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

Trial ID: C12-08

Protocol ID:

Location: Macon County

Study Director: Culpepper, Davis

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 shunting along with speckling with higher rates of Staple alone or in combination with WeatherMax.
2. Greater than 10% injury was noted with Weathermax at 88 and 176 oz/A; Staple at or above 5 oz/A; WeatherMax at 88 or 176 oz/A plus Staple at 10 or 15 oz/A, respectively. Injury was severe (27 to 44%) with WeatherMax at 88 oz or 176 oz plus Staple LX at 10 to 15 oz.
3. Lack of weed control prohibited later cotton injury evaluations.

Glyphosate-resistant Palmer amaranth response:

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1. At 8 or 20 DAT, WeatherMax at 176 oz/A alone or mixed with Staple were the only treatments providing greater than 88% control. Staple alone provided less than 57% control.
2. By 57 DAT, WeatherMax at 176 oz/A plus Staple at 15 oz/A provided 85% control. No other treatment provided greater than 75% control. Staple treatments provided less than 50% control.

CONCLUSIONS:

1. These field efforts along with the greenhouse study confirm multiple resistance in this population of Palmer amaranth.

GENERAL COMMENTS:

- 1 April 25, 2008 - Firestorm @ 1 qt/A + Prowl H20 at 2.1 pt/A and 1 qt/A Crop Oil applied over trial.
2. May 23 and June 7 - Oversprayed trial with 1.5 pt Parrlay.
3. Rainfall that occurred while conducting the experiment is as follows:

Apr 28	1 in
May 9	0.4 in
May 11	2.7 in
May 20	0.2 in
May 24	0.3 in
Jun 11	0.9 in
Jun 17	0.6 in
Jun 22	1 in
Jul 5	0.5 in
Jul 21	1 in

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Protocol ID:

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Pest Type		W Weed	W Weed	W Weed	W Weed		
Pest Code		AMAPA	AMAPA	AMAPA	AMAPA		
Crop Code	GOSHI						
BBCH Scale	BCOT						
Rating Date	May-30-08	May-30-08	Jun-11-08	Jun-26-08	Jul-18-08		
Rating Data Type	injury	control	control	control	control		
Rating Unit	%	%	%	%	%		
Days After First/Last Applic.	8	8	20	35	57		
Trt-Eval Interval	8 DA-A	8 DA-A	20 DA-A	35 DA-A	57 DA-A		
Trt No.	Treatment Name	Rate	1	2	3	4	5
		Rate Unit					
1	WeatherMax	22 OZ/A	0 g	0 f	0 g	0 g	0 h
2	WeatherMax	44 OZ/A	3 g	23 e	23 f	21 f	14 g
3	WeatherMax	88 OZ/A	13 de	62 b	59 c	36 e	30 f
4	WeatherMax	176 OZ/A	23 c	89 a	89 a	74 b	71 b
5	Staple LX NIS	2.5 OZ/A 0.25 % V/V	9 f	30 e	33 e	28 f	13 g
6	Staple LX NIS	5.0 OZ/A 0.25 % V/V	11 ef	40 d	36 e	26 f	19 g
7	Staple LX NIS	10.0 OZ/A 0.25 % V/V	14 de	41 d	45 d	45 d	25 f
8	Staple LX NIS	15.0 OZ/A 0.25 % V/V	15 d	47 cd	56 c	60 c	46 d
9	WeatherMax Staple LX	22 OZ/A 2.5 OZ/A	9 f	40 d	46 d	29 f	13 g
10	WeatherMax Staple LX	44 OZ/A 5.0 OZ/A	11 ef	51 c	68 b	45 d	38 e
11	WeatherMax Staple LX	88 OZ/A 10.0 OZ/A	28 b	68 b	73 b	70 b	63 c
12	WeatherMax Staple LX	176 OZ/A 15.0 OZ/A	44 a	92 a	93 a	82 a	85 a
LSD (P=.05)			3.4	7.6	8.2	7.2	6.3
Standard Deviation			2.3	5.2	5.7	5.0	4.3
CV			15.64	10.8	11.02	11.65	12.54
Bartlett's X2			7.239	12.963	15.708	12.01	9.19
P(Bartlett's X2)			0.612	0.164	0.108	0.213	0.514

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

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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 Co.

Trial Status: completed

State/Prov.: GA

Trial Reliability: excellent

Postal Code: 31794

Initiation Date: Apr-23-08

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 555 BRR	Description: _____
BBCH Scale: BCOT	Planting Date: Apr-23-08
Planting Method: hill crop	Rate, Unit: 2 8 in
Depth, Unit: 0.5 in	Perennial Age, Unit: _____
Row Spacing, Unit: 36 in	Spacing Within Row, Unit: 8 in
Seed Bed: bedded	Soil Temperature, Unit: 82 F
Soil Moisture: moist	Emergence Date: Apr-29-08
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	Texture: loamy sand	
% Silt: 14	pH: 6.4	Soil Name: _____	
% Clay: 4	CEC: _____	Fert. Level: _____	
Analyzed By: _____			

Additional Measured Elements		
Element	Quantity	Unit

Moisture Conditions		
Overall Moisture Conditions: see comments		
Closest Weather Station: _____	Distance: _____	Unit: _____

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	Date	Time	Amount	Unit	Type	Interval	Unit
1.							

Application Description

	A
Application Date:	May-22-08
Time of Day:	10 am
Application Method:	broadcast
Application Timing:	POST
Application Placement:	overtop
Applied By:	Culpepper
Air Temperature, Unit:	86 F
% Relative Humidity:	50
Wind Velocity, Unit:	0 F
Wind Direction:	
Dew Presence (Y/N):	N
Water Hardness:	
Soil Temperature, Unit:	80 F
Soil Moisture:	moist
% 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:	4 leaf 100
Stage Minimum, Percent:	4 leaf 100
Stage Maximum, Percent:	4 leaf 100
Diameter, Unit:	
Height, Unit:	4 in
Height Minimum, Maximum:	3.5 4.5

Pest Stage At Each Application

	A
Pest 1 Code, Disc., Scale:	AMAPA W .
Stage Majority, Percent:	6 80
Stage Minimum, Percent:	5 10
Stage Maximum, Percent:	7 10
Diameter, Unit:	
Height, Unit:	3 in
Height Minimum, Maximum:	2 4
Density, Unit:	12 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 in
Boom Height, Unit:	15 in
Ground Speed, Unit:	3 mph
Incorporation Equip.:	
Hours to Incorp.:	
Incorp. Depth, Unit:	
Carrier:	water
Spray Volume, Unit:	15 GAL/AC
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: