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Impact of deep tillage on the control of glyphosate-resistant Palmer amaranth.

Trial ID: C23-08 Study Dir.: Stanley Culpepper
Location: Macon County Investigator: Stanley Culpepper

Reps: 3 Plots: 12 by 25 feet
Spray vol: 14.8 gal/ac Mix size: 1 liters (min 1.1575)

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
1	Breaking Land									102	203	306
	Non-treated Control											
2	Breaking Land									103	206	308
	Roundup WeatherMax	4.5		L	22	OZ/A	POST1	C	11.61 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	POST 2	D	11.61 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	PD	E	11.61 ml/mx			
3	Breaking Land									106	207	302
	Prowl	3.8		L	2.1	PT/A	PRE	B	17.73 ml/mx			
	Reflex	2		L	1	PT/A	PRE	B	8.445 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	POST1	C	11.61 ml/mx			
	Dual Magnum	7.64		L	16	OZ/A	POST1	C	8.446 ml/mx			
	Direx	4		L	1	QT/A	PD	E	16.89 ml/mx			
	MSMA	6		L	2.5	PT/A	PD	E	21.11 ml/mx			
4	Breaking Land									107	202	304
	Treflan	4		L	1.5	PT/A	PPI	A	12.67 ml/mx			
	Reflex	2		L	1	PT/A	PRE	B	8.445 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	POST1	C	11.61 ml/mx			
	Dual Magnum	7.64		L	16	OZ/A	POST1	C	8.446 ml/mx			
	Direx	4		L	1	QT/A	PD	E	16.89 ml/mx			
	MSMA	6		L	2.5	PT/A	PD	E	21.11 ml/mx			
5	No deep tillage									101	204	305
	Non-treated Control											
6	No deep tillage									104	205	307
	Roundup WeatherMax	4.5		L	22	OZ/A	POST1	C	11.61 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	POST 2	D	11.61 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	PD	E	11.61 ml/mx			
7	No deep tillage									105	208	301
	Prowl	3.8		L	2.1	PT/A	PRE	B	17.73 ml/mx			
	Reflex	2		L	1	PT/A	PRE	B	8.445 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	POST1	C	11.61 ml/mx			
	Dual Magnum	7.64		L	16	OZ/A	POST1	C	8.446 ml/mx			
	Direx	4		L	1	QT/A	PD	E	16.89 ml/mx			
	MSMA	6		L	2.5	PT/A	PD	E	21.11 ml/mx			
8	No deep tillage									108	201	303
	Treflan	4		L	1.5	PT/A	PPI	A	12.67 ml/mx			
	Reflex	2		L	1	PT/A	PRE	B	8.445 ml/mx			
	Roundup WeatherMax	4.5		L	22	OZ/A	POST1	C	11.61 ml/mx			
	Dual Magnum	7.64		L	16	OZ/A	POST1	C	8.446 ml/mx			
	Direx	4		L	1	QT/A	PD	E	16.89 ml/mx			
	MSMA	6		L	2.5	PT/A	PD	E	21.11 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
145.165	ml	Roundup WeatherMax	4.5	L	
44.337	ml	Prowl	3.8	L	
42.225	ml	Reflex	2	L	
42.230	ml	Dual Magnum	7.64	L	

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Reps: 3 Plots: 12 by 25 feet
Spray vol: 14.8 gal/ac Mix size: 1 liters (min 1.1575)

Trt No.	Tr> N>	Form Conc	Form Unit	Form Type	Rate	Plot No. By Rep

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

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
84.451	ml	Direx	4	L	
105.563	ml	MSMA	6	L	
31.669	ml	Treflan	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.

Trial Comments

OBJECTIVE: Determine impact of deep tillage on glyphosate-resistant Palmer amaranth emergence.

Cotton Injury:
1. Neither tillage nor herbicide treatments impacted visual plant growth.

Palmer Response:
1. Breaking the land, without the addition of herbicides, provided 75, 53, and 0% control at 14, 31 and 60 DAP. At 19 DAT, the number of Palmer amaranth plants per square yard was reduced 60% by breaking the land.
2. When the land was broke, Treflan PPI or Prowl PRE programs provided excellent control.
3. When the land was not broke, Treflan PPI programs were more effective than Prowl PRE programs.

Large Crabgrass:
1. Breaking the land, without the addition of herbicides, provided 75, 61, and 58% control at 14, 31 and 60 DAP. At 19 DAT, the number of Palmer amaranth plants per square yard was reduced 60% by breaking the land.
2. All herbicide programs included glyphosate and provided excellent control.

Seed Cotton Yield:
1. Treatments not receiving herbicides could not be harvested.
2. Yields from systems with Treflan PPI or Prowl PRE after breaking the land only provided similar yields.

GENERAL COMMENTS:
1. Deep tillage included using a moldboard plow breaking the land 6 to 10 inches deep just prior to applying preplant incorporated treatments.
2. Rainfall (in) that occurred early during the season when herbicides were applied ares 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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Trial ID: C23-08 Study Dir.: Stanley Culpepper
Location: Macon County Investigator: Stanley Culpepper

Trt No.	Treatment Name	Rate	Rate Unit	1	2	3	4	5	6	7
Weed Code				INJURY	INJURY	AMAPA	AMAPA	AMAPA	AMAPA	AMAPA
Crop Code				GOSHI	GOSHI					
Rating Data Type				control	control	control	#	#	control	control
Rating Unit				%	%	%	squareft	squareft	%	%
Rating Date				May-30-08	Jun-24-08	May-09-08	May-14-08	May-26-08	May-26-08	Jun-24-08
Trt-Eval Interval				35 DA-B	60 DA-B	14 DA-B	19 DA-B	31 DA-B	31 DA-B	60 DA-B
ARM Action Codes										
# Subsamples, Dec.										
1	Breaking Land			0 a	0 a	77 b	6 b	8 b	53 c	0 c
	Non-treated Control									
2	Breaking Land			0 a	0 a	77 b			68 b	0 c
	Roundup WeatherMax	22	OZ/A							
	Roundup WeatherMax	22	OZ/A							
	Roundup WeatherMax	22	OZ/A							
3	Breaking Land			3 a	3 a	100 a			100 a	95 a
	Prowl	2.1	PT/A							
	Reflex	1	PT/A							
	Roundup WeatherMax	22	OZ/A							
	Dual Magnum	16	OZ/A							
	Direx	1	QT/A							
	MSMA	2.5	PT/A							
4	Breaking Land			3 a	0 a	100 a			99 a	97 a
	Treflan	1.5	PT/A							
	Reflex	1	PT/A							
	Roundup WeatherMax	22	OZ/A							
	Dual Magnum	16	OZ/A							
	Direx	1	QT/A							
	MSMA	2.5	PT/A							
5	No deep tillage			0 a	0 a	0 c	14 a	16 a	0 e	0 c
	Non-treated Control									
6	No deep tillage			5 a	0 a	3 c			12 d	0 c
	Roundup WeatherMax	22	OZ/A							
	Roundup WeatherMax	22	OZ/A							
	Roundup WeatherMax	22	OZ/A							
7	No deep tillage			0 a	0 a	100 a			89 a	70 b
	Prowl	2.1	PT/A							
	Reflex	1	PT/A							
	Roundup WeatherMax	22	OZ/A							
	Dual Magnum	16	OZ/A							
	Direx	1	QT/A							
	MSMA	2.5	PT/A							
8	No deep tillage			2 a	0 a	100 a			100 a	97 a
	Treflan	1.5	PT/A							
	Reflex	1	PT/A							
	Roundup WeatherMax	22	OZ/A							
	Dual Magnum	16	OZ/A							
	Direx	1	QT/A							
	MSMA	2.5	PT/A							
LSD (P=.05)				7.2	3.6	4.6	5.7	5.2	11.4	14.2
Standard Deviation				4.1	2.0	2.6	1.6	1.5	6.5	8.1
CV				258.44	489.9	3.8	16.61	12.1	9.97	18.15
Bartlett's X2				3.55	0.0	1.313	0.065	0.158	17.694	6.509
P(Bartlett's X2)				0.314	.	0.519	0.798	0.691	0.003*	0.089

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Weed Code	INJURY	INJURY	AMAPA	AMAPA	AMAPA	AMAPA	AMAPA
Crop Code	GOSHI	GOSHI					
Rating Data Type	control	control	control	#	#	control	control
Rating Unit	%	%	%	squareft	squareft	%	%
Rating Date	May-30-08	Jun-24-08	May-09-08	May-14-08	May-26-08	May-26-08	Jun-24-08
Trt-Eval Interval	35 DA-B	60 DA-B	14 DA-B	19 DA-B	31 DA-B	31 DA-B	60 DA-B
ARM Action Codes							
# Subsamples, Dec.							

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

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Trt No.	Treatment Name	Rate	Rate Unit	8	9	10	11	12	13	14	15
Weed Code				AMAPA	AMAPA	DIGSA	DIGSA	DIGSA	DIGSA	Seed Yld	Seed Yld
Crop Code										GOSHI	GOSHI
Rating Data Type				control	control	control	control	control	control	lbs	YIELD
Rating Unit				%	%	%	%	%	%	1rowplot	LB
Rating Date				Jun-26-08	Sep-09-08	May-09-08	May-26-08	Jun-26-08	Sep-09-08	Oct-17-08	Oct-17-08
Trt-Eval Interval				62 DA-B	137 DA-B	14 DA-B	31 DA-B	62 DA-B	137 DA-B	175 DA-B	175 DA-B
ARM Action Codes											TY1
# Subsamples, Dec.											1
1	Breaking Land			0 d	0 c	75 b	62 b	58 b	0 b	0 c	0.0 c
	Non-treated Control										
2	Breaking Land			17 c	0 c	68 b	100 a	99 a	96 a	0 c	0.0 c
	Roundup WeatherMax	22	OZ/A								
	Roundup WeatherMax	22	OZ/A								
	Roundup WeatherMax	22	OZ/A								
3	Breaking Land			96 a	94 a	100 a	100 a	99 a	99 a	2 a	1432.6 a
	Prowl	2.1	PT/A								
	Reflex	1	PT/A								
	Roundup WeatherMax	22	OZ/A								
	Dual Magnum	16	OZ/A								
	Direx	1	QT/A								
	MSMA	2.5	PT/A								
4	Breaking Land			98 a	98 a	100 a	100 a	100 a	96 a	3 a	1548.8 a
	Treflan	1.5	PT/A								
	Reflex	1	PT/A								
	Roundup WeatherMax	22	OZ/A								
	Dual Magnum	16	OZ/A								
	Direx	1	QT/A								
	MSMA	2.5	PT/A								
5	No deep tillage			0 d	0 c	0 c	0 c	0 c	0 b	0 c	0.0 c
	Non-treated Control										
6	No deep tillage			0 d	0 c	0 c	100 a	99 a	96 a	0 c	0.0 c
	Roundup WeatherMax	22	OZ/A								
	Roundup WeatherMax	22	OZ/A								
	Roundup WeatherMax	22	OZ/A								
7	No deep tillage			83 b	79 b	100 a	100 a	98 a	99 a	2 b	1171.3 b
	Prowl	2.1	PT/A								
	Reflex	1	PT/A								
	Roundup WeatherMax	22	OZ/A								
	Dual Magnum	16	OZ/A								
	Direx	1	QT/A								
	MSMA	2.5	PT/A								
8	No deep tillage			96 a	90 a	100 a	100 a	100 a	99 a	3 a	1568.2 a
	Treflan	1.5	PT/A								
	Reflex	1	PT/A								
	Roundup WeatherMax	22	OZ/A								
	Dual Magnum	16	OZ/A								
	Direx	1	QT/A								
	MSMA	2.5	PT/A								
LSD (P=.05)				10.0	7.5	9.3	7.8	8.7	4.9	0.4	247.77
Standard Deviation				5.7	4.3	5.3	4.4	5.0	2.8	0.2	141.47
CV				11.71	9.48	7.86	5.38	6.11	3.82	19.78	19.78
Bartlett's X2				4.705	4.616	2.185	0.0	38.93	0.029	2.038	2.038
P(Bartlett's X2)				0.319	0.202	0.139	.	0.001*	0.986	0.565	0.565

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

Column 15: TY1 = 580.8*[C14]

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Trial ID: C23-08 Study Dir.: Stanley Culpepper
Location: Macon County Investigator: Stanley Culpepper

GENERAL TRIAL INFORMATION

Study Director: Stanley Culpepper **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 Co. **Trial Status:** completed
State/Prov.: GA **Trial Reliability:** good
Postal Code: 31794 **Initiation Date:** Apr-24-08
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	Amaranth, Palmer	Amaranthus palmeri
2.	DIGSA	Digitaria sanguinalis	Digitaria sanguinalis

Crop 1: GOSHI COTTON, SHORT STAPLE **Variety:** DP 555 BRR
Planting Date: Apr-23-08 **Planting Method:** hill drop
Rate: 2 8 in **Depth:** 0.5 in **Perennial Age:** ____ _____
Row Spacing: 36 in **Spacing Within Row:** 8.5 in **Seed Bed:** flat
Soil Temperature: 82 F **Soil Moisture:** moist **Emergence Date:** Apr-29-08

SITE AND DESIGN

Plot Width, Unit: 12 FT **Plot Length, Unit:** 25 FT **Reps:** 3
Site Type: On farm
Tillage Type: Conventional **Study Design:** SPLIT-PLOT

Trial Initiation Comments:

	Previous Crops	Previous Pesticides	Year
1.			

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MAINTENANCE

Field Prep./Maintenance:

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

SOIL DESCRIPTION

% Sand: 82 **% OM:** 2 **Texture:** loamy sand
% Silt: 14 **pH:** 6.4 **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: see comments
Closest Weather Station: _____ **Distance:** _____ **Unit:** __

APPLICATION DESCRIPTION

	A	B	C	D	E
Application Date:	Apr-24-08	Apr-25-08	May-14-08	May-26-08	Jun-27-08
Time of Day:	7:00 am	2:00 PM	7:00 am	7:00 am	8:00 am
Application Method:	broadcast	broadcast	broadcast	broadcast	broadcast
Application Timing:	PPI	PRE	POST 1	POST 2	PD
Applic. Placement:	on soil	on soil	overtop	overtop	directed
Air Temp., Unit:	65 F	85 F	66 F	76 F	76 F
% Relative Humidity:	70	49	58	70	58
Wind Velocity, Unit:	3 mph	5 mph	0 mph	0 mph	3 mph
Dew Presence (Y/N):	N	N	N	Y	Y
Water Hardness:					
Soil Temp., Unit:	65 F	82 F	64 F	78 F	78 F
Soil Moisture:	moist	moist	moist	fair	moist
% Cloud Cover:	0	30	70	0	0

CROP STAGE AT EACH APPLICATION

	A	B	C	D	E
Crop 1 Code, Stage:	GOSHI A	GOSHI B	GOSHI C	GOSHI D	GOSHI E
Stage Scale:	preplant	PRE	1 leaf	5 leaf	13 leaf
Height, Unit:	0 in	0 in	1.5 in	6 in	15 in

WEED STAGE AT EACH APPLICATION

	A	B	C	D	E
Weed 1 Code, Stage:	AMAPA A	AMAPA B	AMAPA C	AMAPA D	AMAPA E
Stage Scale:	preplant	PRE	2.5 in	5 in	18 in
Density, Unit:	0 ydsq	0 ydsq	30 ydsq	30 ydsq	30 ydsq
Weed 2 Code, Stage:	DIGSA A	DIGSA B	DIGSA C	DIGSA D	DIGSA E
Stage Scale:	preplant	PRE	2 in	2 in	3 in
Density, Unit:	0 ydsq	0 ydsq	20 ydsq	5 ydsq	5 ydsq

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APPLICATION EQUIPMENT

	A	B	C	D	E
Appl. Equipment:	backpack	backpack	backpack	backpack	backpack
Operating Pressure:	24	24	24	24	24
Nozzle Type:	flat fan	flat fan	flat fan	flat fan	flat fan
Nozzle Size:	11002	11002	11002	11002	11002
Nozzle Spacing, Unit:	18 in	18 in	18 in	18 in	12 in
Nozzles/Row:	2	2	2	2	3
Band Width, Unit:					
Boom Length, Unit:	4.5 ft	4.5 ft	4.5 ft	4.5 ft	24 in
Boom Height, Unit:	15 in	15 in	15 in	15 in	12 in
Ground Speed, Unit:	3 mph	3 mph	3 mph	3 mph	3 mph
Incorporation Equip.:					
Hours to Incorp.:					
Incorp. Depth, Unit:					
Carrier:	water	water	water	water	water
Spray Volume, Unit:	15 GPA	14.5 GPA	15 GPA	15 GPA	15 GPA
Spray pH:					
Propellant:	CO2	CO2	CO2	CO2	CO2
Tank Mix (Y/N):	Y	Y	Y	Y	Y

Trt No	Treatment Application Comment