

Palmer Amaranth Management

As Palmer amaranth continues to spread in the Northeast across the DelMarVa and parts of Pennsylvania, and with one known location of waterhemp in Virginia, 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 HatchTrak 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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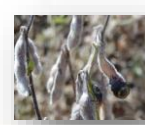
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Methods to Prevent Palmer Pigweed Establishment and to Combat Existing Infestations (cont.)

• Chemical Control With Herbicides and Effective Modes of Action

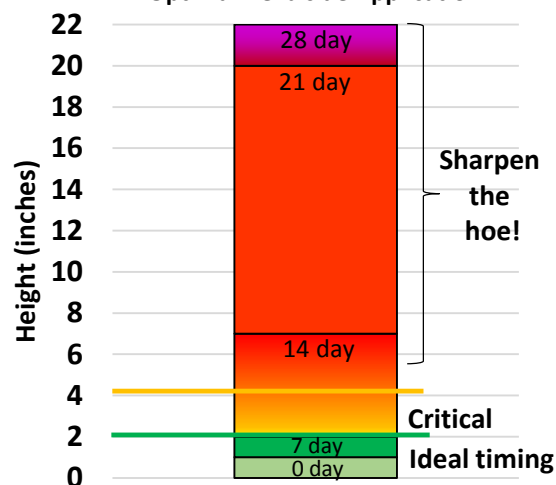
- **Preemergence Herbicides.** FMC has two of the best pigweed control options in the Authority[®] and Anthem[®] herbicide brand products. When residual weed control is needed early season to get the crop to full canopy, sulfentrazone and pyroxasulfone have the best length of residual in their respective 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

Group 14 Herbicides (PPO Inhibitors) ¹	Soil Half Life (days)	Group 15 Herbicides (Long Chain Fatty Acid Inhibitors)	Soil Half Life (days)
sulfentrazone (Authority [®] herbicide brands)	70.8	pyroxasulfone (Anthem [®] herbicide brands)	34
fomesafen	45.6	dimethenamid	20
saflufenacil	21.4	s-metolachlor	22
flumioxazin	21.2		

¹Weed Science 2014 62:664-671.

Palmer Amaranth Growth Rate Effect on Optimal Herbicide Application



Source: Charlie Cahoon, Painter, VA, 2017.

- **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 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

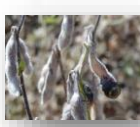
**Post + Residual
Glyphosate or Glufosinate +**

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.

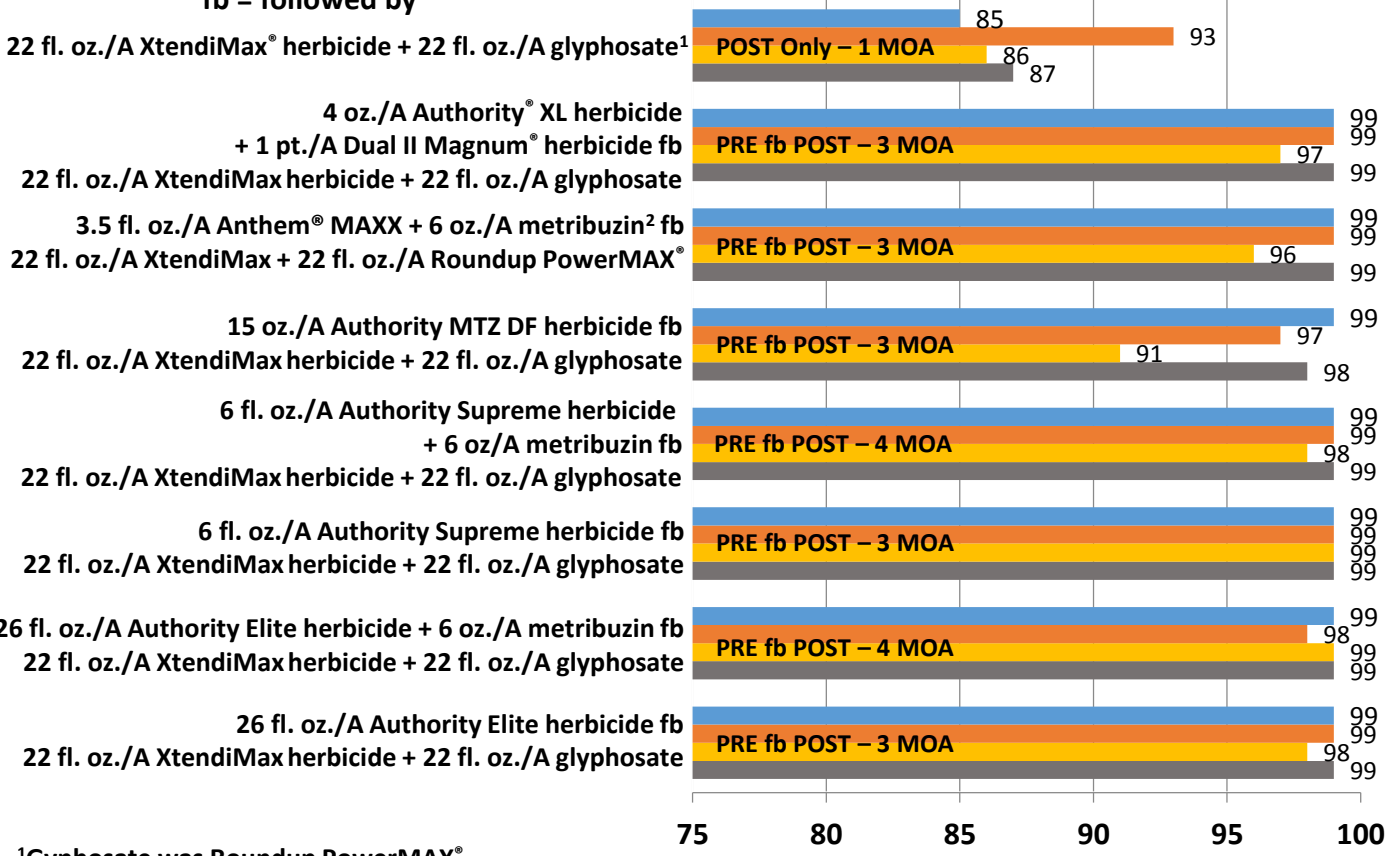
Anthem[®] MAXX herbicide 2.5-3 fl. oz./A
 Apply 14-21 days after planting prior to new pigweed emergence.





Benefit of Residual Herbicides in Roundup Ready 2 Xtend[®] Soybeans

30 Days After Application
fb = followed by
(Application and # of Palmer amaranth
Effective Modes of Action Listed on Bars)



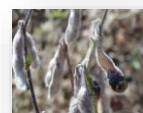
¹Glyphosate was Roundup PowerMAX[®]
²Metribuzin use rate in the Northeast and Eastern Shore typically ranges from 3-5 oz./A.
Source: Mt. Vernon, IL. 2017.

■ Palmer amaranth ■ Morningglory spp.
■ Fall Panicum ■ Large Crabgrass

Summary of Benefits to Support Pre Herbicide Use

- Past reliance on herbicide-tolerant crops promoting use of a single mode of action for postemergence control of marestail and *Amaranthus* species was a driver for resistance in glyphosate-tolerant crops.
- Incorporating multiple, effective modes of action promotes sound resistance management.
- Effective use of pre herbicides reduces the population density of Palmer amaranth and other weeds treated with the new herbicide-tolerant crop traits, which reduces the herbicide selection pressure that drives resistance.
- The new herbicide-tolerant crops are not new modes of action for agriculture. They only allow in-season treatment over the top of the crop, where allowed.
- With the rapid growth rate of Palmer amaranth, failure to use a pre herbicide during a rainy spring may result in treatment of Palmer amaranth that has outgrown the stage of susceptibility. Survivors may become resistant weeds in future crops and render the new crop trait technology ineffective against that species.

HatchTrakSM



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