Herbicide Application Timing: Effect on Weed Control Efficacy

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Acknowledgment

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- Syngenta Crop Protection
- United Phosphorus, Inc.
- Valent USA Corporation
2018 Weed Control Issues

• Weather!!
• Clethodim-resistant Italian ryegrass
• Off-target herbicide movement
  Clethodim, paraquat, glyphosate, Loyant, dicamba, 2,4-D
• Group 15 herbicide injury in soybean
• Poor grass control in all crops
## 2018 Weather

<table>
<thead>
<tr>
<th></th>
<th>Air Temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum</td>
<td>Minimum</td>
</tr>
<tr>
<td>April:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>70</td>
<td>48</td>
</tr>
<tr>
<td>10-yr average</td>
<td>77</td>
<td>55</td>
</tr>
<tr>
<td>May:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>90</td>
<td>67</td>
</tr>
<tr>
<td>10-yr average</td>
<td>82</td>
<td>62</td>
</tr>
</tbody>
</table>
Trimming Herbicide Costs

- Low commodity prices
- High input costs
- Effective weed control in 2017
- Injury from residual herbicides
- Other budgetary needs
Critical Period of Weed Control:

- The period of time in which weed control is necessary to avoid significant yield loss.
- Varies with crop, weed species, weed density, weed emergence timing, and environmental factors.

Source: Altieri 1995
Critical Period of Weed Control

Soybean and cotton yield loss due to interference from Palmer amaranth

Source: Klingaman and Oliver 1994

Source: Morgan et al. 2001
Preplant/PRE Management

Photo: Tom Eubank
Preplant/PRE Management
Preplant/PRE in Cotton

Palmer amaranth control with residual herbicides evaluated 2 weeks after planting

![Bar graph showing Palmer amaranth control with residual herbicides evaluated 2 weeks after planting. The graph compares control percentages for different preplant treatments: No preplant, Valor-2 oz, Reflex-1 pt, Cotoran-2 pt, and Prowl H2O-2.1 pt. The graph indicates that preplant treatments generally result in higher control percentages compared to no preplant treatment.]
Preplant/PRE in Cotton

Nontreated

Cotoran PRE

Valor 30 d preplant fb Cotoran PRE

Reflex 10 d preplant fb Cotoran PRE
PRE in Soybean

Palmer amaranth control 28 DAT with residual herbicides applied at soybean planting

*Data pooled across 6 site years.
PRE in Soybean

- Nontreated
- Authority MTZ
- TriCorr
- Boundary
PRE in Soybean

Soybean injury 14 DAT with residual herbicides applied at planting

*Data pooled across 6 site years.
Group 15 Herbicide Injury
Group 15 Herbicide Injury

Cotton injury 7 days following applications of Dual Magnum and Warrant in cotton

Injury (%)

One-leaf treatment

Five-leaf treatment

Dual Mag.-1 PT
Dual Mag.-2 PT
Warrant-3 PT
Warrant-6 PT
Group 15 Herbicide Injury

Dual Magnum at 1 PT/A

Dual Magnum at 2 PT/A

Warrant at 3 PT/A

Warrant at 6 PT/A
POST Application Timing

Soybean yield following glyphosate at different application timings in Crowley, LA

Yield reduced 0.42 bushels for each day herbicide application was delayed.
POST Application Timing

Two applications of Liberty 280 at 29 OZ/A spaced 1 wk apart

Initiated 2 WAP
Initiated 3 WAP
Initiated 4 WAP
POST Application Timing

- Nontreated
- Glyphosate + dicamba at V3
- Glyphosate + dicamba at V6
- Boundary followed by glyphosate + dicamba at V3
## Cost of Palmer Amaranth

Comparison of prices for herbicide programs targeting Palmer amaranth in 2007 and 2018

<table>
<thead>
<tr>
<th>Timing</th>
<th>2007</th>
<th>Cost</th>
<th>2018</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Treatment</strong></td>
<td><strong>Cost</strong></td>
<td><strong>Treatment</strong></td>
<td><strong>Cost</strong></td>
</tr>
<tr>
<td>Burndown</td>
<td>Glyphosate + 2,4-D</td>
<td>$10.56</td>
<td>Glyphosate + 2,4-D + Select Max + Valor SX</td>
<td>$32.41</td>
</tr>
<tr>
<td>PRE</td>
<td>N/A</td>
<td>$0.00</td>
<td>Paraquat + Boundary</td>
<td>$29.62</td>
</tr>
<tr>
<td>Early-POST</td>
<td>Glyphosate + s-metolachlor</td>
<td>$19.57</td>
<td>Glyphosate + Engenia + Zidua</td>
<td>$36.92</td>
</tr>
<tr>
<td>Late-POST</td>
<td>Glyphosate</td>
<td>$5.76</td>
<td>Glyphosate + s-metolachlor</td>
<td>$19.57</td>
</tr>
</tbody>
</table>

**Total** | **$35.89** | **$118.52**

Note: All prices for 2007 and 2018 are from MSU-ES 2019 Soybean Planning Budget.
Cost of Palmer Amaranth

Soybean yield loss due to interference from Palmer amaranth

- 15% yield reduction
- 7.5 BU/A loss on 50 BU/A crop
- $64.50/A gross loss at $8.60/BU soybean price
Cost of Palmer Amaranth

Cotton yield loss due to interference from Palmer amaranth

- 15% yield reduction
- 150 lb/A loss on 1,000 lb/A crop
- $114/A gross loss at $0.76/lb cotton price
2019 Weed Management Suggestions for Mississippi Row Crops

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