2018 Weed Control Update

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Auburn University
DICAMBA...a pretty old herbicide

- First discovered in 1950’s
- Synthetic auxin herbicide (mimic of IAA)
- Very mobile in plants, injury symptom starts with very low rates
- Broad-spectrum on broadleaf plants
- Registered in corn, wheat, grain crops, pasture and hay field, forestry, roadside, non-crop area and in resistant crops
- Has volatility (formulation dependent)
- Resistant crop varieties available since 2015
WELL, THE TRUTH IS...

I WANT DICAMBA!!!
As of Oct 15, 2017

*Total: ~3.6 million
As of Oct 15, 2017

*Total: 2,708
Xtend and Enlist Update

• Plenty of dicamba drift all over soybean producing states (Glyphosate + ALS + PPO resistant pigweed)
• More restrictions for dicamba in 2018 season (record keeping, triple cleaning, application timing, restricted use, etc.)
• Xtendimax and Engenia federal label expires at the end of 2018 (EPA renewal???)
• Both Xtendimax and Engenia has lower volatility, but still not zero
• Enlist Duo and Enlist One for 2018
• Enlist Soybean for 2018?
• Mandatory auxin training in spring 2018
Reflex Injury!!!
# 2016 Evaluations

<table>
<thead>
<tr>
<th>#</th>
<th>Trade name</th>
<th>Application rate (fl oz/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NTC</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Reflex</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Reflex</td>
<td>8</td>
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<tr>
<td>4</td>
<td>Reflex</td>
<td>16</td>
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<tr>
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<td>6</td>
<td>Reflex</td>
<td>64</td>
</tr>
<tr>
<td>7</td>
<td>Reflex</td>
<td>128</td>
</tr>
<tr>
<td>8</td>
<td>Reflex + Prowl H20</td>
<td>16 + 32</td>
</tr>
<tr>
<td>9</td>
<td>Reflex + Warrant</td>
<td>16 + 48</td>
</tr>
<tr>
<td>10</td>
<td>Reflex + Direx</td>
<td>16 + 20</td>
</tr>
<tr>
<td>11</td>
<td>Brake F16</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>Brake F16</td>
<td>32</td>
</tr>
<tr>
<td>13</td>
<td>Brake FX</td>
<td>32</td>
</tr>
</tbody>
</table>
Cotton injury 20-22 DAP

Fairhope

Shorter
Cotton injury 20-22 DAP

Hawkinsville GA
Final cotton yield as affected by herbicide treatments

NTC lint yield: 1016 lb/A
# 2017 Evaluations (1)

<table>
<thead>
<tr>
<th>#</th>
<th>Trade Name</th>
<th>RATE</th>
<th>FIELD RATE PT/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reflex + Warrant</td>
<td>1X</td>
<td>1 + 3.2</td>
</tr>
<tr>
<td>2</td>
<td>Reflex + Warrant</td>
<td>2X</td>
<td>2 + 6.4</td>
</tr>
<tr>
<td>3</td>
<td>Reflex + Direx</td>
<td>1X</td>
<td>1 + 1.6</td>
</tr>
<tr>
<td>4</td>
<td>Reflex + Direx</td>
<td>2X</td>
<td>2 + 3.2</td>
</tr>
<tr>
<td>5</td>
<td>Reflex + Caparol</td>
<td>1X</td>
<td>1 + 4</td>
</tr>
<tr>
<td>6</td>
<td>Reflex + Caparol</td>
<td>2X</td>
<td>2 + 8</td>
</tr>
<tr>
<td>7</td>
<td>Brake F16</td>
<td>1X</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Brake F16</td>
<td>2X</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>NTC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DP 1538 B2XF, DP 1646 B2XF, PHY 444 WRF, PHY 490 W3FE planted in RCBD, 4 reps, 6 x 25 ft plots at 3 locations in AL (Headland, Shorter and Atmore)
COTTON STAND 3 WAP MACON COUNTY
(Planted May 30)

FOMESAFEN 2 pt/A + DIURON 3.2 pt/A

NTC
COTTON STAND 7 WAP MACON COUNTY
(late July)

FOMESAFEN 2 pt/A + DIURON 3.2 pt/A

NTC
COTTON YIELD

- Lower stand count and cotton height observed at two locations with three treatments at 3 WAP. No differences were seen at 7 WAP.

- No significant location or variety interactions with treatment.

NTC lint yield: 1061 lb/A
<table>
<thead>
<tr>
<th>#</th>
<th>Herbicide Treatment</th>
<th>Application Rate</th>
<th>Application Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Valor + Direx 4L</td>
<td>2 oz/A + 1.6 pt/A</td>
<td>3 Weeks Prior to Planting</td>
</tr>
<tr>
<td>2</td>
<td>Valor + Warrant</td>
<td>2 oz/A + 3.2 pt/A</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Valor + Caparol</td>
<td>2 oz/A + 4.5 pt/A</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Valor + Xtendimax</td>
<td>2 oz/A + 44 oz/A</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Reflex + Warrant</td>
<td>1+ 3.2 pt/A</td>
<td>1 Week Prior to Planting</td>
</tr>
<tr>
<td>6</td>
<td>Reflex + Direx 4 L</td>
<td>1+ 1.6 pt/A</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Reflex + Caparol</td>
<td>1+ 4.5 pt/A</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Warrant + Direx 4L</td>
<td>3.2 + 1.6 pt/A</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Warrant + Prowl H2O</td>
<td>3.2 + 2 pt/A</td>
<td>-</td>
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<tr>
<td>10</td>
<td>Brake FX + Prowl H2O</td>
<td>2 + 2 pt/A</td>
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</tr>
<tr>
<td>11</td>
<td>Brake F16 + Prowl H2O</td>
<td>1 + 2 pt/A</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Non Treated Check</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gramoxone and NIS applied at 2 pt/A and 0.5% v/v with all treatments.
Two locations: Headland and Fairhope AL
• No treatment effect on stand count and cotton height during the season

Seed Cotton Yield

NTC lint yield: 
1080 lb/A
Liberty (29oz/a) + Dual magnum (22oz/a) followed by Xtendimax (22 oz/a)+ Roundup Powermax (32 oz/a) 4 days after initial application

Day of initial application (June 15 2017)
Liberty (29 oz/a) + Dual Magnum (22 oz/a) followed by Enlist Duo (4.75 pt/a) 4 days after initial application

Day of initial application (June 15 2017)

14 DAIT

20 inch
Xtendimax (22oz/a) + Roundup Powermax (32 oz/a) followed by Liberty (29 oz/a) + Dual Magnum (22 oz/a) 4 days after initial treatment

Day of initial application (June 15 2017)
Enlist Duo (4.75 pt/a) followed by Liberty (29 oz/a) + Dual Magnum (22 oz/a) 4 days after initial application.
Butyrac 200 (16 oz/a) followed by Cobra (12.5 oz/a) + Dual Magnum (22 oz/a) 4 days after initial application

Day of initial application (June 15 2017)
Butyrac 200 (16 oz/a) + Cobra (12.5 oz/a) + Dual Magnum (22 oz/a)

Day of initial application (June 15 2017)

10 inch

14 DAIT
Liberty 32oz + Dual Mag
1.33 pt/A on June 28

Liberty 32oz + Dual Mag
1.33 pt/A on July 20

Liberty 32oz + Outlook 21
oz/A on June 28

Liberty 32oz + Outlook 21
oz/A on July 20
Xtendimax 22oz + Roundup PM 32 oz/A on June 28

Liberty 32oz + Warrant 3 pt/A on July 20

Xtendimax 22oz + Roundup PM 32 oz/A on June 28

Liberty 32oz + Dual Mag 1.33 pt/A on July 20

Xtendimax 22oz + Roundup PM 32 oz/A on June 28

Liberty 32oz + Outlook 21 oz/A on July 20
Neither dicamba nor 2,4-D will be the silver bullet. They may can take down a few big pigweed. But they can not do this consistently and those survivors are likely to develop resistance in future under constant selection pressure.
An example of survivor at the same site
Gramoxone + Storm + 24DB

Cadre + Storm + 24DB
HAGIE UPFRONT STS 10

TANK CAPACITY: 3570 L
BOOM WIDTH: 27.4 M
JOHN DEERE 6700

TANK CAPACITY: 1590 L
BOOM WIDTH: 18.3 M
SPRACOUPE 4660

TANK CAPACITY: 1580 L
BOOM WIDTH: 24.4 M
## 2,4-D Retention

### Cleaning Protocol

<table>
<thead>
<tr>
<th>Cleaning Protocol</th>
<th>Rinse 1 (PPM)</th>
<th>Rinse 2 (PPM)</th>
<th>Rinse 3 (PPM)</th>
<th>Rinse 4 (PPM)</th>
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</thead>
<tbody>
<tr>
<td>Triple Rinse Water</td>
<td>203.13 A</td>
<td>21.20 A</td>
<td>2.75 A</td>
<td>1.90 A</td>
</tr>
<tr>
<td>Ammonium+Glyphosate+Water</td>
<td>420.79 A</td>
<td>11.66 A</td>
<td>1.27 B</td>
<td>0.90 AB</td>
</tr>
<tr>
<td>Ammonium+Fimco+Water</td>
<td>258.95 A</td>
<td>20.79 A</td>
<td>1.18 B</td>
<td>1.16 AB</td>
</tr>
<tr>
<td>Ammonium+Protank+Water</td>
<td>675.19 A</td>
<td>22.13 A</td>
<td>2.13 AB</td>
<td>0.66 B</td>
</tr>
</tbody>
</table>

### Sprayer

<table>
<thead>
<tr>
<th>Sprayer</th>
<th>Rinse 1 (PPM)</th>
<th>Rinse 2 (PPM)</th>
<th>Rinse 3 (PPM)</th>
<th>Rinse 4 (PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haige Upfront STS 10</td>
<td>665.43 A</td>
<td>30.71 A</td>
<td>2.66 A</td>
<td>1.89 A</td>
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<tr>
<td>John Deere 6700</td>
<td>180.60 B</td>
<td>10.15 A</td>
<td>1.30 B</td>
<td>0.62 B</td>
</tr>
<tr>
<td>Spracooupe 4660</td>
<td>332.51 AB</td>
<td>15.98 A</td>
<td>1.53 AB</td>
<td>0.62 B</td>
</tr>
</tbody>
</table>

A 2,4-D was initially applied at 1.06 kg AI ha\(^{-1}\).

B Means followed by the same letter in a column are not significantly different based on a mixed model analysis of variance (P=0.05).

C No sprayer x treatment interactions were observed at P=0.05, therefore data from all sprayers were combined for sprayer effects.
# DICAMBA RETENTION

<table>
<thead>
<tr>
<th>CLEANING PROTOCOL</th>
<th>RINSE 1 (PPM)</th>
<th>RINSE 2 (PPM)</th>
<th>RINSE 3 (PPM)</th>
<th>RINSE 4 (PPM)</th>
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</thead>
<tbody>
<tr>
<td>TRIPLE RINSE WATER</td>
<td>310.44 A</td>
<td>22.22 A</td>
<td>3.57 A</td>
<td>1.25 A</td>
</tr>
<tr>
<td>AMMONIUM+GLYPHOSATE+WATER</td>
<td>534.10 A</td>
<td>17.77 A</td>
<td>0.72 B</td>
<td>0.67 A</td>
</tr>
<tr>
<td>AMMONIUM+FIMCO+WATER</td>
<td>385.25 A</td>
<td>30.85 A</td>
<td>1.21 B</td>
<td>0.90 A</td>
</tr>
<tr>
<td>AMMONIUM+PROTANK+WATER</td>
<td>484.77 A</td>
<td>31.06 A</td>
<td>1.28 B</td>
<td>0.50 A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPRAYER</th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HAIGE UPFRONT STS 10</td>
<td>555.17 A</td>
<td>32.85 A</td>
<td>2.55 A</td>
<td>1.09 A</td>
</tr>
<tr>
<td>JOHN DEERE 6700</td>
<td>282.46 B</td>
<td>18.05 A</td>
<td>0.75 A</td>
<td>0.91 A</td>
</tr>
<tr>
<td>SPRACOUPE 4660</td>
<td>448.28 AB</td>
<td>25.54 A</td>
<td>1.78 A</td>
<td>0.48 A</td>
</tr>
</tbody>
</table>

A DICAMBA WAS INITIALLY APPLIED AT 1.12 KG AI HA⁻¹.
B MEANS FOLLOWED BY THE SAME LETTER IN A COLUMN ARE NOT SIGNIFICANTLY DIFFERENT BASED ON A MIXED MODEL ANALYSIS OF VARIANCE (P=0.05).
C NO SPRAYER X TREATMENT INTERACTIONS WERE OBSERVED AT P=0.05, THEREFORE DATA FROM ALL SPRAYERS WERE COMBINED FOR SPRAYER EFFECTS.
Dicamba at 5 ppm reduced soybean yield

Other data suggesting 3.6 ppm of 2,4-D reduced cotton yield (similar sensitivity compared to dicamba on soybean)

After triple rinse, 2,4-D concentration (0.62-1.89 ppm) and dicamba concentration (0.48-1.09 ppm) were below minimum concentration to cause yield loss on cotton and soybean

Our data suggests triple rinse will be definitely required to prevent dicamba or 2,4-D injuring sensitive soybean or cotton and reduce yield

The earlier you send out foliage sample to the lab, the more likely they can find it!
Cotton stand 51 DAP in 2016

2,4-D 0.5 lb/A @ planting

Dicamba 0.5 lb/A @ planting
Cotton stand 51 DAP in 2017

Dicamba 1 lb/A @ PRE

NTC
What we learned from 2017?

• Whether you use Xtend, Enlist or Liberty, it will take two shots of POST to get your field clean

• We did good to prevent dicamba drift, but whether Xtendimax and Engenia can still have federal labels after 2018 remain uncertain

• Neither dicamba nor 2,4-D can replace soil herbicides. Soil herbicides are more important than ever considering resistance concerns and grass pressure.

• Crop injury by herbicide in general was worse due to excessive rains, but they managed to catch up

• No confirmed reports of PPO-resistant pigweed from South AL, South GA and FL panhandle, yet!!!
Weed control system in dryland peanut

Gramoxone-based program

- **PRE:** Prowl H2O @Planting
- **POST 1:** Gramoxone (12 oz/A) + Storm/Basagran/24DB + Residual herbicide @14-28 DAP
- **POST 2:** Cadre/Ultra Blazer/Cobra + 24DB + Residual Herbicide @45-60 DAP

Valor-based program

- **PRE:** Valor (3 oz/A) + Strongarm + Prowl H2O @Planting
- **Gramoxone (Optional)**
- **POST 1:** Cadre/Ultra Blazer/Cobra + 24DB + Residual Herbicide @30-40 DAP
- **POST 2 (optional):** Aim + 24DB @ 70-90 DAP

- Residual herbicide options for POST: Zidua, Dual Magnum, Warrant, Outlook
- Use rate: 1.5-2.1 oz/A for Zidua, 1-1.33 pt for Dual Magnum, 2.5-3 pt/A for Warrant, 15-18 oz/A for Outlook
- Only use NIS for POST treatments to prevent leaf burn
Late season weed problems. Many happened because farmers did not use residual herbicide in their POST applications!!!
Valor and Gramoxone Injury
GA-06G  Valor 3 oz/A  Henry County 22 DAP

Valor 3 oz/A + Strongarm 0.45 oz/A  Henry County 22 DAP
GA 06G
Valor 6 oz/A + Strongarm 0.9 oz/A
Henry County 22 DAP
GA 06G
Valor 3oz/A + Strongarm
0.45 oz/A
Macon County 48 DAP
GA 06G
Valor 6 oz/A + Strongarm 0.9 oz/A
Macon County 48 DAP
GA-O6G NTC
Macon County 48 DAP
All five varieties tested showed good tolerance to valor-based treatments!!! (Georgia 06G, Georgia 12Y, Georgia 14 N, Georgia 09B, and TufRunner 511)
All four varieties tested showed good tolerance to Gramoxone-based treatments!!! (Georgia 06G, Georgia 12Y, Georgia 14N and TufRunner 511)
Tropical Spiderwort
This field has a lot of tropical spiderwort!!!
Soil Herbicide Treatments for Tropical Spiderwort Control 6/8/17 @ 22 DAP
Tropical Spiderwort Control @ 15 days after Gramoxone + Dual Mag + 2,4-DB

% of control

- Valor SX 3 oz/A + Strongarm 0.45 oz/A
- Valor SX 3 oz/A + Warrant 3.5 pt/A
- Warrant 3.5 pt/A
- Strongarm 0.45 oz/A
- Warrant 3.5 pt/A + Strongarm 0.45 oz/A

Headland | Samson
Timing A
Prowl H2O 2 pt/A

Timing B
Gramoxone 12 oz/A
Dual Magnum 1.33 pt/A
Butyrac 200 16 oz/A
NIS 0.25 v/v
Timing A
Prowl H2O 2 pt/A

Timing B
Gramoxone 12 oz/A
Warrant 3.5 pt/A
Butyrac 200 16 oz/A
NIS 0.25 v/v
Timing A
Prowl H2O 2 pt/A

Timing B
Gramoxone 12 oz/A
Zidua 3.25 oz/A
Butyrac 200 16 oz/A
NIS 0.25 v/v
Non Treated Check
Thank you!