Evaluation of MagGrow Technology for Defoliating Cotton in Mississippi and Georgia

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Tifton, GA

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Gaylon Morgan
Ed Barnes
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Cary, NC
MagGrow Technology

Components -
• Manifolds between the tank & section control
• Magnetic Rods inside the boom

Benefits (www.maggrow.com) -
• Increased spray coverage (20-50%)
• Lower water usage (up to 50%)
• Reduces spray drift (up to 70%)
Cotton Harvest-aids: preserves yield, quality, and influences harvest efficiency

Cotton defoliation: technology or practices that can help

✓ Provide on-target application
✓ Improve coverage and efficacy
✓ More efficient with spray applications

Does a sprayer equipped with MagGrow provides better coverage and efficacy than conventional system?
Locations & Methods:

Treatments:

1. Two sprayers –
   - *With MagGrow*
   - *Without MagGrow*

2. Application Rate – (GA)
   - *Standard (100%)*
   - *Reduced (80%)*

<table>
<thead>
<tr>
<th></th>
<th>Mississippi</th>
<th>Georgia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applicator</strong></td>
<td>John Deere R4023 (2)</td>
<td>Case IH 3340 (2)</td>
</tr>
<tr>
<td><strong>Control System</strong></td>
<td>JD Rate Controller + PWM</td>
<td>Raven Viper 4 + Rate Controller</td>
</tr>
<tr>
<td><strong>Application Rate</strong></td>
<td>10 GPA</td>
<td>8 &amp; 10 GPA</td>
</tr>
<tr>
<td><strong>Nozzle Spacing</strong></td>
<td>20”</td>
<td>20”</td>
</tr>
<tr>
<td><strong>Nozzle Type</strong></td>
<td>PS3DQ008</td>
<td>Wilger ER11004, ER11003</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td>50 PSI</td>
<td>28 PSI</td>
</tr>
<tr>
<td><strong>Products</strong></td>
<td>Drop 1-50</td>
<td>Tribufos 6</td>
</tr>
<tr>
<td></td>
<td>Prep 1-4</td>
<td>Daze 4SC</td>
</tr>
<tr>
<td></td>
<td>80/20 0.25%</td>
<td>Boll’d 6SL</td>
</tr>
</tbody>
</table>
Calibration: Rate, Pressure, Spray Pattern……..

Case Patriot 3340 Sprayers

Nozzle spray pattern verification

MagGrow system

Wilger ER11004

Pressure Verification
Data Collection

Pre-Application:
• % defoliation

During Application: *(only in Georgia)*
• Spray Coverage (top, middle and bottom)

Post-Application: *(7-14 DAP)*
• Harvest-aid ratings - defoliation, green leaves, and desiccated leaves (%)
• green bolls (%)
• Visual aerial imagery using a UAV
## Results

*(Mississippi)*

### Harvest-aid efficacy ratings

<table>
<thead>
<tr>
<th>Trt No.</th>
<th>Description</th>
<th>Defoliation</th>
<th>Green Leaves</th>
<th>Desiccated Leaves</th>
<th>Green Bolls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>MagGrow applicator</td>
<td>78.3</td>
<td>10.0</td>
<td>11.6</td>
<td>8.3</td>
</tr>
<tr>
<td>2</td>
<td>Standard applicator</td>
<td>78.3</td>
<td>10.0</td>
<td>11.6</td>
<td>8.3</td>
</tr>
<tr>
<td>p-value (0.10)</td>
<td></td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Means were analyzed using Tukey's HSD Test for means separation *(p≤0.10).*
Abbreviations: ns = means are not significantly different.
## Results

(Georgia)

Spray Coverage at three different plant locations:

<table>
<thead>
<tr>
<th>Trt No.</th>
<th>Description</th>
<th>Top</th>
<th>Middle</th>
<th>Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conventional – 10 GPA</td>
<td>3.9</td>
<td>3.3</td>
<td>3.4</td>
</tr>
<tr>
<td>2</td>
<td>MagGrow – 10 GPA</td>
<td>4.8</td>
<td>3.9</td>
<td>3.5</td>
</tr>
<tr>
<td>3</td>
<td>Conventional – 8 GPA</td>
<td>4.7</td>
<td>4.2</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>MagGrow – 8 GPA</td>
<td>4.5</td>
<td>3.8</td>
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*p-value (0.10)*

NS

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Abbreviations: ns = means are not significantly different.
Conventional – 10 GPA

MagGrow – 10 GPA
Conventional – 8 GPA

MagGrow – 8 GPA
Coverage variability: Boom & Plant

- Card Location
- Canopy
## Results

(Georgia)

### Harvest-aid efficacy ratings

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<th>Desiccated Leaves</th>
<th>Green Bolls</th>
<th>Open Bolls</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Conventional – 10 GPA</td>
<td>93.3%</td>
<td>0.0%</td>
<td>6.7%</td>
<td>2.0%</td>
<td>98.0%</td>
</tr>
<tr>
<td>2</td>
<td>MagGrow – 10 GPA</td>
<td>98.0%</td>
<td>0.3%</td>
<td>1.7%</td>
<td>0.0%</td>
<td>100.0%</td>
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Results

Lilly, Georgia
Based on spray deposition analysis, no differences in spray coverage were observed between the conventional and MagGrow systems at both 8 and 10 GPA.

Based on visual ratings, harvest-aid products had remove > 80% (Mississippi) and > 90% (Georgia) of the foliage in both conventional and MagGrow systems.

Results showed no effect (positive or negative) of the MagGrow system on spray coverage and harvest-aid efficacy.

**What’s Next:** More technology evaluation for Pesticide applications – volume, coverage & drift.
Questions/Comments?