trt-Eval Interval								16 DA-C		6 DA-D		23 DA-D	
# Subsamples, Dec.								0		0		0	
Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Grow Stg	Appl Code						
12	Nortron	4	L	3	pt/a	PRE	A	0	99	0	99	1	
12	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B						
12	Betamix	1.3	L	2	pt/a	2-leaf	B						
12	AMS		WG	17	lb/100 gal	2-leaf	B						
12	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
12	Betamix	1.3	L	3	pt/a	6-leaf	C						
12	Warrant	3	L	3	pt/a	6-leaf	C						
12	AMS		WG	17	lb/100 gal	6-leaf	C						
12	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
12	AMS		WG	17	lb/100 gal	canopy	D						
13	Nortron	4	L	3	pt/a	PRE	A	0	85	0	83	0	
13	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B						
13	Nortron	4	L	4	fl oz/a	2-leaf	B						
13	Destiny HC		L	1.5	pt/a	2-leaf	B						
13	AMS		WG	17	lb/100 gal	2-leaf	B						
13	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
13	Nortron	4	L	4	fl oz/a	6-leaf	C						
13	Warrant	3	L	3	pt/a	6-leaf	C						
13	Destiny HC		L	1.5	pt/a	6-leaf	C						
13	AMS		WG	17	lb/100 gal	6-leaf	C						
13	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
13	AMS		WG	17	lb/100 gal	canopy	D						
14	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	23	0	8	1	
14	Nortron	4	L	4	fl oz/a	2-leaf	B						
14	Destiny HC		L	1.5	pt/a	2-leaf	B						
14	AMS		WG	17	lb/100 gal	2-leaf	B						
14	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
14	Nortron	4	L	4	fl oz/a	6-leaf	C						
14	Warrant	3	L	3	pt/a	6-leaf	C						
14	Destiny HC		L	1.5	pt/a	6-leaf	C						
14	AMS		WG	17	lb/100 gal	6-leaf	C						
14	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
14	AMS		WG	17	lb/100 gal	canopy	D						
15	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	77	0	75	0	
15	Nortron	4	L	4	fl oz/a	2-leaf	B						
15	Warrant	3	L	3	pt/a	2-leaf	B						
15	Destiny HC		L	1.5	pt/a	2-leaf	B						
15	AMS		WG	17	lb/100 gal	2-leaf	B						
15	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C						
15	Nortron	4	L	4	fl oz/a	6-leaf	C						
15	Warrant	3	L	3	pt/a	6-leaf	C						
15	Destiny HC		L	1.5	pt/a	6-leaf	C						
15	AMS		WG	17	lb/100 gal	6-leaf	C						
15	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D						
15	AMS		WG	17	lb/100 gal	canopy	D						

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15 Study Dir.: Sprague and Powell
 Conducted: Gratiot Co. Investigator: Christy Sprague

Weed Code												
Crop Code												
Rating Data Type								BETVU	AMAPA	BETVU	AMAPA	BETVU
Rating Unit								injury	control	injury	control	injury
Rating Date								percent	percent	percent	percent	percent
Trt-Eval Interval								Jul/15/2015	Jul/15/2015	Jul/21/2015	Jul/21/2015	Aug/07/2015
# Subsamples, Dec.								16 DA-C	16 DA-C	6 DA-D	6 DA-D	23 DA-D
								0	0	0	0	0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Grow Stg	Appl Code					
16	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0	70	0	68	1
16	Nortron	4	L	4	fl oz/a	2-leaf	B					
16	Dual II Magnum	7.64	L	1.33	pt/a	2-leaf	B					
16	Destiny HC		L	1.5	pt/a	2-leaf	B					
16	AMS		WG	17	lb/100 gal	2-leaf	B					
16	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C					
16	Nortron	4	L	4	fl oz/a	6-leaf	C					
16	Dual II Magnum	7.64	L	1.33	pt/a	6-leaf	C					
16	Destiny HC		L	1.5	pt/a	6-leaf	C					
16	AMS		WG	17	lb/100 gal	6-leaf	C					
16	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D					
16	AMS		WG	17	lb/100 gal	canopy	D					

LSD (P=.05)								0.0	10.8	0.0	12.1	2.6
CV								0.0	11.21	0.0	13.1	282.8

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

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15
 Conducted: Gratiot Co.

Study Dir.: Sprague and Powell
 Investigator: Christy Sprague

Weed Code AMAPA
 Crop Code
 Rating Data Type control
 Rating Unit percent
 Rating Date Aug/07/2015
 Trt-Eval Interval 23 DA-D
 # Subsamples, Dec. 0

Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate	Rate Unit	Grow Stg	Appl Code	
1	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0
1	AMS		WG	17	lb/100 gal	2-leaf	B	
1	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
1	AMS		WG	17	lb/100 gal	6-leaf	C	
1	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
1	AMS		WG	17	lb/100 gal	canopy	D	
2	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	80
2	Betamix	1.3	L	2	pt/a	2-leaf	B	
2	Warrant	3	L	3	pt/a	2-leaf	B	
2	AMS		WG	17	lb/100 gal	2-leaf	B	
2	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
2	AMS		WG	17	lb/100 gal	6-leaf	C	
2	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
2	AMS		WG	17	lb/100 gal	canopy	D	
3	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	84
3	Betamix	1.3	L	2	pt/a	2-leaf	B	
3	Dual II Magnum	7.64	L	1.33	pt/a	2-leaf	B	
3	AMS		WG	17	lb/100 gal	2-leaf	B	
3	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
3	AMS		WG	17	lb/100 gal	6-leaf	C	
3	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
3	AMS		WG	17	lb/100 gal	canopy	D	
4	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	75
4	Betamix	1.3	L	2	pt/a	2-leaf	B	
4	AMS		WG	17	lb/100 gal	2-leaf	B	
4	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
4	Betamix	1.3	L	3	pt/a	6-leaf	C	
4	AMS		WG	17	lb/100 gal	6-leaf	C	
4	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
4	AMS		WG	17	lb/100 gal	canopy	D	
5	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	79
5	Betamix	1.3	L	2	pt/a	2-leaf	B	
5	AMS		WG	17	lb/100 gal	2-leaf	B	
5	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
5	Betamix	1.3	L	3	pt/a	6-leaf	C	
5	Warrant	3	L	3	pt/a	6-leaf	C	
5	AMS		WG	17	lb/100 gal	6-leaf	C	
5	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
5	AMS		WG	17	lb/100 gal	canopy	D	
6	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	60
6	Betamix	1.3	L	2	pt/a	2-leaf	B	
6	AMS		WG	17	lb/100 gal	2-leaf	B	
6	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
6	Betamix	1.3	L	3	pt/a	6-leaf	C	
6	Dual II Magnum	7.64	L	1.33	pt/a	6-leaf	C	
6	AMS		WG	17	lb/100 gal	6-leaf	C	
6	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
6	AMS		WG	17	lb/100 gal	canopy	D	

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15
 Conducted: Gratiot Co.

Study Dir.: Sprague and Powell
 Investigator: Christy Sprague

Weed Code
 Crop Code
 Rating Data Type
 Rating Unit
 Rating Date
 Trt-Eval Interval
 # Subsamples, Dec.

AMAPA
 control
 percent
 Aug/07/2015
 23 DA-D
 0

Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate	Rate Unit	Grow Stg	Appl Code	
7	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	95
7	Betamix	1.3	L	2	pt/a	2-leaf	B	
7	AMS		WG	17	lb/100 gal	2-leaf	B	
7	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
7	Betamix	1.3	L	3	pt/a	6-leaf	C	
7	Outlook	6	L	18	fl oz/a	6-leaf	C	
7	AMS		WG	17	lb/100 gal	6-leaf	C	
7	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
7	AMS		WG	17	lb/100 gal	canopy	D	
8	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	96
8	Betamix	1.3	L	2	pt/a	2-leaf	B	
8	AMS		WG	17	lb/100 gal	2-leaf	B	
8	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
8	Betamix	1.3	L	3	pt/a	6-leaf	C	
8	AMS		WG	17	lb/100 gal	6-leaf	C	
8	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
8	Betamix	1.3	L	3	pt/a	canopy	D	
8	AMS		WG	17	lb/100 gal	canopy	D	
9	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	88
9	Betamix	1.3	L	2	pt/a	2-leaf	B	
9	AMS		WG	17	lb/100 gal	2-leaf	B	
9	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
9	Betamix	1.3	L	4	pt/a	6-leaf	C	
9	AMS		WG	17	lb/100 gal	6-leaf	C	
9	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
9	Betamix	1.3	L	6	pt/a	canopy	D	
9	AMS		WG	17	lb/100 gal	canopy	D	
10	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	0
10	Nortron	4	L	4	fl oz/a	2-leaf	B	
10	AMS		WG	17	lb/100 gal	2-leaf	B	
10	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
10	Nortron	4	L	4	fl oz/a	6-leaf	C	
10	AMS		WG	17	lb/100 gal	6-leaf	C	
10	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
10	Nortron	4	L	4	fl oz/a	canopy	D	
10	AMS		WG	17	lb/100 gal	canopy	D	
11	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	30
11	Nortron	4	L	4	fl oz/a	2-leaf	B	
11	Destiny HC		L	1.5	pt/a	2-leaf	B	
11	AMS		WG	17	lb/100 gal	2-leaf	B	
11	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
11	Nortron	4	L	4	fl oz/a	6-leaf	C	
11	Destiny HC		L	1.5	pt/a	6-leaf	C	
11	AMS		WG	17	lb/100 gal	6-leaf	C	
11	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
11	Nortron	4	L	4	fl oz/a	canopy	D	
11	Destiny HC		L	1.5	pt/a	canopy	D	
11	AMS		WG	17	lb/100 gal	canopy	D	

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15
 Conducted: Gratiot Co.

Study Dir.: Sprague and Powell
 Investigator: Christy Sprague

Weed Code AMAPA
 Crop Code
 Rating Data Type control
 Rating Unit percent
 Rating Date Aug/07/2015
 Trt-Eval Interval 23 DA-D
 # Subsamples, Dec. 0

Trt No.	Treatment Name	Form Conc	Form Type	Rate Rate	Rate Unit	Grow Stg	Appl Code	
12	Nortron	4	L	3	pt/a	PRE	A	99
12	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	
12	Betamix	1.3	L	2	pt/a	2-leaf	B	
12	AMS		WG	17	lb/100 gal	2-leaf	B	
12	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
12	Betamix	1.3	L	3	pt/a	6-leaf	C	
12	Warrant	3	L	3	pt/a	6-leaf	C	
12	AMS		WG	17	lb/100 gal	6-leaf	C	
12	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
12	AMS		WG	17	lb/100 gal	canopy	D	
13	Nortron	4	L	3	pt/a	PRE	A	82
13	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	
13	Nortron	4	L	4	fl oz/a	2-leaf	B	
13	Destiny HC		L	1.5	pt/a	2-leaf	B	
13	AMS		WG	17	lb/100 gal	2-leaf	B	
13	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
13	Nortron	4	L	4	fl oz/a	6-leaf	C	
13	Warrant	3	L	3	pt/a	6-leaf	C	
13	Destiny HC		L	1.5	pt/a	6-leaf	C	
13	AMS		WG	17	lb/100 gal	6-leaf	C	
13	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
13	AMS		WG	17	lb/100 gal	canopy	D	
14	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	28
14	Nortron	4	L	4	fl oz/a	2-leaf	B	
14	Destiny HC		L	1.5	pt/a	2-leaf	B	
14	AMS		WG	17	lb/100 gal	2-leaf	B	
14	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
14	Nortron	4	L	4	fl oz/a	6-leaf	C	
14	Warrant	3	L	3	pt/a	6-leaf	C	
14	Destiny HC		L	1.5	pt/a	6-leaf	C	
14	AMS		WG	17	lb/100 gal	6-leaf	C	
14	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
14	AMS		WG	17	lb/100 gal	canopy	D	
15	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	73
15	Nortron	4	L	4	fl oz/a	2-leaf	B	
15	Warrant	3	L	3	pt/a	2-leaf	B	
15	Destiny HC		L	1.5	pt/a	2-leaf	B	
15	AMS		WG	17	lb/100 gal	2-leaf	B	
15	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
15	Nortron	4	L	4	fl oz/a	6-leaf	C	
15	Warrant	3	L	3	pt/a	6-leaf	C	
15	Destiny HC		L	1.5	pt/a	6-leaf	C	
15	AMS		WG	17	lb/100 gal	6-leaf	C	
15	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
15	AMS		WG	17	lb/100 gal	canopy	D	

MSU Weed Science Research Program

Control of glyphosate-resistant Palmer amaranth in sugarbeets

Trial ID: SB05-15 Study Dir.: Sprague and Powell
 Conducted: Gratiot Co. Investigator: Christy Sprague

Weed Code AMAPA
 Crop Code
 Rating Data Type control
 Rating Unit percent
 Rating Date Aug/07/2015
 Trt-Eval Interval 23 DA-D
 # Subsamples, Dec. 0

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Unit	Grow Stg	Appl Code	
16	Roundup PowerMax	4.5	SL	32	fl oz/a	2-leaf	B	67
16	Nortron	4	L	4	fl oz/a	2-leaf	B	
16	Dual II Magnum	7.64	L	1.33	pt/a	2-leaf	B	
16	Destiny HC		L	1.5	pt/a	2-leaf	B	
16	AMS		WG	17	lb/100 gal	2-leaf	B	
16	Roundup PowerMax	4.5	SL	22	fl oz/a	6-leaf	C	
16	Nortron	4	L	4	fl oz/a	6-leaf	C	
16	Dual II Magnum	7.64	L	1.33	pt/a	6-leaf	C	
16	Destiny HC		L	1.5	pt/a	6-leaf	C	
16	AMS		WG	17	lb/100 gal	6-leaf	C	
16	Roundup PowerMax	4.5	SL	22	fl oz/a	canopy	D	
16	AMS		WG	17	lb/100 gal	canopy	D	

LSD (P=.05) 11.2
 CV 12.16

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