Weed Control in Cotton
Bayer CropScience Announces Liberty Herbicide to Replace Ignite Herbicide for LibertyLink Crops

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Liberty Ignite ^ Smokes Weeds
Glyphosate-Resistant Weeds in NC
Horseweed Control in No-Till Cotton

• Focus on effective burndown program.
• RRF cotton: Only in-crop option is Liberty under hood
• LL or WRF cotton: Can use Liberty overtop
Burndown Programs for Glyphosate-Resistant Horseweed

Two components of burndown program:

1. Something to kill emerged horseweed*
2. Something to give residual control

Programs:

- Glyphosate + Clarity (1/2 pt)** + Valor
- Glyphosate + 2,4-D (2 pt)** + Valor

*Best if applied while weed still in rosette state (top picture )

**Waiting intervals required
  - Clarity: 21 days + rain (cotton)
  - 2,4-D: 30 days (cotton)
GR Horseweed
Roundup at burndown

Roundup + 2 pt 2,4-D
+ 2 oz Valor
at burndown
Roundup + Sharpen, burndown on glyphosate-resistant horseweed.

42-day waiting period for cotton.
Glyphosate-resistant common ragweed
Controlling Glyphosate-Resistant Common Ragweed in Cotton

1. Residual herbicide Preplant or PRE
   
   Cotoran E      Direx G      Prowl N  
   Reflex G      Staple N  
   Valor G

2. POST overtop options limited

   Ignite E      Envoke G      Staple P
   (must be small, < 2”)

3. Many POST-directed options

   Caparol + MSMA E     Cotoran + MSMA GE
   Cobra + MSMA E      Valor + MSMA GE
   Direx + MSMA E      
   Layby Pro + MSMA E  
   Suprend + MSMA E

* Include Gramoxone at planting in no-till systems.
Visited 242 sites.
No Palmer at some sites.
Sampled 242 sites.  
131 sites (54%) had Palmer amaranth  
98.5% of Palmer amaranth sampled was glyphosate-resistant.
Cotton growers have adopted management programs
Why is seed bank management critical?
• Prolific seed production

  - 450,000 seed/plant grown in competition with cotton (Sosnoskie and Culpepper, UGA)

  - Equivalent to 10 seed/ft$^2$ if evenly distributed over an acre
How can we reduce seed bank?
Impact of Crop Rotation and Good Control in Rotational Crop
(whole field in soybean in 2009; all treated alike in 2009)

Carthage, NC 2009
Loss in viability of buried Palmer amaranth seed.
Univ. Georgia.*

- Data averaged over two biotypes, two collection/start years, and four burial depths. Webster, Sosnoskie, and Culpepper.
POST-Harvest Palmer Amaranth Control

Untreated

Treated

Wayne Co., 2011
What should a grower do concerning variety selection and resistant Palmer amaranth?

• Variety (and trait) selection will be a key decision for growers.

• In fields heavily infested with glyphosate-resistant Palmer, a Liberty-tolerant variety (LL or WRF) is the best option, assuming good management.

• For other fields, where Palmer is not so bad, variety selection should be based on agronomic performance rather than herbicide tolerance per se. RRF, WRF, or LL are all options.

• Carefully study variety performance data. Look at all the data you can find.
Order of Discussion

- Palmer management in RRF cotton
- Palmer management in LL or WRF cotton
• Aggressive Preplant and/or PRE herbicide program. Get it PRE or you don’t get it. No salvage POST options in RR cotton.
Weak PRE
Powermax + Dual Magnum POST-1
Powermax POST 2

Strong Pre
Powermax + Dual Magnum POST-1
Powermax POST-2

Wayne Co., 2010
Hedging Against Lack of Timely Rain on PRE Herbicides: Palmer Amaranth in Cotton

• In conventional tillage, incorporate a yellow herbicide.

• In no-till cotton, put residual with preplant burndown. Paraquat + another residual at planting.
Preplant/PRE herbicides for Palmer amaranth in Cotton

<table>
<thead>
<tr>
<th>Preplant/no-till</th>
<th>PPI</th>
<th>conv. till</th>
<th>PRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valor</td>
<td>Treflan</td>
<td></td>
<td>Cotoran</td>
</tr>
<tr>
<td>Diuron</td>
<td>Prowl</td>
<td>Reflex + Cotoran</td>
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<tr>
<td></td>
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</table>
Palmer amaranth control by PRE herbicides; 40 days*

* Average of 5 locations; 2 in GA, 3 in NC. No other herbicides included.

** Applied same time as the PRE herbicides.
What happened here?
GR Palmer Amaranth Control in RR Cotton Southeast US Recommendations

- Aggressive Preplant and/or PRE herbicide program
- Dual Magnum or Warrant early POST
Cotton injury by Dual Magnum vs Warrant POST*. 7-15 days. Avg. 12 trials, 2010-2011.

*Some trials with RRF, some with WRF, some with LL.
Palmer amaranth control by Dual vs Warrant POST*. 15-21 days.** Avg. 12 trials, 2010-2011.

*Some trials with RRF, some with WRF, some with LL.
** Evaluated before the next application.
• Avoid cotton in badly infested fields
• Aggressive Preplant and/or PRE herbicide program
• Dual Magnum or Warrant early POST
• Residual lay-by
All plots with three overtop applications of Ignite, no PRE

Wayne Co. 2011
Residual lay-by options for cotton*

- Caparol
- Suprend
- Layby Pro
- Cotoran

Diuron
Reflex**
Valor***

* Follow height restrictions and rotational restrictions. Mix with MSMA or glyphosate.
** Max of 1.5 pt/year from all applications.
*** Max of 2 oz/year from all applications.
GR Palmer Amaranth Control in RR Cotton
Southeast US Recommendations

• Aggressive Preplant and/or PRE herbicide program
• Dual Magnum or Warrant early POST
• Residual lay-by
• Goal is to have overlapping residuals
Overlapping Residuals

Preplant
Preemergence
Residual POST
Residual Lay-by
Impacts of Glyphosate-Resistant Weeds

• Return to residual herbicides  
  PRE, POST overtop, layby

• Return to hooded sprayers

• Hand weeding

• Shift to glufosinate-tolerant varieties

• Less no-till, more cultivation (not in NC)

• Increased costs
Percent of 2011 Cotton Crop Planted to Glufosinate-Tolerant Varieties

USDA Agricultural Marketing Service
Liberty-based programs

~ emphases on Palmer
~ emphases on resistance management
Palmer Amaranth management with Liberty-based programs

• Aggressive Preplant and/or PRE program
  – Better control
  – More flexibility in timing of first Ignite application
Weed Management in Glufosinate-Tolerant Cotton

- Timing is critical!! 3 to 4 inches for consistent control of *Amaranthus* species.
Good preplant/PRE program gives some flexibility in timing.

From Ignite 280 label:

<table>
<thead>
<tr>
<th>Weed Species</th>
<th>Maximum Weed Height or Diameter (Inches)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>22 oz/A</td>
</tr>
<tr>
<td>Amaranth, Palmer&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Pigweed, redroot&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>Pigweed, prostrate&lt;sup&gt;2&lt;/sup&gt;</td>
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<tr>
<td>Pigweed, spiny&lt;sup&gt;2&lt;/sup&gt;</td>
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<tr>
<td>Pigweed, smooth&lt;sup&gt;2&lt;/sup&gt;</td>
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This is not a 4-inch pigweed!
• Aggressive Preplant and/or PRE program
  – Better control
  – More flexibility in timing of first Ignite application
  – Critical for resistance management
<table>
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<tr>
<th>PRE</th>
<th>POST 1</th>
<th>POST 2</th>
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<th>Late</th>
<th>Season</th>
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<tr>
<td>None</td>
<td>Rup</td>
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All treatments included Roundup + 2,4-D preplant; Gramoxone at planting; Suprend + MSMA layby.
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Palmer Amaranth management with Ignite-based programs

- Avoid cotton in badly infested fields
- Aggressive Preplant and/or PRE program
- Dual Magnum with first POST of Liberty (Warrant/Liberty mixes not on either label)
### Palmer Amaranth Management Systems in No-Till Glytol/LL

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- Aggressive Preplant and/or PRE program
- Dual Magnum with first POST of Ignite
- Residual lay-by
Weed Resistance to Liberty:
Will it happen?
Weed Resistance to Liberty: Should we be concerned?

No silver bullets on horizon
Liberty will play significant role in future programs
Liberty-Based Weed Management: Use it Wisely
Resistance Management with Liberty:

• Use preplant and/or PRE herbicides
• Use residual layby herbicides
• Consider Dual Magnum POST
• Start clean
• Very timely Liberty application
• Limit to two Liberty applications/year
• Shoot your neighbor if he abuses Liberty
Questions?