

## **Resistant Palmer Amaranth Control**

### **Best Management Practices**

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Palmer amaranth (careless weed or pigweed) is a plant native to the desert southwest that has developed resistance to multiple herbicide mechanisms of action (MOAs). In multiple crops, in all major Arizona agricultural areas, Palmer amaranth resistant to glyphosate and ALS inhibitors (e.g., Staple<sup>®</sup>) can be found.

Weed escapes in cotton fields can disperse resistant seeds, contributing to spread across agricultural landscapes. **A diversity of control tactics are needed to manage herbicide resistant Palmer amaranth<sup>3</sup>.** The strategy of spraying only postemergence herbicides over-the-top without the use of preemergence herbicides and tillage is not sustainable. Overuse of this strategy has already resulted in reduced sensitivity of Palmer to 2,4-D in Kansas<sup>4</sup> and dicamba in Tennessee<sup>5</sup>.

### **PREPLANT**

- Preplant, preemergence herbicides must be incorporated into the soil to be effective, either with water (pendimethalin) or mechanically (pendimethalin and trifluralin)

### **EARLY POST** – After cotton emergence

- Tillage – Use cultivation to remove weeds
- Rotate and combine chemistries with different MOAs when spraying over-the-top herbicides (e.g. glufosinate, dicamba and 2,4-D)
- Consider tank-mixing with preemergence herbicides (e.g., acetochlor, dimethenamid-P, metolachlor, or Prowl H<sub>2</sub>O<sup>®</sup>) if they can be incorporated with irrigation or tillage
- Spray **small** weeds before they exceed 2 to 4 inches in size
- Do not spray water- or temperature-stressed weeds

### **LATE POST** – When cotton is 8 to 15 inches tall

- Use over-the-top, selective, herbicide sprays to control weed escapes from early POST weed control tactics
- Post-Direct and hooded sprayer applications – Consider burn-down type chemistries – Aim<sup>®</sup>, diuron, ET<sup>®</sup>, Goal Tender<sup>®</sup>, prometryn; as well as selective chemistries (e.g., glufosinate, glyphosate, dicamba, and 2,4-D)
- Tillage – When cultivating for weed control, keep in mind that dust on plant leaves **tends to deactivate postemergence herbicides and that soil disturbance can deactivate some preemergence herbicides**

### **LAYBY** – When cotton is >15 inches tall up to row closure

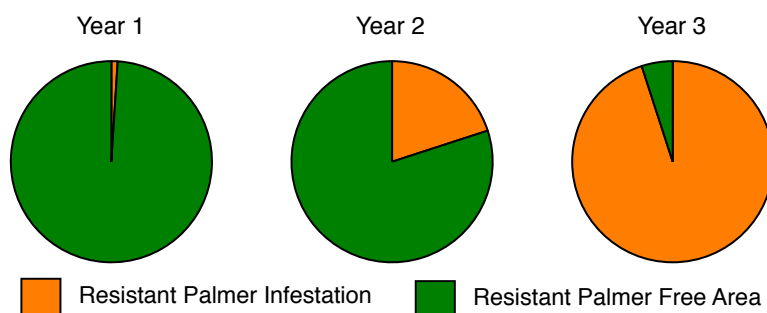
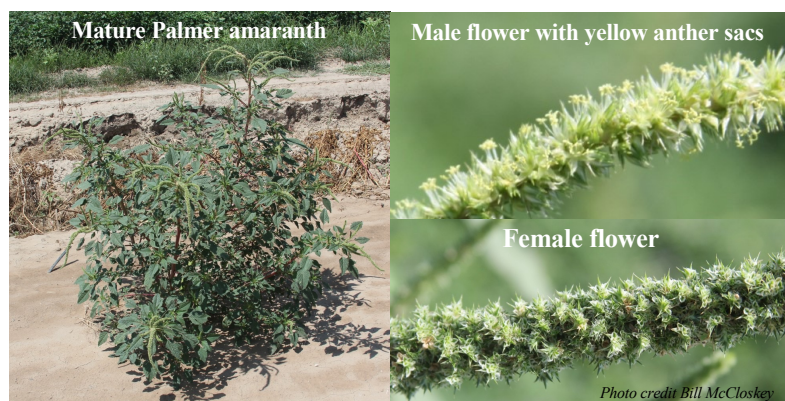
- Sanitation – Remove weed escapes to stop seed production, this includes hand roughing and tillage
- Use and rotate a diversity of pre- and post-emergence herbicide mixtures in post-directed or hooded sprayer applications (e.g., Chateau<sup>®</sup>, diuron, Fierce<sup>®</sup>, Goal Tender<sup>®</sup>, prometryn, or Prowl H<sub>2</sub>O<sup>®</sup> mixed with glufosinate, glyphosate, dicamba, 2,4-D, Aim<sup>®</sup> or ET<sup>®</sup>)

### **END OF SEASON SANITATION**

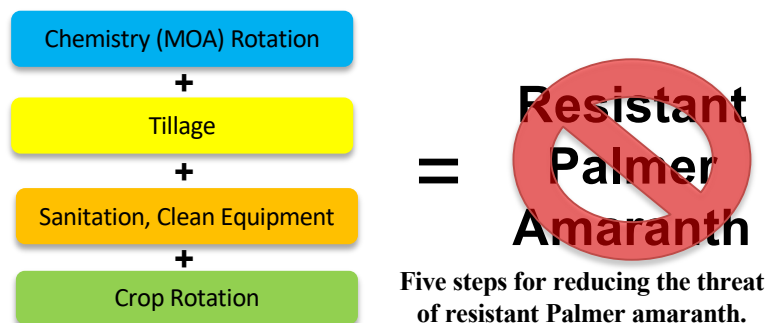
- Remove all weed escapes
- Clean equipment, especially harvesters, between fields.
- Control Palmer amaranth in surrounding areas – irrigation ditches, fence lines, and other non-crop areas
- Rotate crops

### **\*HERBICIDE APPLICATION STEWARDSHIP\***

**Read and strictly adhere to all herbicide labels.**



**Pigweed can get out of hand quickly! Just one escaped resistant plant in year 1 can lead to a 95% field infestation of resistant Palmer in year 3<sup>6</sup>.**



### **References:**

- <sup>3</sup>Norsworthy et al. 2012. Best practices for reducing herbicide resistance. Weed Science, Special Issue: 31-62.
- <sup>4</sup>Kumar et al. 2019. Confirmation of 2,4-D resistance and identification of multiple resistance in a Kansas Palmer amaranth (Amaranthus palmeri) Population. Pest Manag Sci 75: 2925-2933
- <sup>5</sup>Unglesbee, Emily. 2021. Dicamba-Resistant Pigweed – Dicamba-Resistant Palmer Amaranth Confirmed in Tennessee. Progressive Farmer. <https://www.dtnpf.com/agriculture/web/ag/crops/article/2020/07/27/dicamba-resistant-palmer-amaranth>
- <sup>6</sup>Norsworthy et al. 2014. In-field movement of glyphosate-resistant Palmer amaranth and its impact on cotton lint yield: evidence supporting a zero-threshold strategy. Weed Science 62:237-249



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