Herbicide Resistance: Protecting the PPO’s

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Herbicide Resistance

**Definition**

- WSSA definition
- “the *inherited* ability of a plant to survive and reproduce following exposure to a dose of herbicide normally lethal to the wild type”

ALS-Resistant Palmer Amaranth in Peanuts
Herbicide Resistance

Why????

• **Selection Pressure**
  - Overuse of single product or MOA

• **Pollen Drift**
  - Resistant trait moves thru pollen

Palmer Amaranth Pollen
PPO Inhibiting Herbicides

- **PPO or Protox**
  - *Protoporphyrinogen oxidase*
  - *Enzyme found in chloroplast and mitochondria needed for formation of chlorophyll*
  - *Cell membrane destruction*

- **Many common herbicides have this mode of action!!**
  - *Ultra Blazer, Cobra, Goal, Reflex, Ronstar, Resource, Aim, Valor, Storm, Spartan, ET*
Glyphosate and ALS resistance is forcing GA growers to rely on PPO herbicides!!!
Palmer Amaranth Control in Peanuts
Macon County, GA – 2007 (38 DAT)

NTC

Valor SX 51WG @ 3 oz/A
GR-Palmer Amaranth Control in Soybean – 2007 (83 DAT)

Untreated

Prefix 5.29EC @ 2 pt/A
What the heck is Prefix???

- **5.29 SC formulation**
  - 4.34 lbs Dual Magnum
  - 0.95 lb Reflex

- **Use rate is 2 pt/A ($10.50)**
  - At 2 pts/A you get the following…….
  - 1.085 lb ai of Dual Magnum (18.2 ozs/A)
  - 0.2375 lb ai of Reflex (15.2 ozs/A)
## High Potential to Overuse ( Abuse )

### Reflex and Valor

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Peanut</th>
<th>Corn</th>
<th>Soybean</th>
<th>Cotton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflex</td>
<td>No (?)</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Valor</td>
<td>Yes</td>
<td>Yes (PPLNT)</td>
<td>Yes</td>
<td>Yes (PPLNT) (LAYBY)</td>
</tr>
</tbody>
</table>
PPO Resistance Already Exists!

- **Common waterhemp**
  - 2001 (KS)
    - Resistant to POST but not PRE
  - 2002 (IL)
  - 2005 (MO)

- **Common ragweed**
  - 2005 (DE)

- **Wild poinsettia**
  - 2004 (Brazil)
Preventing PPO Resistance in GA

• **Know modes of action**

• **Should we save the PPO herbicides for our 2 most important row crops (cotton, peanuts)??**
  - 1.7 million acres (cotton + peanuts) vs. 0.78 million acres (soybeans + corn)

• **Rotate crops**
  - Corn (atrazine, Callisto, 2,4-D, Status)
  - Soybeans (Dual Magnum, Sencor)

• **Try not to use a PPO more than once per crop per year**
  - i.e. Do not use Valor and Reflex on cotton in the same year
  - 2-1-2 program??
  - What about peanuts???
    - **Valor, Cobra, Ultra Blazer, Storm**
Preventing PPO Resistance in GA

- Include other residual herbicides with PPO’s
  - Dual Magnum, Intrro, Outlook
  - Treflan, Prowl, Sonalan
  - Boundary (Sencor + Dual Magnum)
  - Prefix (Reflex + Dual Magnum)
Preventing PPO Resistance in GA

- Use other weed control tactics
  - Cultivation
    - No known cases of steel-resistance have been reported
    - Diesel fuel prices and time are major deterents
  - Hand-rogueing (seed-bank control)

- Do not want to but may have to!!!