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Palmer amaranth competition with cotton.

Trial ID: C28-06
Location: Macon Co.

Study Dir.: Andrew MacRae
Investigator: Stanley Culpepper

Reps: 4 Plots: 12 by 25 feet
Spray vol: 14.8 gal/ac Mix size: 2 liters (min 1.9292)

| Trt No. | Treatment Name | Form Conc | Form Unit | Form Type | Rate | Rate Unit | Grow Stg | Appl Code | Amt to Measure | Plot No. By Rep | | | |
|---------|--------------------------------------|---------------|----------------------------|----------------|------|----------------------|----------------------|-----------|---|-----------------|-----|-----|-----|
| | | | | | | | | | | 1 | 2 | 3 | 4 |
| 1 | 3 leaf establishment 0 in 20 ft | | | | | | | A | | 103 | 213 | 324 | 401 |
| 2 | 3 leaf establishment 2 in 20 ft | | | | | | | A | | 122 | 217 | 303 | 411 |
| 3 | 3 leaf establishment 3 in 20 ft | | | | | | | A | | 124 | 207 | 318 | 422 |
| 4 | 3 leaf establishment 5 in 20 ft | | | | | | | A | | 118 | 202 | 305 | 409 |
| 5 | 3 leaf establishment 10 in 20 ft | | | | | | | A | | 113 | 218 | 315 | 408 |
| 6 | 8 leaf establishment 0 in 20 ft | | | | | | | B | | 112 | 211 | 323 | 404 |
| 7 | 8 leaf establishment 2 in 20 ft | | | | | | | B | | 111 | 219 | 313 | 415 |
| 8 | 8 leaf establishment 3 in 20 ft | | | | | | | B | | 109 | 215 | 322 | 416 |
| 9 | 8 leaf establishment 5 in 20 ft | | | | | | | B | | 114 | 206 | 320 | 418 |
| 10 | 8 leaf establishment 10 in 20 ft | | | | | | | B | | 110 | 220 | 316 | 406 |
| 11 | 12 leaf establishment 0 in 20 ft | | | | | | | C | | 121 | 212 | 319 | 417 |
| 12 | 12 leaf establishment 2 in 20 ft | | | | | | | C | | 106 | 208 | 310 | 424 |
| 13 | 12 leaf establishment 3 in 20 ft | | | | | | | C | | 104 | 214 | 308 | 412 |
| 14 | 12 leaf establishment 5 in 20 ft | | | | | | | C | | 108 | 224 | 311 | 407 |
| 15 | 12 leaf establishment 10 in 20 ft | | | | | | | C | | 120 | 210 | 301 | 421 |
| 16 | 2 wk after layby 0 in 20 ft | | | | | | | D | | 116 | 221 | 302 | 402 |
| 17 | 2 wk after layby 2 in 20 ft | | | | | | | D | | 117 | 201 | 307 | 423 |
| 18 | 2 wk after layby 3 in 20 ft | | | | | | | D | | 105 | 209 | 306 | 410 |
| 19 | 2 wk after layby 5 in 20 ft | | | | | | | D | | 119 | 205 | 317 | 419 |
| 20 | 2 wk after layby 10 in 20 ft | | | | | | | D | | 123 | 222 | 309 | 414 |
| 21 | Prowl H2O | 3.8 | LB/GAL | SC | 1 | QT/A | PRE | | 33.78 ml/mx | 101 | 203 | 314 | 405 |
| 22 | Prowl H2O Reflex | 3.8 2 | LB/GAL LB/GAL | SC SC | 1 | QT/A PT/A | PRE PRE | | 33.78 ml/mx 16.89 ml/mx | 102 | 216 | 304 | 403 |
| 23 | Prowl H2O Reflex Dual Magnum | 3.8 2 4 | LB/GAL LB/GAL LB/GAL | SC SC SC | 1 | QT/A PT/A OZ/A | PRE PRE 1 leaf | | 33.78 ml/mx 16.89 ml/mx 12.67 ml/mx | 115 | 204 | 312 | 420 |

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Reps: 4 Plots: 12 by 25 feet
 Spray vol: 14.8 gal/ac Mix size: 2 liters (min 1.9292)

| Trt No. | Treatment Name | Form Conc | Form Unit | Form Type | Rate Rate | Grow Unit | Appl Code | Amt Product to Measure | Plot No. By Rep | | | |
|---------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------------|-----|-----|-----|
| | | | | | | | | | 1 | 2 | 3 | 4 |
| 24 | Prowl H2O | 3.8 | LB/GAL | SC | 1 | QT/A | PRE | 33.78 ml/mx | 107 | 223 | 321 | 413 |
| | Reflex | 2 | LB/GAL | SC | 1 | PT/A | PRE | 16.89 ml/mx | | | | |
| | Direx | 4 | LB/GAL | SC | 1 | QT/A | layby | 33.78 ml/mx | | | | |
| | MSMA | 6 | LB/GAL | L | 2 | LB A/A | layby | 45.04 ml/mx | | | | |
| | NIS | | | | 0.25 | % V/V | layby | 4.999 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 |
|---------|------|----------------|-----------|-----------|----------|
| 168.901 | ml | Prowl H2O | 3.8 | SC | |
| 63.338 | ml | Reflex | 2 | SC | |
| 15.836 | ml | Dual Magnum | 4 | SC | |
| 42.225 | ml | Direx | 4 | SC | |
| 56.300 | ml | MSMA | 6 | L | |
| 6.249 | ml | NIS | | | |

- * 'Per area' calculations based on spray volume= 14.8 gal/ac, mix size= 2 liters (mix size basis).
- * Product amount calculations increased 25 % for overage adjustment.
- * 'Per volume' calculations use spray volume= 14.8 gal/ac, mix size= 2 liters.

Trial Comments

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Palmer amaranth competition with cotton.

Trial ID: C28-06

Study Dir.: Andrew MacRae

Location: Macon Co.

Investigator: Stanley Culpepper

| Weed Code | Seed Cotton | Seed Cotton | Seed Cotton | Seed Cotton | Seed Cotton | Seed Cotton | AMAPA Male | | |
|------------------|--------------------------------------|------------------|-------------|-------------|-------------|-------------|------------|----------|-------|
| Crop Code | Harv Bag 1 | Harv Bag 2 | Harv Bag 3 | Harv Bag 4 | Yield | Yield | Harvest | | |
| Rating Data Type | lbs | lbs | lbs | lbs | lbs/plt | lbs/A | Num/plt | | |
| Rating Unit | Oct-26-06 | Oct-26-06 | Oct-26-06 | Oct-26-06 | Oct-26-06 | Oct-26-06 | Sep-28-06 | | |
| Rating Date | | | | | T1 | T2 | | | |
| ARM Action Codes | | | | | | | | | |
| Trt No. | Treatment Name | Rate | | | | | | | |
| | | Rate Unit | 1 | 2 | 3 | 4 | 5 | | |
| | | | 6 | 7 | | | | | |
| 1 | 3 leaf establishment 0 in 20 ft | | 2 abc | 3 abc | 2 a | 0 b | 7 abc | 2587 abc | 0 e |
| 2 | 3 leaf establishment 2 in 20 ft | | 3 ab | 1 c-h | 0 a | 0 b | 4 efg | 1585 efg | 2 b-e |
| 3 | 3 leaf establishment 3 in 20 ft | | 3 ab | 1 e-h | 0 a | 0 b | 4 fgh | 1298 fgh | 3 b-e |
| 4 | 3 leaf establishment 5 in 20 ft | | 2 bc | 3 a-e | 0 a | 0 b | 5 d-g | 1635 d-g | 5 b-e |
| 5 | 3 leaf establishment 10 in 20 ft | | 2 c | 1 fgh | 0 a | 0 b | 2 h | 757 h | 9 bcd |
| 6 | 8 leaf establishment 0 in 20 ft | | 3 abc | 2 a-f | 1 a | 0 b | 6 a-e | 2276 a-e | 0 e |
| 7 | 8 leaf establishment 2 in 20 ft | | 3 abc | 3 a-d | 1 a | 0 b | 6 a-e | 2273 a-e | 3 b-e |
| 8 | 8 leaf establishment 3 in 20 ft | | 3 ab | 3 a-e | 0 a | 0 b | 5 c-f | 1992 c-f | 4 b-e |
| 9 | 8 leaf establishment 5 in 20 ft | | 3 abc | 2 b-h | 0 a | 0 b | 5 d-g | 1640 d-g | 4 b-e |
| 10 | 8 leaf establishment 10 in 20 ft | | 3 abc | 0 gh | 0 a | 0 b | 3 gh | 1074 gh | 9 bc |
| 11 | 12 leaf establishment 0 in 20 ft | | 3 a | 3 ab | 2 a | 0 b | 8 a | 3024 a | 0 e |
| 12 | 12 leaf establishment 2 in 20 ft | | 3 ab | 2 a-h | 1 a | 0 b | 7 a-e | 2391 a-e | 2 b-e |
| 13 | 12 leaf establishment 3 in 20 ft | | 3 abc | 2 a-f | 1 a | 0 b | 6 a-e | 2324 a-e | 3 b-e |
| 14 | 12 leaf establishment 5 in 20 ft | | 3 ab | 1 c-h | 1 a | 0 b | 5 c-f | 1908 c-f | 5 b-e |
| 15 | 12 leaf establishment 10 in 20 ft | | 3 ab | 2 a-h | 1 a | 0 b | 6 b-e | 2175 b-e | 10 b |
| 16 | 2 wk after layby 0 in 20 ft | | 4 a | 2 a-g | 1 a | 0 b | 6 a-e | 2226 a-e | 0 e |
| 17 | 2 wk after layby 2 in 20 ft | | 3 ab | 3 abc | 1 a | 1 a | 8 ab | 2844 ab | 2 cde |
| 18 | 2 wk after layby 3 in 20 ft | | 4 a | 3 a-d | 1 a | 0 b | 7 a-d | 2485 a-d | 3 b-e |
| 19 | 2 wk after layby 5 in 20 ft | | 3 ab | 3 abc | 1 a | 0 b | 8 ab | 2863 ab | 4 b-e |
| 20 | 2 wk after layby 10 in 20 ft | | 3 ab | 4 a | 0 a | 0 b | 7 a-e | 2420 a-e | 10 b |
| 21 | Prowl H2O | 1 QT/A | 0 d | 0 h | 0 a | 0 b | 0 i | 46 i | 75 a |
| 22 | Prowl H2O Reflex | 1 QT/A 1 PT/A | 3 ab | 2 b-h | 0 a | 0 b | 5 d-g | 1634 d-g | 1 de |

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| Weed Code | Seed Cotton | Seed Cotton | Seed Cotton | Seed Cotton | Seed Cotton | Seed Cotton | AMAPA Male | | | |
|--------------------|---|--------------------------|---|-------------|-------------|-------------|------------|-------|----------|---------|
| Crop Code | Harv Bag 1 | Harv Bag 2 | Harv Bag 3 | Harv Bag 4 | Yield | Yield | Harvest | | | |
| Rating Data Type | lbs | lbs | lbs | lbs | lbs/plt | lbs/A | Num/plt | | | |
| Rating Unit | Oct-26-06 | Oct-26-06 | Oct-26-06 | Oct-26-06 | Oct-26-06 | Oct-26-06 | Sep-28-06 | | | |
| Rating Date | | | | | T1 | T2 | | | | |
| ARM Action Codes | | | | | | | | | | |
| Trt No. | Treatment Name | Rate | Unit | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 23 | Prowl H2O Reflex Dual Magnum | 1 1 12 | QT/A PT/A OZ/A | 3 ab | 2 a-f | 1 a | 0 b | 7 a-e | 2389 a-e | 1 e |
| 24 | Prowl H2O Reflex Direx MSMA NIS | 1 1 1 2 0.25 | QT/A PT/A QT/A LB A/A % V/V | 3 ab | 1 d-h | 0 a | 0 b | 4 efg | 1586 efg | 1 e |
| LSD (P=.05) | | | | 1.1 | 1.6 | 1.4 | 0.4 | 2.0 | 708.2 | 6.7 |
| Standard Deviation | | | | 0.8 | 1.2 | 1.0 | 0.3 | 1.4 | 500.7 | 4.7 |
| CV | | | | 28.52 | 59.15 | 155.72 | 979.8 | 25.34 | 25.34 | 73.62 |
| Bartlett's X2 | | | | 31.883 | 18.229 | 6.911 | 0.0 | 32.03 | 32.03 | 126.882 |
| P(Bartlett's X2) | | | | 0.103 | 0.692 | 0.938 | . | 0.10 | 0.10 | 0.001* |

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

Column 5: T1 = [1]+[2]+[3]+[4]
 Column 6: T2 = [5]/120*43560

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| Weed Code | | | AMAPA | AMAPA | AMAPA | AMAPA | AMAPA | AMAPA | AMAPA |
|------------------|--------------------------------------|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Crop Code | | | Male | Female | Female | Both | Both | Both | Both |
| Rating Data Type | | | Harvest | Harvest | Harvest | Harvest | Harvest | Harvest | Harvest |
| Rating Unit | | | lbs/plt | Num/plt | lbs/plt | Num/plt | lbs/plt | Num/A | lbs/A |
| Rating Date | | | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 |
| ARM Action Codes | | | | | | T3 | T4 | T5 | T6 |
| Trt No. | Treatment Name | Rate Unit | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | 3 leaf establishment 0 in 20 ft | | 0 e | 0 b | 0 g | 0 c | 0 g | 0 c | 0 g |
| 2 | 3 leaf establishment 2 in 20 ft | | 9 b-e | 3 b | 6 fg | 5 bc | 15 ef | 1634 bc | 5493 ef |
| 3 | 3 leaf establishment 3 in 20 ft | | 10 bcd | 4 b | 18 de | 7 bc | 29 d | 2450 bc | 10378 d |
| 4 | 3 leaf establishment 5 in 20 ft | | 12 bc | 5 b | 16 def | 9 bc | 28 d | 3267 bc | 10135 d |
| 5 | 3 leaf establishment 10 in 20 ft | | 23 a | 10 b | 41 ab | 19 b | 65 b | 6988 b | 23432 b |
| 6 | 8 leaf establishment 0 in 20 ft | | 0 e | 0 b | 0 g | 0 c | 0 g | 0 c | 0 g |
| 7 | 8 leaf establishment 2 in 20 ft | | 3 de | 2 b | 3 g | 4 bc | 6 efg | 1543 bc | 2276 efg |
| 8 | 8 leaf establishment 3 in 20 ft | | 7 cde | 3 b | 9 efg | 7 bc | 15 ef | 2360 bc | 5512 ef |
| 9 | 8 leaf establishment 5 in 20 ft | | 6 cde | 7 b | 24 cd | 11 bc | 30 d | 3993 bc | 10845 d |
| 10 | 8 leaf establishment 10 in 20 ft | | 16 b | 10 b | 32 bc | 20 b | 48 c | 7079 b | 17517 c |
| 11 | 12 leaf establishment 0 in 20 ft | | 0 e | 0 b | 0 g | 0 c | 0 g | 0 c | 0 g |
| 12 | 12 leaf establishment 2 in 20 ft | | 3 de | 2 b | 2 g | 4 bc | 5 efg | 1543 bc | 1759 efg |
| 13 | 12 leaf establishment 3 in 20 ft | | 3 de | 3 b | 3 g | 6 bc | 5 efg | 2087 bc | 1918 efg |
| 14 | 12 leaf establishment 5 in 20 ft | | 3 de | 3 b | 5 fg | 8 bc | 8 efg | 2995 bc | 3011 efg |
| 15 | 12 leaf establishment 10 in 20 ft | | 6 cde | 8 b | 7 efg | 18 bc | 13 efg | 6534 bc | 4815 efg |
| 16 | 2 wk after layby 0 in 20 ft | | 0 e | 0 b | 0 g | 0 c | 0 g | 0 c | 0 g |
| 17 | 2 wk after layby 2 in 20 ft | | 0 e | 2 b | 2 g | 3 bc | 2 fg | 1089 bc | 837 fg |
| 18 | 2 wk after layby 3 in 20 ft | | 1 e | 4 b | 3 g | 6 bc | 3 efg | 2269 bc | 1264 efg |
| 19 | 2 wk after layby 5 in 20 ft | | 1 e | 5 b | 1 g | 10 bc | 2 fg | 3449 bc | 848 fg |
| 20 | 2 wk after layby 10 in 20 ft | | 4 de | 9 b | 5 fg | 19 b | 8 efg | 6988 b | 3075 efg |
| 21 | Prowl H2O | 1 QT/A | 30 a | 87 a | 46 a | 162 a | 76 a | 58806 a | 27650 a |
| 22 | Prowl H2O Reflex | 1 QT/A 1 PT/A | 5 cde | 3 b | 11 efg | 4 bc | 16 e | 1361 bc | 5939 e |
| 23 | Prowl H2O Reflex Dual Magnum | 1 QT/A 1 PT/A 12 OZ/A | 2 de | 1 b | 9 efg | 2 bc | 11 efg | 635 bc | 3998 efg |

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| Weed Code | AMAPA Male | AMAPA Female | AMAPA Female | AMAPA Both | AMAPA Both | AMAPA Both | AMAPA Both | | | |
|--------------------|----------------|-----------------|-----------------|---------------|---------------|---------------|---------------|--------|---------|----------|
| Crop Code | | | | | | | | | | |
| Rating Data Type | Harvest | Harvest | Harvest | Harvest | Harvest | Harvest | Harvest | | | |
| Rating Unit | lbs/plt | Num/plt | lbs/plt | Num/plt | lbs/plt | Num/A | lbs/A | | | |
| Rating Date | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | Sep-28-06 | | | |
| ARM Action Codes | | | | T3 | T4 | T5 | T6 | | | |
| Trt No. | Treatment Name | Rate | Unit | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 24 | Prowl H2O | 1 | QT/A | 5 cde | 1 b | 8 efg | 2 bc | 13 efg | 726 bc | 4883 efg |
| | Reflex | 1 | PT/A | | | | | | | |
| | Direx | 1 | QT/A | | | | | | | |
| | MSMA | 2 | LB A/A | | | | | | | |
| | NIS | 0.25 | % V/V | | | | | | | |
| LSD (P=.05) | | | | 7.4 | 9.4 | 9.9 | 15.2 | 11.2 | 5531.8 | 4048.1 |
| Standard Deviation | | | | 5.2 | 6.6 | 7.0 | 10.8 | 7.9 | 3911.6 | 2862.5 |
| CV | | | | 84.56 | 93.38 | 66.3 | 79.7 | 47.19 | 79.7 | 47.19 |
| Bartlett's X2 | | | | 84.289 | 152.519 | 53.026 | 221.376 | 48.967 | 221.376 | 48.967 |
| P(Bartlett's X2) | | | | 0.001* | 0.001* | 0.001* | 0.001* | 0.001* | 0.001* | 0.001* |

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

Column 11: T3 = [7]+[9]

Column 12: T4 = [8]+[10]

Column 13: T5 = [11]/120*43560

Column 14: T6 = [12]/120*43560

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Palmer amaranth competition with cotton.

Trial ID: C28-06

Study Dir.: Andrew MacRae

Location: Macon Co.

Investigator: Stanley Culpepper

GENERAL TRIAL INFORMATION

Study Director: Andrew MacRae

Title: Post Doc Res Associate

Affiliation: University of Georgia

Postal Code: _____

Investigator: Stanley Culpepper

Title: Ext. Weed Science

Affiliation: University of Georgia

Postal Code: _____

TRIAL LOCATION

City: Macon Co.

Trial Status: completed

State/Prov.: Georgia

Trial Reliability: good

Postal Code: _____

Initiation Date: May-01-06

Country: _____

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:

- 1) To determine the density of Palmer amaranth that reduces cotton yield.
- 2) To determine the effect of establishment time on objective 1.
- 3) To determine the amount of Palmer amaranth biomass accumulated during the growing season when established at certain densities and times.
- 4) To determine the effect of establishment time and density on Palmer amaranth's production of seed.

Conclusions:

Cotton yield reduction:

- 1) Established at the 3-1f stage of cotton - all densities of Palmer amaranth reduced seed cotton yield a minimum of 1002 lbs/A.
- 2) Established at the 8-1f stage of cotton - 2 and 3/20 ft of row did not reduce seed cotton yield, 5 and 10/20 ft of row reduced seed cotton yield.
- 3) Established at the 12 and 17-1f stage of cotton - Palmer amaranth did not reduce seed cotton yield.
- 4) Herbicide treatments - Only the Prowl H2O plus Reflex PRE followed by Dual Magnum EPOST produced seed cotton yield similar to the non-treated check.

Palmer amaranth biomass:

- 1) Established at the 3-1f stage of cotton - Palmer amaranth biomass increased from 5493 to 23432 lbs/A as the density increased.
- 2) Established at the 8-1f stage of cotton - Palmer amaranth biomass increased from 2276 to 17517 lbs/A as the density increased.
- 3) Established at the 12-1f stage of cotton - Palmer amaranth biomass increased from 1759 to 4815 lbs/A as the density increased.
- 4) Established at the 17-1f stage of cotton - Palmer amaranth biomass ranged from 837 to 3075 lbs/A for the densities tested.

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5) Herbicide treatments - Prowl H2O alone had the greatest amount of Palmer amaranth in the entire trial (27650 lbs/A). The remaining three treatments had Palmer amaranth biomass ranging from 3998 to 5939 lbs/A.

Seed production:

1) Seed heads were harvested, however, the seed has not been fully cleaned at the time of this report.

Conclusions:

- 1) Allowing Palmer amaranth to establish early in the growing season will result in a reduction in yield.
- 2) Palmer amaranth established at the 12-1f stage of cotton or later did not reduce yield.
- 3) Of the herbicide treatments tested only the Prowl H2O plus Reflex PRE followed by Dual Magnum EPOST had no reduction in yield.
- 4) To manage glyphosate-resistant Palmer amaranth, the use of residual herbicide PRE and EPOST will be required to limit the possibility of yield reduction by preventing the establishment of Palmer amaranth until after the 12-1f stage of cotton.

CROP AND WEED DESCRIPTION

| Weed | Code | Common Name | Scientific Name |
|------|------|-------------|-----------------|
| 1. | | | |

Crop 1: GOSHI COTTON, SHORT STAPLE **Variety:** DP 555 RRBG
Planting Date: May-01-06 **Planting Method:** Seeded - Hilldrop
Rate: 2 per 8 inch **Depth:** 0.5 in **Perennial Age:** _____
Row Spacing: 3 ft **Spacing Within Row:** _____ **Seed Bed:** bedded
Soil Temperature: 79 F **Soil Moisture:** moist **Emergence Date:** _____

SITE AND DESIGN

Plot Width, Unit: 12 FT **Plot Length, Unit:** 25 FT **Reps:** 4
Site Type: on farm
Tillage Type: conventional **Study Design:** FACTORIAL

Trial Initiation Comments:

| | Previous Crops | Previous Pesticides | Year |
|----|----------------|---------------------|------|
| 1. | | | |

MAINTENANCE

Field Prep./Maintenance:

Field was conventionally prepared prior to planting.

All checks and treatments where Palmer amaranth were transplanted received Prowl H2O at 1 qt/A plus Reflex at 1 pt/A PRE followed by Dual Magnum at 1 pt/A EPOST to 2-1f cotton. These plots were maintained weed-free via hand removal. For the herbicide treatments, Prowl H2O and Reflex was applied PRE, Dual Magnum was applied EPOST to 2-1f cotton, and MSMA plus Direx was applied at layby to 13-1f cotton.

Palmer amaranth (6- to 8-1f and 3 to 5 inches in height) was transplanted into the plots from a nursery within the same field known to contain the glyphosate resistant biotype. The nursery was sprayed with Roundup WeatherMax at 22 oz/A two weeks prior to transplanting to remove any susceptible biotypes. Transplants were irrigated by hand for one week following planting.

Palmer amaranth was transplanted when cotton had 3, 8, 12, and 17 leaves to simulate escapes from PRE, 4-1f, 8-1f, and layby herbicide applications, respectively.

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

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SOIL DESCRIPTION

| | | |
|------------|------------|---------------------|
| % Sand: 82 | % OM: 2.0 | Texture: loamy sand |
| % Silt: 14 | pH: 6.3 | 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: dry

Closest Weather Station: _____ Distance: _____ Unit: ____

APPLICATION DESCRIPTION

| | A |
|----------------------|---|
| Application Date: | |
| Time of Day: | |
| Application Method: | |
| Application Timing: | |
| Applic. Placement: | |
| Air Temp., Unit: | |
| % Relative Humidity: | |
| Wind Velocity, Unit: | |
| Dew Presence (Y/N): | |
| Water Hardness: | |
| Soil Temp., Unit: | |
| Soil Moisture: | |
| % Cloud Cover: | |

CROP STAGE AT EACH APPLICATION

| | A |
|---------------------|-------|
| Crop 1 Code, Stage: | GOSHI |
| Stage Scale: | |
| Height, Unit: | |

WEED STAGE AT EACH APPLICATION

| | A |
|---------------------|---|
| Weed 1 Code, Stage: | |
| Stage Scale: | |
| Density, Unit: | |

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APPLICATION EQUIPMENT

| | |
|-----------------------|---|
| | A |
| Appl. Equipment: | |
| Operating Pressure: | |
| Nozzle Type: | |
| Nozzle Size: | |
| Nozzle Spacing, Unit: | |
| Nozzles/Row: | |
| Band Width, Unit: | |
| Boom Length, Unit: | |
| Boom Height, Unit: | |
| Ground Speed, Unit: | |
| Incorporation Equip.: | |
| Hours to Incorp.: | |
| Incorp. Depth, Unit: | |
| Carrier: | |
| Spray Volume, Unit: | |
| Spray pH: | |
| Propellant: | |
| Tank Mix (Y/N): | |

| Trt No | Treatment Application Comment |
|--------|-------------------------------|
| | |