Palmer Amaranth Management

As Palmer amaranth continues to spread in the Mid-South across the Delta Region and with one known location of waterhemp in the Red River area in Louisiana, consultants, growers and applicators should remain vigilant. They should prepare herbicide strategies to address the issue as if this is the year it will show up, especially if either genus of *Amaranthus*, aka pigweed, has been found in the vicinity. The growth rate and seed production of *Amaranthus* spp. combined with its propensity to develop resistance to herbicides raises the threat level for this weed to the top. The remainder of this Agricultural Solutions from FMC will focus on methods to limit the introduction or spread of this weed locally and regionally.

**Methods to Prevent Palmer Pigweed Establishment and to Combat Existing Infestations**

- **Exclusion**
  - Sanitation of “new” used equipment. Used equipment purchases need to be treated as though they came from infested fields. Pressure washing and complete teardown to clean every crack and crevice as best as possible is best before use on the farm.
  - Purchase certified seed, both crop and cover crop seeds, to avoid introduction in the seed bag.
  - Manure, cotton seed or chicken litter: Any of these may also be an avenue to spread pigweed seeds across the farm.

- **Cultural and Mechanical Practices**
  - **Crop rotation.** Corn-soybean rotation allows use of atrazine (Group 5) and HPPD inhibitors such as mesotrione (Group 27) during the corn production cycle.
  - **Plant clean.** Do not plant into existing weed infestations.
  - **Use narrow row spacing and bushy cultivars** to quickly establish row closure. Pigweed germination is decreased under low light conditions.
  - **Plant population.** Increase plant population as practical to increase competition with pigweed for resources.
  - **Tillage.** Pigweed seeds’ longevity is relatively short. Turning the soil over to bury pigweed seeds can be employed as a last resort if no-till and soil conservation on rolling land is a priority.
  - **Removal.** Employ a zero tolerance strategy. Do not allow pigweed to remain in the field and go to seed. Chop or pull the pigweed plants and remove from the field. Pigweed left in the field will often produce roots at the nodes and produce many clones that can produce seed.
  - **Cover crops.** Dense mats of cover crops may be effective in suppressing pigweed germination or may at least reduce pigweed population.
  - **Post harvest pigweed control.** Once the crop is harvested, care must be taken to ensure escapes and late-emerging pigweed does not go to seed.

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Methods to Prevent Palmer Pigweed Establishment and to Combat Existing Infestations (cont.)

• Chemical Control With Herbicides and Effective Modes of Action
  • Preemergence Herbicides. FMC has two of the best pigweed control options in the Authority® and Anthem® herbicide brand products. When residual weed control is needed early season to get the crop to full canopy, sulfentrazone and pyroxasulfone have the best length of residual in their respective Groups (14 and 15) (Table 1).
  • Pre herbicides protect the early-season, critical weed free periods to preserve yield potential.
  • Pre herbicides provide time to make timely post herbicide applications. A ~12 day delay in making your post herbicide application and getting your overlapping residual out can be the difference between success and failure with Palmer amaranth. See Cahoon data below.

Table 1. Comparison of Herbicide Soil Half Lives

<table>
<thead>
<tr>
<th>Group 14 Herbicides (PPO Inhibitors)¹</th>
<th>Soil Half Life (days)</th>
<th>Group 15 Herbicides (Long Chain Fatty Acid Inhibitors)</th>
<th>Soil Half Life (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>sulfentrazone (Authority® herbicide brands)</td>
<td>70.8</td>
<td>pyroxasulfone (Anthem® herbicide brands)</td>
<td>34</td>
</tr>
<tr>
<td>fomesafen</td>
<td>45.6</td>
<td>dimethenamid</td>
<td>20</td>
</tr>
<tr>
<td>saflufenacil</td>
<td>21.4</td>
<td>s-metolachlor</td>
<td>22</td>
</tr>
<tr>
<td>flumioxazin</td>
<td>21.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Palmer Amaranth Growth Rate Effect on Optimal Herbicide Application

<table>
<thead>
<tr>
<th>Height (inches)</th>
<th>0 day</th>
<th>7 day</th>
<th>14 day</th>
<th>21 day</th>
<th>28 day</th>
</tr>
</thead>
</table>

• Postemergence Herbicides. Herbicide resistant traits allow in-season application of various effective modes of action to control emerged pigweed. Pigweed size (<4”, the smaller the better) is still extremely important to prevent incomplete control and protect the technology. Even with new technology, there is no silver bullet. Palmer amaranth 4” or less is still the target window for optimum efficacy.
  • LibertyLink® crops allow the postemergence application of glufosinate (Group 10)
  • Roundup Ready 2 Xtend® soybean and Enlist® soybean traits allow for over the top use of Group 4 herbicides (check State and local restrictions).
• Overlapping Residual. The Group 15 herbicide in Anthem® MAXX (pyroxasulfone) is the perfect residual herbicide postemergence for soybeans and may be applied through V3 to provide in-season residual pigweed control.

Preplant / Preemergence (No-Till – Add effective burndown)  
FMC Herbicide Solutions  
Post + Residual  
Glyphosate or Glufosinate +

Authority® MTZ DF herbicide 12-16 oz./A  
Authority® Elite herbicide 25-28 fl. oz./A*  
Authority® First DF herbicide 4.5-6.4 oz./A*  
Authority® XL herbicide 4-5 oz./A*  
*Add metribuzin 3-5 oz. for an additional site of action on pigweeds.  

Anthem® MAXX herbicide 2.5-4 fl. oz./A  
Apply 14-21 days after planting prior to new pigweed emergence.
### GOOD
- Two sites of action (Group 5, 15) with activity on pigweeds
  - **Anthem® MAXX herbicide 2.5 – 4 fl. oz.**
    - + Metribuzin 5 - 6.5 oz.
    - Excellent grass and small seeded broadleaf activity
- Two sites of action (Group 14,15) with activity on pigweeds + grass activity
  - **Authority® Elite herbicide 26 – 28 fl. oz.**
- Two sites of action (Group 5,14) with activity on pigweeds and provides large seeded broadleaf activity
  - **Authority® MTZ DF herbicide 15 oz.**
  - Authority® Maxx herbicide 5 oz. + Metribuzin 5 – 6.5 oz.
  - Authority® XL herbicide 4 oz. + Metribuzin 5 – 6.5 oz.
  - Authority® First DF herbicide 4-5 oz. + Metribuzin 5 – 6.5 oz.
  (see product labels for use rates and precautions based on soil type)

### BETTER
- Three sites of action (Group 5, 14, 15) with activity on pigweeds and provides broad spectrum grass and broadleaf weed control
  - Authority Elite herbicide 28 – 32 fl. oz. + Metribuzin 6.5 - 8 oz.
  - Anthem MAXX herbicide 3 – 4 fl. oz. + Authority First DF herbicide 5 oz.
    - Soil pH flexibility (see labels)
(see product labels for use rates and precautions based on soil type)

Liberty® herbicide OR Roundup Ready 2 Xtend® soybean technology (check state restrictions where approved) OR Enlist® Weed Control System (upon approvals).

Liberty herbicide OR Roundup Ready 2 Xtend soybean technology (check state restriction where approved) OR Enlist Weed Control System (upon approvals) + Anthem MAXX herbicide 2-3 fl. oz. (upon tank-mix approvals).

**Anthem MAXX herbicide** 2.5 – 4 fl. oz. (Do not exceed 5.7 fl. oz. in a soybean cropping season)
- Flexible application timing: 45 days prior to planting through 3 trifoliates
- Outstanding post sequential residual addition for waterhemp/Palmer amaranth, grass
- In post applications apply 21-28 days after planting or prior to new weed emergence
- When a metribuzin herbicide is used, apply to metribuzin tolerant varieties
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