

University of Georgia

Glyphosate-resistant Palmer amaranth control by residual herbicides applied preemergence.

Trial ID: C27-06

Protocol ID:

Location: Macon Co. (Paved)

Study Director: Kichler, Culpepper

Investigator: Stanley Culpepper

Reps: 4

Plots: 6 by 22 feet

Spray vol: 14.8 gal/ac

Mix size: 1 liters (min .67908)

Tt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Growth Stage	Appl Code	Amt Product to Measure	Plot No. By Rep			
										1	2	3	4
1	1X Rate Caparol	4.0 lba/gal	L		2	PT/A	PRE	A	16.89 ml/mx	119	207	326	422
2	1X Rate Cotoran	4.0 lba/gal	L		2	PT/A	PRE	A	16.89 ml/mx	125	205	318	420
3	1X Rate Direx	4.0 lba/gal	L		2	PT/A	PRE	A	16.89 ml/mx	114	208	324	416
4	1X Rate Dual Magnum	7.62 lba/gal	L		1	PT/A	PRE	A	8.445 ml/mx	123	213	314	424
5	1X Rate Envoke	75 %	WG		0.1	OZ/A	PRE	A	.0506 g/mx	117	206	325	415
6	1X Rate Layby Pro	4.0 lba/gal	L		2	PT/A	PRE	A	16.89 ml/mx	121	210	321	421
7	1X Rate Linex	4.0 lba/gal	L		2	PT/A	PRE	A	16.89 ml/mx	120	201	317	426
8	1X Rate Prowl H2O	3.8 lba/gal	L		2	PT/A	PRE	A	16.89 ml/mx	126	204	316	425
9	1X Rate Reflex	2.0 lba/gal	L		1	PT/A	PRE	A	8.445 ml/mx	115	202	319	417
10	1X Rate Stalwart	8.0 lba/gal	L		1	PT/A	PRE	A	8.445 ml/mx	118	211	322	419
11	1X Rate Staple LX	3.2 lba/gal	L		1.7	FLOZ/A	PRE	A	0.8974 ml/mx	124	212	315	423
12	1X Rate Suprend	80 %	WG		1	LB/A	PRE	A	8.096 g/mx	116	203	320	414
13	1X Rate Valor SX	51 %	WG		1.5	OZ/A	PRE	A	0.759 g/mx	122	209	323	418
14	1.5X Rate Caparol	4.0 lba/gal	L		3	PT/A	PRE	A	25.34 ml/mx	103	223	312	413
15	1.5X Rate Cotoran	4.0 lba/gal	L		3	PT/A	PRE	A	25.34 ml/mx	111	221	304	408
16	1.5X Rate Direx	4.0 lba/gal	L		3	PT/A	PRE	A	25.34 ml/mx	107	225	308	403
17	1.5X Rate Dual Magnum	7.62 lba/gal	L		1.5	PT/A	PRE	A	12.67 ml/mx	109	219	301	402
18	1.5X Rate Envoke	75 %	WG		0.15	OZ/A	PRE	A	.0759 g/mx	112	215	307	404
19	1.5X Rate Layby Pro	4.0 lba/gal	L		3	PT/A	PRE	A	25.34 ml/mx	113	222	309	410
20	1.5X Rate Linex	4.0 lba/gal	L		3	PT/A	PRE	A	25.34 ml/mx	106	218	311	409
21	1.5X Rate Prowl H2O	3.8 lba/gal	L		3	PT/A	PRE	A	25.34 ml/mx	102	214	302	406
22	1.5X Rate Reflex	2.0 lba/gal	L		1.5	PT/A	PRE	A	12.67 ml/mx	108	217	305	412
23	1.5X Rate Stalwart	8.0 lba/gal	L		1.5	PT/A	PRE	A	12.67 ml/mx	101	216	306	405

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Reps: 4 Plots: 6 by 22 feet
 Spray vol: 14.8 gal/ac Mix size: 1 liters (min .67908)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Growth Unit	Appl Stage	Amt Code	Product to Measure	Plot No. By Rep			
										1	2	3	4
24	1.5X Rate Staple LX	3.2	lba/gal	L	2.55	FL OZ/A	PRE	A	1.346 ml/mx	105	224	310	411
25	1.5X Rate Suprend	80	%	WG	1.5	LB/A	PRE	A	12.14 g/mx	104	226	303	407
26	1.5X Rate Valor SX	51	%	WG	2.25	OZ/A	PRE	A	1.139 g/mx	110	220	313	401
27	Untreated									128	227	327	427
28	Untreated									127	228	328	428

Sort Order: Treatment

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

Amount*	Unit	Treatment Name	Form Conc	Form Type	Lot Code
52.782	ml	Caparol	4.0	L	
52.782	ml	Cotoran	4.0	L	
52.782	ml	Direx	4.0	L	
26.391	ml	Dual Magnum	7.62	L	
0.158	g	Envoke	75	WG	
52.782	ml	Layby Pro	4.0	L	
52.782	ml	Linex	4.0	L	
52.782	ml	Prowl H2O	3.8	L	
26.391	ml	Reflex	2.0	L	
26.391	ml	Stalwart	8.0	L	
2.804	ml	Staple LX	3.2	L	
25.301	g	Suprend	80	WG	
2.372	g	Valor SX	51	WG	

* '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 the most effective residual cotton herbicide for the control of Palmer amaranth.

Note: All herbicides were applied PRE to cotton and weeds. Over 5.5 inches of rain occurred within 9 days of applying treatments. After this rainfall it did not rain for over 50 days.

Cotton Response:

1. The greatest injury occurred with Valor followed by Linex and Layby Pro.
2. Injury from many other commonly used herbicides ranged from 8 to 15% because of the heavy rains after planting.

Palmer Amaranth Visual Response from the straight analysis:

1. Valor and Reflex were the most effective options providing over 94% control 85 d after application at the 1 X rate.
2. Excellent control was noted for up to 59 days with the 1.5 X rate of Dual Magnum.
3. Excellent control was noted up to 31 days with Suprend and Staple at the 1.5 X rate with good control noted with Staple and Suprend at the 1X rate and Dual Magnum, Direx and Layby Pro at the 1.5 X rate.
4. At 18 DAT, Direx, Dual mag, Reflex, Staple, Suprend and Valor provided at least 90% control.
5. At 18 DAT, Caparol and Prowl tended to be the least effective products.
6. Direx and Layby Pro tended to be more effective than Cotoran, Caparol, and Linex.
7. Dual Magnum was more effective than Stalwart.
8. Staple was more effective than Envoke.

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Palmer Amaranth Response from factorial:

1. As expected, the 1.5X rate was more effective than the 1X rate at all evaluation dates when pooled over herbicide options.
2. At 18 DAT, Caparol, Cotoran, Envoke, Prowl H20, and Stalwart tended to be the least effective options.
3. At 31 DAT, Reflex, Valor, Suprend, Staple and Dual Mag. were the most effective options when pooled over rates.
4. By 50 DAT, Reflex and Valor stood out compared to other options and this trend held true through the last evaluation at 85 DAT. By 85 DAT when pooled over herbicide rates, the next most effective herbicide was 26% less effective than Valor or Reflex.

Palmer Emergence Counts:

1. On June 8, the number of Palmer emerged in a 18 sq ft area were counted.
2. When pooled over herbicide option, the 1.0 X rate had nearly twice as many Palmer as the 1.5 X rate.
3. When pooled over herbicide rate, more Palmer emerged in the Caparol, Cotoran, Prowl, Linex and Stalwart plots compared to other treated plots.

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Glyphosate-resistant Palmer amaranth control by residual herbicides applied preemergence.

Trial ID: C27-06

Protocol ID:

Location: Macon Co. (Paved)

Study Director: Kichler, Culpepper

Investigator: Stanley Culpepper

Pest Code				AMAPA	AMAPA	AMAPA	AMAPA	AMAPA			
Crop Code	GOSHI	GOSHI	GOSHI								
BBCH Scale	BCOT	BCOT	BCOT								
Rating Date	May-15-06	Jun-01-06	Jun-08-06	May-19-06	Jun-01-06	Jun-20-06	Jul-07-06	Jul-25-06			
Rating Data Type	injury	injury	injury	control	control	control	control	control			
Rating Unit	%	%	%	%	%	%	%	%			
Assessed By	JK	JK	AD	SC	JK	JK	SC	JK			
Days After First/Last Applic.	14	31	38	18	31	50	67	85			
Trt-Eval Interval	14 DA-A	31 DA-A	38 DA-A	18 DA-A	31 DA-A	50 DA-A	59 DA-A	85 DA-A			
Trt No.	Treatment Name	Rate	Rate Unit	1	2	3	4	5	6	7	8
1	1X Rate Caparol	2	PT/A	8 gh	13 c-f	10 ef	77 i	52 i	57 fg	35 klm	38 g-j
2	1X Rate Cotoran	2	PT/A	8 gh	5 ef	3 f	82 ghi	56 ghi	58 efg	33 lm	48 e-j
3	1X Rate Direx	2	PT/A	16 fgh	17 cde	6 ef	90 b-g	75 c-f	67 c-g	53 f-i	50 e-j
4	1X Rate Dual Magnum	1	PT/A	8 gh	6 ef	3 f	95 a-e	83 b-e	76 bcd	58 e-h	45 f-j
5	1X Rate Envoke	0.1	OZ/A	8 gh	12 c-f	0 f	89 c-g	66 e-i	59 d-g	38 j-m	40 g-j
6	1X Rate Layby Pro	2	PT/A	38 de	23 cd	13 def	87 e-h	82 b-e	64 d-g	50 g-j	59 d-h
7	1X Rate Linex	2	PT/A	51 cd	45 b	30 bc	88 d-g	68 e-i	57 fg	38 j-m	40 g-j
8	1X Rate Prowl H2O	2	PT/A	12 fgh	20 cde	4 ef	78 hi	61 f-i	51 g	26 m	33 hij
9	1X Rate Reflex	1	PT/A	13 fgh	17 cde	1 f	98 abc	98 ab	98 a	95 a	97 a
10	1X Rate Stalwart	1	PT/A	12 fgh	10 c-f	1 f	83 ghi	53 hi	51 g	25 m	25 j
11	1X Rate Staple LX	1.7	FL OZ/A	6 gh	5 ef	0 f	96 a-d	87 a-d	84 abc	69 b-e	60 d-h
12	1X Rate Suprend	1	LB/A	15 fgh	13 c-f	0 f	94 a-e	88 abc	76 b-e	64 c-f	65 c-g
13	1X Rate Valor SX	1.5	OZ/A	60 bc	50 b	24 cd	99 ab	100 a	100 a	95 a	96 a
14	1.5X Rate Caparol	3	PT/A	22 efg	18 cde	8 ef	81 ghi	67 e-i	58 d-g	29 m	30 ij
15	1.5X Rate Cotoran	3	PT/A	13 fgh	10 c-f	9 ef	89 c-g	77 c-f	72 b-f	44 i-l	54 d-i
16	1.5X Rate Direx	3	PT/A	28 ef	20 cde	13 def	93 a-f	85 a-d	85 abc	72 bcd	69 b-f
17	1.5X Rate Dual Magnum	1.5	PT/A	9 gh	10 c-f	9 ef	98 abc	96 ab	96 a	90 a	89 abc
18	1.5X Rate Envoke	0.15	OZ/A	10 fgh	7 def	4 ef	86 e-h	69 e-h	68 c-g	41 i-l	44 f-j
19	1.5X Rate Layby Pro	3	PT/A	63 bc	55 b	40 b	96 a-d	86 a-d	74 b-f	56 fgh	60 d-h
20	1.5X Rate Linex	3	PT/A	76 ab	69 a	61 a	96 a-d	71 d-g	68 c-g	47 h-k	55 d-i

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Pest Code	GOSHI	GOSHI	GOSHI	AMAPA	AMAPA	AMAPA	AMAPA	AMAPA			
Crop Code	GOSHI	GOSHI	GOSHI	AMAPA	AMAPA	AMAPA	AMAPA	AMAPA			
BBCH Scale	BCOT	BCOT	BCOT								
Rating Date	May-15-06	Jun-01-06	Jun-08-06	May-19-06	Jun-01-06	Jun-20-06	Jul-07-06	Jul-25-06			
Rating Data Type	injury	injury	injury	control	control	control	control	control			
Rating Unit	%	%	%	%	%	%	%	%			
Assessed By	JK	JK	AD	SC	JK	JK	SC	JK			
Days After First/Last Applic.	14	31	38	18	31	50	67	85			
Trt-Eval Interval	14 DA-A	31 DA-A	38 DA-A	18 DA-A	31 DA-A	50 DA-A	59 DA-A	85 DA-A			
Trt No.	Treatment Name	Rate	Rate Unit	1	2	3	4	5	6	7	8
21	1.5X Rate Prowl H2O	3	PT/A	14 fgh	24 c	18 cde	85 f-i	74 c-f	76 b-e	62 d-g	60 d-h
22	1.5X Rate Reflex	1.5	PT/A	17 fgh	13 c-f	3 f	99 ab	100 a	100 a	98 a	100 a
23	1.5X Rate Stalwart	1.5	PT/A	8 gh	10 c-f	0 f	89 c-g	73 c-f	69 c-g	48 h-k	45 f-j
24	1.5X Rate Staple LX	2.55	FL OZ/A	10 fgh	10 c-f	1 f	97 abc	94 ab	90 ab	78 b	79 a-d
25	1.5X Rate Suprend	1.5	LB/A	18 fgh	23 cd	9 ef	99 ab	96 ab	84 abc	75 bc	75 a-e
26	1.5X Rate Valor SX	2.25	OZ/A	81 a	81 a	58 a	99 a	100 a	100 a	97 a	95 ab
27	Untreated			0 h	0 f	0 f	0 j	0 j	0 h	0 n	0 k
28	Untreated			0 h	0 f	0 f	0 j	0 j	0 h	0 n	0 k
LSD (P=.05)				15.8	13.1	12.1	7.8	14.1	15.6	11.1	23.7
Standard Deviation				11.2	9.3	8.5	5.5	10.0	11.0	7.8	16.8
CV				50.18	44.45	73.78	6.5	13.6	15.97	14.51	30.3
Bartlett's X2				61.03	62.513	51.51	51.079	46.43	51.854	56.117	54.494
P(Bartlett's X2)				0.001*	0.001*	0.001*	0.001*	0.003*	0.001*	0.001*	0.001*

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

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Pest Code	AMAPA	
Crop Code		
BBCH Scale		
Rating Date	Jun-08-06	
Rating Data Type	#plant/6ft	
Rating Unit	#	
Assessed By	SC	
Days After First/Last Applic.	38	
Trt-Eval Interval	38 DA-A	
Trt No.	Treatment Name	Rate Unit
		9
1	1X Rate Caparol	2 PT/A
		37 bc
2	1X Rate Cotoran	2 PT/A
		33 bcd
3	1X Rate Direx	2 PT/A
		9 fgh
4	1X Rate Dual Magnum	1 PT/A
		9 fgh
5	1X Rate Envoke	0.1 OZ/A
		27 b-f
6	1X Rate Layby Pro	2 PT/A
		10 e-h
7	1X Rate Linex	2 PT/A
		12 e-h
8	1X Rate Prowl H2O	2 PT/A
		18 c-h
9	1X Rate Reflex	1 PT/A
		0 h
10	1X Rate Stalwart	1 PT/A
		43 b
11	1X Rate Staple LX	1.7 FL OZ/A
		4 gh
12	1X Rate Suprend	1 LB/A
		6 fgh
13	1X Rate Valor SX	1.5 OZ/A
		0 h
14	1.5X Rate Caparol	3 PT/A
		29 b-e
15	1.5X Rate Cotoran	3 PT/A
		18 c-h
16	1.5X Rate Direx	3 PT/A
		2 gh
17	1.5X Rate Dual Magnum	1.5 PT/A
		2 gh
18	1.5X Rate Envoke	0.15 OZ/A
		22 c-g
19	1.5X Rate Layby Pro	3 PT/A
		4 gh
20	1.5X Rate Linex	3 PT/A
		15 d-h
21	1.5X Rate Prowl H2O	3 PT/A
		9 e-h
22	1.5X Rate Reflex	1.5 PT/A
		1 gh
23	1.5X Rate Stalwart	1.5 PT/A
		7 fgh

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Pest Code	AMAPA	
Crop Code		
BBCH Scale		
Rating Date	Jun-08-06	
Rating Data Type	#plant/6ft	
Rating Unit	#	
Assessed By	SC	
Days After First/Last Applic.	38	
Trt-Eval Interval	38 DA-A	
Trt No.	Treatment Name	Rate Unit
24	1.5X Rate Staple LX	2.55 FL OZ/A
25	1.5X Rate Suprend	1.5 LB/A
26	1.5X Rate Valor SX	2.25 OZ/A
27	Untreated	
28	Untreated	
		9
		2 gh
		3 gh
		0 h
		238 a
		239 a
LSD (P=.05)	17.4	
Standard Deviation	12.3	
CV	43.21	
Bartlett's X2	141.803	
P(Bartlett's X2)	0.001*	

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

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**Glyphosate-resistant Palmer amaranth control by residual herbicides applied
preemergence.**

Trial ID: C27-06

Protocol ID: _____

Location: Macon Co. (Paved)

Study Director: Kichler, Culpepper

Investigator: Stanley Culpepper

General Trial Information

Study Director: Stanley Culpepper

Title: Ext. Weed Science

Affiliation: University of Georgia

Postal Code: 31794

E-mail: _____

Investigator: Jeremy Kickler

Title: Macon. Co. Extension

Affiliation: University of Georgia

Postal Code: _____

E-mail: _____

Keywords:

Trial Location

City: Macon Co

Trial Status: completed

State/Prov.: GA

Trial Reliability: excellent

Postal Code: USA

Initiation Date: May-01-06

Country: Macon

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: WS485BRR	Description: _____
BBCH Scale: BCOT	Planting Date: May-01-06
Planting Method: seeded	Rate, Unit: 3 ft
Depth, Unit: 0.5 in	Perennial Age, Unit: _____
Row Spacing, Unit: 3 ft	Spacing Within Row, Unit: 4 in
Seed Bed: bedded	Soil Temperature, Unit: 79 F
Soil Moisture: moist	Emergence Date: May-06-06
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:	Sutton farms
Plot Length, Unit: 22	FT	Tillage Type:	conventional
Replications: 4		Study Design:	Split-Plot
% 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: 6.3	Soil Name:	_____
% Clay: 4	CEC: _____	Fert. Level:	_____
Analyzed By: _____			

Additional Measured Elements		
Element	Quantity	Unit

Moisture Conditions		
Overall Moisture Conditions: May 7 1" rain, May 10 4.5 " rain, dry afterwards		
Closest Weather Station: _____	Distance: _____	Unit: _____

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	Date	Time	Amount	Unit	Type	Interval	Unit
1.							

Application Description

	A
Application Date:	May-01-06
Time of Day:	5:00pm
Application Method:	broadcast
Application Timing:	PRE
Application Placement:	on soil
Applied By:	Culpepper
Air Temperature, Unit:	77 F
% Relative Humidity:	35
Wind Velocity, Unit:	3 mph
Wind Direction:	
Dew Presence (Y/N):	n
Water Hardness:	
Soil Temperature, Unit:	79 F
Soil Moisture:	moist
% Cloud Cover:	0
Next Rain Occurred On:	

Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale:	GOSHI BCOT
Stage Scale Used:	DESC
Stage Majority, Percent:	not up 100
Stage Minimum, Percent:	not up 100
Stage Maximum, Percent:	not up 100
Diameter, Unit:	0 in
Height, Unit:	0 in
Height Minimum, Maximum:	0 0

Pest Stage At Each Application

	A
Pest 1 Code, Disc., Scale:	AMAPA W PRE
Stage Majority, Percent:	not up 100
Stage Minimum, Percent:	not up 100
Stage Maximum, Percent:	not up 100
Diameter, Unit:	0 in
Height, Unit:	0 in
Height Minimum, Maximum:	0 0
Density, Unit:	112 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 inch
Nozzles/Row:	2
Nozzle Calibration, Unit:	
Band Width, Unit:	
Boom ID:	
Boom Length, Unit:	4.5 feet
Boom Height, Unit:	15 inch
Ground Speed, Unit:	3 mph
Incorporation Equip.:	
Hours to Incorp.:	
Incorp. Depth, Unit:	
Carrier:	water
Spray Volume, Unit:	14.8 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: