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Glyphosate-resistant Palmer amaranth response to 2,4-D and dicamba.

Trial ID: C6-07 Study Dir.: Culpepper
Location: Macon County Investigator: Stanley Culpepper

Reps: 4 Plots: 6 by 25 feet
Spray vol: 14.8 gal/ac Mix size: 1 liters (min .77168)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	Amt Product to Measure	Plot No. By Rep 1	2	3	4
1	Non-treated									101	214	307	410
2	Glyphomax XRT	4		L	12	OZ/A	POST	A	6.334 ml/mx	102	215	308	406
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
3	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx	103	212	321	422
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
4	Glyphomax XRT	4		L	24	OZ/A	POST	A	12.67 ml/mx	104	206	309	423
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
5	Weedar 64	3.8		L	12.6	OZ/A	POST	A	6.651 ml/mx	105	213	302	408
6	Weedar 64	3.8		L	12.6	OZ/A	POST	A	6.651 ml/mx	106	221	310	412
	Glyphomax XRT	4		L	12	OZ/A	POST	A	6.334 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
7	Weedar 64	3.8		L	12.6	OZ/A	POST	A	6.651 ml/mx	107	217	319	413
	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
8	Weedar 64	3.8		L	12.6	OZ/A	POST	A	6.651 ml/mx	108	207	301	424
	Glyphomax XRT	4		L	24	OZ/A	POST	A	12.67 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
9	Weedar 64	3.8		L	16.8	OZ/A	POST	A	8.868 ml/mx	109	210	305	418
10	Weedar 64	3.8		L	16.8	OZ/A	POST	A	8.868 ml/mx	110	224	320	419
	Glyphomax XRT	4		L	12	OZ/A	POST	A	6.334 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
11	Weedar 64	3.8		L	16.8	OZ/A	POST	A	8.868 ml/mx	111	201	304	414
	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
12	Weedar 64	3.8		L	16.8	OZ/A	POST	A	8.868 ml/mx	112	204	303	417
	Glyphomax XRT	4		L	24	OZ/A	POST	A	12.67 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
13	Weedar 64	3.8		L	25.2	OZ/A	POST	A	13.3 ml/mx	113	202	313	409
14	Weedar 64	3.8		L	25.2	OZ/A	POST	A	13.3 ml/mx	114	203	324	415
	Glyphomax XRT	4		L	12	OZ/A	POST	A	6.334 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
15	Weedar 64	3.8		L	25.2	OZ/A	POST	A	13.3 ml/mx	115	219	317	421
	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
16	Weedar 64	3.8		L	25.2	OZ/A	POST	A	13.3 ml/mx	116	208	316	420
	Glyphomax XRT	4		L	24	OZ/A	POST	A	12.67 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
17	Weedar 64	3.8		L	33.6	OZ/A	POST	A	17.74 ml/mx	117	211	314	404
18	Weedar 64	3.8		L	33.6	OZ/A	POST	A	17.74 ml/mx	118	209	318	411
	Glyphomax XRT	4		L	12	OZ/A	POST	A	6.334 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
19	Weedar 64	3.8		L	33.6	OZ/A	POST	A	17.74 ml/mx	119	220	315	405
	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
20	Weedar 64	3.8		L	33.6	OZ/A	POST	A	17.74 ml/mx	120	218	311	403
	Glyphomax XRT	4		L	24	OZ/A	POST	A	12.67 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
21	Banvel	4		L	4	OZ/A	POST	A	2.111 ml/mx	121	223	306	402
	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				

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Reps: 4 Plots: 6 by 25 feet
Spray vol: 14.8 gal/ac Mix size: 1 liters (min .77168)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit	Grow Stg	Appl Code	Amt Product to Measure	Plot No. By Rep 1	2	3	4
22	Banvel	4		L	8	OZ/A	POST	A	4.223 ml/mx	122	216	312	401
	Glyphomax XRT	4		L	16	OZ/A	POST	A	8.446 ml/mx				
	AMS			WG	2	% W/W	POST	A	20.0 g/mx				
23	Banvel	4		L	4	OZ/A	POST	A	2.111 ml/mx	123	222	323	407
24	Banvel	4		L	8	OZ/A	POST	A	4.223 ml/mx	124	205	322	416

Sort Order: Treatment

Product quantities required for listed treatments and applications in one trial:

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
192.674	ml	Glyphomax XRT	4	L	
424.955	g	AMS		WG	
232.792	ml	Weedar 64	3.8	L	
15.836	ml	Banvel	4	L	

* 'Per area' calculations based on spray volume= 14.8 gal/ac, mix size= 1 liters (mix size basis).
* Product amount calculations increased 25 % for overage adjustment.
* 'Per volume' calculations use spray volume= 14.8 gal/ac, mix size= 1 liters.

Trial Comments

OBJECTIVE: Evaluate glyphosate-resistant Palmer amaranth response to 2,4-D and dicamba applied alone or mixed with glyphosate.

Glyphosate-resistant Palmer amaranth response:
1. Glyphosate alone had no effect on Palmer growth.
2. Control of two inch Palmer amaranth was complete by 32 DAT with all rates of 2,4-D except 12.6 oz/A which provided good to excellent control. Banvel at 4 oz/A was less effective with only 81% control while banvel at 8 oz/A provided at least 96% control.
3. Ten inch Palmer was much more challenging. By 32 DAT, control was consistently greater than 70% with Weedar at only rates of 25.2 and 33.6 oz/A; however, control was still less than 90% with all of these treatments. Ten inch Palmer control by banvel was less than 65% throughout the season.
4. By 42 DAT, control in all plots was poor and less than 52%.
5. By 55 DAT, there was no difference in the non-treated control and any treated plot. Ten inch tall Palmer plants treated with these herbicides had lost many of their growing points but suckered out with aggressive growth by 5 weeks after treatment.
6. In general, mixing glyphosate with Weedar tended to improve control during early and mid-season. The rate of Glyphomax was not relavent. This was likely a response to the adjuvant system in the Glyphomax XRT possibly improving 2,4-D uptake.

CONCLUSION: This initial data suggest that technology allowing applications of either 2,4-D or Banvel will not be the tool needed for glyphosate-resistant Palmer amaranth at least in the manner that we had hoped.

GENERAL COMMENTS:
April 18: Oversprayed entire trial with 2.1 pt of Prowl H2O.
June 7: Applications were made to two distinct sizes of Palmer amaranth with both sizes being present in each plot. The first flush of Palmer amaranth was 10 inches in height with 4-6 plants per square yard with a second flush being 2 to 3 inches in height with at least 30 plants per square yard.
June 8: Dual Magnum at 2 pt/A was applied over the trial area to prevent continual Palmer emergence.

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Glyphosate-resistant Palmer amaranth response to 2,4-D and dicamba.

Trial ID: C6-07 Study Dir.: Culpepper
Location: Macon County Investigator: Stanley Culpepper

Trt No.	Treatment Name	Rate	Rate Unit	2"AMAPA % control Jun-19-07 12 DA-A	10"AMAPA % control Jun-19-07 12 DA-A	2"AMAPA % control Jul-09-07 32 DA-A	10"AMAPA % control Jul-09-07 32 DA-A	10"AMAPA % control Jul-19-07 42 DA-A	10"AMAPA % control Aug-01-07 55 DA-A
				1	2	3	4	5	6
1	Non-treated			0 g	0 h	0 f	0 h	0 d	0 a
2	Glyphomax XRT	12	OZ/A	0 g	0 h	0 f	0 h	0 d	0 a
	AMS	2	% W/W						
3	Glyphomax XRT	16	OZ/A	0 g	0 h	0 f	0 h	0 d	0 a
	AMS	2	% W/W						
4	Glyphomax XRT	24	OZ/A	0 g	0 h	0 f	0 h	0 d	0 a
	AMS	2	% W/W						
5	Weedar 64	12.6	OZ/A	90 a-d	48 ef	88 d	56 efg	24 c	0 a
6	Weedar 64	12.6	OZ/A	92 a-d	56 de	94 c	66 d-g	31 bc	0 a
	Glyphomax XRT	12	OZ/A						
	AMS	2	% W/W						
7	Weedar 64	12.6	OZ/A	86 c-f	54 de	94 c	61 d-g	30 bc	0 a
	Glyphomax XRT	16	OZ/A						
	AMS	2	% W/W						
8	Weedar 64	12.6	OZ/A	85 def	55 de	94 c	66 d-g	31 bc	0 a
	Glyphomax XRT	24	OZ/A						
	AMS	2	% W/W						
9	Weedar 64	16.8	OZ/A	90 a-d	56 de	99 a	57 efg	30 bc	0 a
10	Weedar 64	16.8	OZ/A	93 abc	66 bcd	99 a	63 d-g	39 abc	0 a
	Glyphomax XRT	12	OZ/A						
	AMS	2	% W/W						
11	Weedar 64	16.8	OZ/A	90 a-d	59 cde	99 a	69 b-f	31 bc	0 a
	Glyphomax XRT	16	OZ/A						
	AMS	2	% W/W						
12	Weedar 64	16.8	OZ/A	91 a-d	64 bcd	99 a	68 c-g	34 bc	0 a
	Glyphomax XRT	24	OZ/A						
	AMS	2	% W/W						
13	Weedar 64	25.2	OZ/A	93 a-d	65 bcd	99 a	73 a-d	34 bc	0 a
14	Weedar 64	25.2	OZ/A	93 abc	70 abc	99 a	81 abc	36 abc	0 a
	Glyphomax XRT	12	OZ/A						
	AMS	2	% W/W						
15	Weedar 64	25.2	OZ/A	97 ab	75 ab	99 a	83 ab	45 ab	0 a
	Glyphomax XRT	16	OZ/A						
	AMS	2	% W/W						
16	Weedar 64	25.2	OZ/A	94 abc	73 ab	99 a	86 a	53 a	0 a
	Glyphomax XRT	24	OZ/A						
	AMS	2	% W/W						
17	Weedar 64	33.6	OZ/A	93 abc	71 abc	99 a	70 b-e	31 bc	0 a
18	Weedar 64	33.6	OZ/A	94 abc	76 ab	99 a	82 ab	45 ab	0 a
	Glyphomax XRT	12	OZ/A						
	AMS	2	% W/W						
19	Weedar 64	33.6	OZ/A	97 a	81 a	99 a	83 ab	41 abc	0 a
	Glyphomax XRT	16	OZ/A						
	AMS	2	% W/W						
20	Weedar 64	33.6	OZ/A	96 ab	76 ab	99 a	81 abc	40 abc	0 a
	Glyphomax XRT	24	OZ/A						
	AMS	2	% W/W						

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Weed Code				2"AMAPA	10"AMAPA	2"AMAPA	10"AMAPA	10"AMAPA	10"AMAPA
Rating Data Type				%	%	%	%	%	%
Rating Unit				control	control	control	control	control	control
Rating Date				Jun-19-07	Jun-19-07	Jul-09-07	Jul-09-07	Jul-19-07	Aug-01-07
Trt-Eval Interval				12 DA-A	12 DA-A	32 DA-A	32 DA-A	42 DA-A	55 DA-A
Trt No.	Treatment Name	Rate	Rate Unit	1	2	3	4	5	6
21	Banvel	4	OZ/A	80 f	38 fg	81 e	54 g	39 abc	0 a
	Glyphomax XRT	16	OZ/A						
	AMS	2	% W/W						
22	Banvel	8	OZ/A	86 c-f	49 ef	97 ab	56 efg	44 ab	0 a
	Glyphomax XRT	16	OZ/A						
	AMS	2	% W/W						
23	Banvel	4	OZ/A	81 ef	33 g	81 e	55 fg	33 bc	0 a
24	Banvel	8	OZ/A	89 b-e	50 ef	97 b	64 d-g	38 abc	0 a
LSD (P=.05)				6.9	11.6	2.0	12.6	14.6	0.0
Standard Deviation				4.8	8.2	1.4	8.9	10.3	0.0
CV				6.42	16.29	1.73	15.54	33.98	0.0
Bartlett's X2				22.989	20.203	0.893	26.796	26.911	0.0
P(Bartlett's X2)				0.238	0.382	0.996	0.109	0.081	.

Means followed by same letter do not significantly differ (P=.05, Duncan's New MRT)

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Glyphosate-resistant Palmer amaranth response to 2,4-D and dicamba.

Trial ID: C6-07 Study Dir.: Culpepper
Location: Macon County Investigator: Stanley Culpepper

GENERAL TRIAL INFORMATION

Study Director: Culpepper, Davis **Title:** Ext. Weed Science
Affiliation: Univ. of Georgia
Postal Code: 31794

Investigator: Stanley Culpepper **Title:** Ext. Weed Science
Affiliation: Univ. of Georgia
Postal Code: 31794

TRIAL LOCATION

City: Macon County **Trial Status:** completed
State/Prov.: GA **Trial Reliability:** _____
Postal Code: _____ **Initiation Date:** Apr-18-07
Country: USA **Planned Completion Date:** _____
E-Longitude of LL Corner °: _____ **N-Latitude of LL Corner °:** _____
Altitude of LL Corner: _____ **Unit:** _____ **Angle y-axis to North °:** _____
Directions:

COOPERATOR/LANDOWNER

Cooperator: _____ **Country:** _____
Org: _____ **Phone No:** _____
Address 1: _____ **Fax No:** _____
Address 2: _____
City: _____
State/Prov: _____
Postal Code: _____

Conducted Under GLP (Y/N): N **Conducted Under GEP (Y/N):** N
Guidelines: _____ **Guideline Description:** _____

Objective:

Conclusions:

CROP AND WEED DESCRIPTION

Weed	Code	Common Name	Scientific Name
1.	AMAPA	Palmer amaranth	

Crop 1: GOSHI COTTON, SHORT STAPLE **Variety:** DP 555 BRR
Planting Date: Apr-18-07 **Planting Method:** hill drop
Rate: _____ _____ **Depth:** _____ __ **Perennial Age:** _____ _____
Row Spacing: 36 in **Spacing Within Row:** _____ _____ **Seed Bed:** _____
Soil Temperature: 68 F **Soil Moisture:** moist **Emergence Date:** _____

SITE AND DESIGN

Plot Width, Unit: 6 FT **Plot Length, Unit:** 25 FT **Reps:** 4
Site Type: Sutton Farms
Tillage Type: Strip-tillage **Study Design:** RANDOMIZED COMPLETE BLOCK

Trial Initiation Comments:

	Previous Crops	Previous Pesticides	Year
1.			

MAINTENANCE

Field Prep./Maintenance:

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No.	Date	Maintenance Treatment Name	Form Conc	Form Unit	Form Type	Rate	Rate Unit
1.							

SOIL DESCRIPTION

% Sand: 82 **% OM:** 6.3 **Texture:** loamy sand
% Silt: 14 **pH:** 2.0 **Soil Name:** _____
% Clay: 4 **CEC:** _____ **Fert. Level:** _____

ADDITIONAL MEASURED ELEMENTS

Element	Quantity	Unit

MOISTURE CONDITIONS

	Date	Time	Amount	Unit	Type	Interval	Unit
1.							

Overall Moisture Conditions: overall dry (great moisture when treatments applied
Closest Weather Station: _____ **Distance:** _____ **Unit:** __

APPLICATION DESCRIPTION

	A
Application Date:	Jun-07-07
Time of Day:	8:00 am
Application Method:	broadcast
Application Timing:	POST
Applic. Placement:	overtop
Air Temp., Unit:	77 F
% Relative Humidity:	65
Wind Velocity, Unit:	3 mph
Dew Presence (Y/N):	N
Water Hardness:	
Soil Temp., Unit:	75 F
Soil Moisture:	moist
% Cloud Cover:	0

CROP STAGE AT EACH APPLICATION

	A
Crop 1 Code, Stage:	GOSHI POST
Stage Scale:	BBCH
Height, Unit:	7 in

WEED STAGE AT EACH APPLICATION

	A
Weed 1 Code, Stage:	AMAPA POST
Stage Scale:	see comme
Density, Unit:	. .

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APPLICATION EQUIPMENT

	A
Appl. Equipment:	backback
Operating Pressure:	24
Nozzle Type:	flatfan
Nozzle Size:	11002
Nozzle Spacing, Unit:	18 in
Nozzles/Row:	2
Band Width, Unit:	
Boom Length, Unit:	4.5 ft
Boom Height, Unit:	15 in
Ground Speed, Unit:	3 mph
Incorporation Equip.:	
Hours to Incorp.:	
Incorp. Depth, Unit:	
Carrier:	water
Spray Volume, Unit:	15 GPA
Spray pH:	
Propellant:	CO2
Tank Mix (Y/N):	y

Trt No	Treatment Application Comment