

# University of Georgia

## Screening Palmer amaranth for multiple resistance to glyphosate and Staple in the field.

Trial ID: C11-07

Protocol ID:

Location: Macon County

Study Director: Stanley Culpepper

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	Growth Unit	Appl Stage	Amt Product to Measure	Plot No. By Rep			
									1	2	3	4
1	WeatherMax	4.5	L	22	OZ/A	POST	A	11.61 ml/mx	101	205	308	401
2	WeatherMax	4.5	L	44	OZ/A	POST	A	23.23 ml/mx	102	201	303	410
3	WeatherMax	4.5	L	88	OZ/A	POST	A	46.45 ml/mx	103	212	304	405
4	WeatherMax	4.5	L	176	OZ/A	POST	A	92.91 ml/mx	104	202	301	402
5	Staple LX NIS	3.2	L	2.5	OZ/A	POST	A	1.32 ml/mx	105	204	310	406
				0.25	% V/V	POST	A	2.5 ml/mx				
6	Staple LX NIS	3.2	L	5.0	OZ/A	POST	A	2.639 ml/mx	106	203	309	408
				0.25	% V/V	POST	A	2.5 ml/mx				
7	Staple LX NIS	3.2	L	10.0	OZ/A	POST	A	5.279 ml/mx	107	206	305	412
				0.25	% V/V	POST	A	2.5 ml/mx				
8	Staple LX NIS	3.2	L	15.0	OZ/A	POST	A	7.918 ml/mx	108	207	311	404
				0.25	% V/V	POST	A	2.5 ml/mx				
9	WeatherMax Staple LX	4.5	L	22	OZ/A	POST	A	11.61 ml/mx	109	208	306	409
				3.2	OZ/A	POST	A	1.32 ml/mx				
10	WeatherMax Staple LX	4.5	L	44	OZ/A	POST	A	23.23 ml/mx	110	211	302	403
				3.2	OZ/A	POST	A	2.639 ml/mx				
11	WeatherMax Staple LX	4.5	L	88	OZ/A	POST	A	46.45 ml/mx	111	210	307	411
				3.2	OZ/A	POST	A	5.279 ml/mx				
12	WeatherMax Staple LX	4.5	L	176	OZ/A	POST	A	92.91 ml/mx	112	209	312	407
				3.2	OZ/A	POST	A	7.918 ml/mx				

Sort Order: Treatment

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

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
435.495	ml	WeatherMax	4.5	L	
42.890	ml	Staple LX	3.2	L	
12.499	ml	NIS		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: Determine if the original glyphosate-resistant Palmer amaranth population is now resistant to Staple.

Cotton Response:

1. Injury was noted as necrotic speckling from glyphosate and glyphosate plus Staple (lower rates) combinations. Injury was more of a chlorosis and stunting along with speckling with higher rates of Staple alone or in combination with WeatherMax.
2. Greater than 10% injury was noted with Weathermax at 176 oz/A; Staple above 5 oz/A; WeatherMax at 88 or 176 oz/A plus Staple at 10 or 15 oz/A, respectively.
3. Lack of weed control prohibited later cotton injury evaluations.

Glyphosate-resistant Palmer amaranth response:

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1. At 7 or 18 DAT, WeatherMax at 176 oz/A alone or mixed with Staple were the only treatments providing greater than 90% control. Staple alone provided less than 58% control.
2. By 59 DAT, WeatherMax at 176 oz/A plus Staple at 15 oz/A provided 95% control. No other treatment provided greater than 81% control. Staple treatments provided less than 50% control.

**GENERAL COMMENTS:**

April 17: Prowl H2O 2.1 pt/A applied over entire trial.

June 3 and 18: 1.5 pt Parrlay applied over entire trial.

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Investigator: Stanley Culpepper

Pest Code	COTTON	AMAPA	AMAPA	AMAPA	AMAPA	AMAPA		
Crop Code	May-19-07	May-19-07	May-30-07	Jun-09-07	Jun-19-07	Jul-10-07		
Rating Date	%	%	%	%	%	%		
Rating Data Type	injury	control	control	control	control	control		
Rating Unit	7	7	18	28	38	59		
Days After First/Last Applic.	7 DA-A	7 DA-A	18 DA-A	28 DA-A	38 DA-A	59 DA-A		
Trt-Eval Interval								
Trt No.	Treatment Name	Rate	Rate	Rate	Rate	Rate		
		Unit	Unit	Unit	Unit	Unit		
		1	2	3	4	5		
1	WeatherMax	22 OZ/A	0 e	10 f	10 i	10 f	10 f	
2	WeatherMax	44 OZ/A	5 de	46 d	26 h	23 e	25 de	24 ef
3	WeatherMax	88 OZ/A	7 cd	74 bc	65 de	64 bc	59 c	67 bc
4	WeatherMax	176 OZ/A	13 c	90 a	90 ab	90 a	87 a	80 b
5	Staple LX NIS	2.5 OZ/A 0.25 % V/V	9 cd	26 e	30 h	29 e	23 de	13 f
6	Staple LX NIS	5.0 OZ/A 0.25 % V/V	11 cd	39 de	41 g	45 d	38 d	15 f
7	Staple LX NIS	10.0 OZ/A 0.25 % V/V	12 cd	38 de	53 f	54 cd	58 c	33 e
8	Staple LX NIS	15.0 OZ/A 0.25 % V/V	14 c	48 d	60 ef	73 b	70 bc	49 d
9	WeatherMax Staple LX	22 OZ/A 2.5 OZ/A	8 cd	43 d	40 g	29 e	34 d	20 ef
10	WeatherMax Staple LX	44 OZ/A 5.0 OZ/A	8 cd	63 c	73 cd	68 b	65 c	59 cd
11	WeatherMax Staple LX	88 OZ/A 10.0 OZ/A	21 b	84 ab	82 bc	85 a	83 ab	81 b
12	WeatherMax Staple LX	176 OZ/A 15.0 OZ/A	29 a	92 a	97 a	95 a	96 a	96 a
LSD (P=.05)			6.6	13.9	9.5	11.3	15.0	13.2
Standard Deviation			4.6	9.6	6.6	7.9	10.4	9.1
CV			40.47	17.7	11.89	14.23	19.4	20.06
Bartlett's X2			15.066	19.462	2.507	11.18	14.964	9.551
P(Bartlett's X2)			0.13	0.022*	0.927	0.344	0.133	0.481

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

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Location: Macon County

Study Director: Stanley Culpepper

Investigator: Stanley Culpepper

### General Trial Information

Study Director: Stanley Culpepper

Title: Ext. Weed Science

Affiliation: Univ. of Georgia

Postal Code: 31794

E-mail: \_\_\_\_\_

Investigator: Stanley Culpepper

Title: Ext. Weed Science

Affiliation: Univ. of Georgia

Postal Code: 31794

E-mail: \_\_\_\_\_

Keywords:

### Trial Location

City: Macon County

Trial Status: completed

State/Prov.: GA

Trial Reliability: excellent

Postal Code: \_\_\_\_\_

Initiation Date: Apr-17-07

Country: USA

Planned Completion Date: \_\_\_\_\_

-Latitude of LL Corner °: \_\_\_\_\_

-Longitude of LL Corner °: \_\_\_\_\_

Altitude of LL Corner: \_\_\_\_\_ Unit: \_\_\_\_\_ Angle y-axis to North °: \_\_\_\_\_

Map Reference: \_\_\_\_\_

Directions:

Conducted Under GLP: \_

Official Trial Code: \_\_\_\_\_

Conducted Under GEP: \_

Other Trial Code: \_\_\_\_\_

Guideline	Description
1.	

Objectives:

Conclusions:

Cooperator/Landowner

Cooperator: \_\_\_\_\_ Country: \_\_\_\_\_

Organization: \_\_\_\_\_ Phone No: \_\_\_\_\_

Address 1: \_\_\_\_\_ Fax No: \_\_\_\_\_

Address 2: \_\_\_\_\_

City: \_\_\_\_\_

State/Prov: \_\_\_\_\_

Postal Code: \_\_\_\_\_ E-mail: \_\_\_\_\_

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Crop Description	
Crop 1: GOSHI <i>Gossypium hirsutum</i>	Cotton, American upland
Variety: DP 143 B2 RF	Description: _____
BBCH Scale: BCOT	Planting Date: Apr-17-07
Planting Method: hill drop	Rate, Unit: 2 8 inch
Depth, Unit: 0.75 in	Perennial Age, Unit: _____
Row Spacing, Unit: 36 in	Spacing Within Row, Unit: _____
Seed Bed: bedded	Soil Temperature, Unit: 54 F
Soil Moisture: moist	Emergence Date: Apr-23-07
Harvest Date: _____	Harvest Equipment: _____
Harvested Width, Unit: _____	Harvested Length, Unit: _____
% Standard Moisture: _____	Moisture Meter: _____
Weighing Equipment: _____	

Pest Description	
Pest 1 Type: W Code: AMAPA <i>Amaranth, Palmer</i>	
Common Name: <i>Amaranthus palmeri</i>	
Description: _____	

Site and Design			
Plot Width, Unit: 6	FT	Site Type: On farm	
Plot Length, Unit: 25	FT	Tillage Type: Conventional	
Replications: 4		Study Design: Randomized Complete Block	
% Slope: _____		Soil Drainage: _ _____	

Trial Initiation Comments:

	Previous Crops	Previous Pesticides	Year
1.			

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

Comment:

Field Prep./Maintenance:

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

Additional Measured Elements		
Element	Quantity	Unit

Moisture Conditions		
Overall Moisture Conditions: dry		
Closest Weather Station: _____	Distance: _____	Unit: _____

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	Date	Time	Amount	Unit	Type	Interval	Unit
1.							

### Application Description

	A
Application Date:	May-12-07
Time of Day:	7:30 am
Application Method:	broadcast
Application Timing:	POST
Application Placement:	overtop
Applied By:	Culpepper
Air Temperature, Unit:	75 F
% Relative Humidity:	42
Wind Velocity, Unit:	0 mph
Wind Direction:	
Dew Presence (Y/N):	N
Water Hardness:	
Soil Temperature, Unit:	77 F
Soil Moisture:	fair
% Cloud Cover:	100
Next Rain Occurred On:	

### Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale:	GOSHI BCOT
Stage Scale Used:	BBCH
Stage Majority, Percent:	1 leaf 90
Stage Minimum, Percent:	cot. 10
Stage Maximum, Percent:	2 leaf 10
Diameter, Unit:	
Height, Unit:	1.5 in
Height Minimum, Maximum:	1 2

### Pest Stage At Each Application

	A
Pest 1 Code, Disc., Scale:	AMAPA W
Stage Majority, Percent:	7 90
Stage Minimum, Percent:	6 10
Stage Maximum, Percent:	8 10
Diameter, Unit:	
Height, Unit:	3 in
Height Minimum, Maximum:	2 4
Density, Unit:	5 YDSQ
Coverage, Unit:	100 %

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## Application Equipment

	A
Appl. Equipment:	backpack
Operating Pressure, Unit:	24      PSI
Nozzle Type:	flat fan
Nozzle Size:	11002
Nozzle Spacing, Unit:	18      in
Nozzles/Row:	2
Nozzle Calibration, Unit:	
Band Width, Unit:	
Boom ID:	
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
Mix Size, Unit:	
Spray pH:	
Propellant:	CO2
Tank Mix (Y/N):	y

Equipment Comment:

Trt No    Treatment Application Comment

\_\_\_\_\_

Date                      By                      Notes

\_\_\_\_\_

Date                      By                      Deviations

\_\_\_\_\_

Reasons: