Distribution and Management of Glyphosate-Resistant Italian Ryegrass

Jason A. Bond, Thomas W. Eubank, Vijay K. Nandula, and Robin C. Bond

Mississippi State University
Delta Research and Extension Center
Stoneville, MS
Topics for Discussion

• Italian ryegrass background
  – Biology
  – Distribution of glyphosate-resistant (GR) populations

• Management programs
  – Emergence patterns
  – Residual herbicide timing
  – Spot treatments
  – POST herbicide timing
  – Spring salvage
Italian Ryegrass Biology

• Environment
  – Fertile soils in areas with mild climates
  – Low tolerance for harsh winter conditions

• Emergence
  – Peaks in fall but emerges throughout winter months
  – 6 to 10 d when day-time temperatures are 50 to 87 F

• Growth
  – Rapid seedling growth continuing into winter and spring

• Reproduction
  – Open pollination; propagates exclusively by seeds
  – Seed dispersal in vicinity of parent
Italian Ryegrass Resistance

- First GR *Lolium* spp. – Rigid ryegrass; Australia, 1996
- First GR Italian ryegrass – Chile, 2001
- First GR Italian ryegrass in U.S. – Oregon, 2004
- First GR Italian ryegrass in crops – Mississippi, 2005
- GR Italian ryegrass documented in Arkansas (2008), North Carolina (2009), Louisiana (2010)
- Italian ryegrass with **multiple resistance** to glyphosate, ALS inhibitors, and ACCase inhibitors in 7 counties in the Mississippi Delta.

Source: www.weedscience.org
Resistance Comparison

• *Lolium* spp. (ryegrass)
  – 4 species; 10 herbicide MOA; 17 countries
  – Italian ryegrass – 4 herbicide MOA; 11 U.S. states

• *Amaranthus* spp. (pigweeds)
  – 7 species; 9 herbicide MOA; 16 countries
  – Palmer amaranth – 4 herbicide MOA; 13 U.S. states

• *Echinochloa* spp. (barnyardgrass)
  – 6 species; 11 herbicide MOA; 27 countries
  – Barnyardgrass – 5 herbicide MOA; 6 U.S. states

Source: www.weedscience.org
GR Italian Ryegrass

Confirmed glyphosate-resistant

Suspected glyphosate-resistant

States with confirmed resistance:
- Arkansas
- Louisiana
- Mississippi

States with suspected resistance:
- North Carolina
- South Carolina

Other states:
- Missouri
- Tennessee
- Georgia
- Alabama
- Kentucky
- North Carolina
- South Carolina
- Louisiana
- Arkansas
- Mississippi

States with no confirmed or suspected resistance:
- Illinois
- Tennessee
- Georgia
- Alabama
- Kentucky
- Louisiana
- Arkansas
- Mississippi
- North Carolina
- South Carolina
Emergence Patterns

GR Italian Ryegrass Emergence in Mississippi

Density (no./m²)


2009-10 2010-2011
Management Programs

• Apply residual herbicide when weather permits from mid-October to mid-November.

• Control emerged GR Italian ryegrass in the fall with aggressive tillage or Gramoxone Inteon.

• Manage GR Italian ryegrass on ditch banks, turn roads, and field borders.

• Scout fields in early- to mid-January to make spring management decisions.

• Control **ALL** escapes prior to planting.
Residual Herbicide Timing

GR Italian Ryegrass Control on March 31, 2010

Application timing

Control (%)

September | October | November

Double disk | Dual Mag.-1.33 PT | Command-2 PT | Treflan-3 PT
Dual Magnum at 1.33 PT/A

Treflan at 3 PT/A + double disk
Double disk; November

Treflan + double disk; Nov.

2 wk after double disk

2 wk after Treflan + double disk
POST Control + Residuals

Dual Magnum at 1.33 pt/A + Gramoxone Inteon at 3 pt/A
Manage Field Borders

Select Max on turn roads in February

Dual Magnum around field border
POST Herbicide Timing

GR Italian Ryegrass Control on March 31, 2010

Control (%)

Application timing

November 5  January 13  March 1

Glyphosate
Select Max-12 OZ
Select Max-16 OZ
January 13 application

Roundup WeatherMax at 22 OZ/A

March 1 application

Select Max at 16 OZ/A
Spring Salvage Applications

Gramoxone Inteon Tank-mixtures
GR Italian Ryegrass Control 28 DAT

Control (%)

<table>
<thead>
<tr>
<th></th>
<th>Gramoxone Inteon 3 PT/A</th>
<th>Gramoxone Inteon 4 PT/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>No tank-mix</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Sencor-7 OZ</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Aatrex-1 QT</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Direx-1.6 PT</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Legend:
- Red: No tank-mix
- Yellow: Sencor-7 OZ
- Blue: Aatrex-1 QT
- Green: Direx-1.6 PT
Summary

• Residual herbicide in mid-October to mid-November
  – Cotton/soybeans – Dual Magnum at 1.33 pt/A
    Treflan at 3 pt/A + double disk
  – Corn – Dual Magnum at 1.33 pt/A
  – Rice – Command at 2 pt/A
• Scout – Do not let ryegrass get too big in spring.
• Complete control prior to planting.
  – Select Max at 12 to 16 oz/A in early spring
  – Gramoxone Inteon at 3 to 4 pt/A preplant
• Herbicide short list: http://msucoares.com/crops/weeds/
Dates of Interest

November 17, 2010
Pigweed Symposium
East Arkansas Community College
Forrest City, AR

March 10, 2011
GR Italian Ryegrass Field Day
MSU Delta Research and Extension Center
Stoneville, MS
Questions?

Jason A. Bond
Delta Research and Extension Center
Stoneville, MS
Phone: (662) 820-7794
E-mail: jbond@drec.msstate.edu