

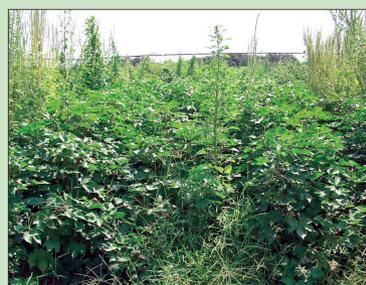
# Conservation Agriculture

## Controlling Glyphosate-Resistant Pigweed



### Rotation of crops and herbicides

Rotate summer crops and use herbicides with different modes of action to discourage development of resistant weeds.



Cotton infested with Palmer amaranth. Note female and male plants in center. *Photo courtesy of Michael Patterson, Auburn University.*

### High-residue cover crops

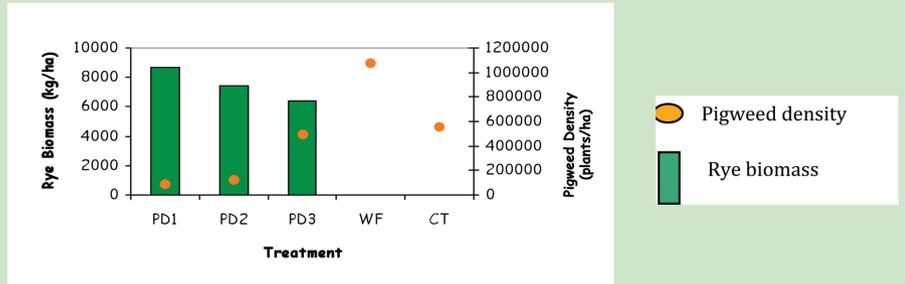


The photo on the left shows that residue inhibits pigweed growth between rows, but there is plenty of pigweed in the row where the soil was disturbed during planting. On the right, herbicide in the row complements the residue, resulting in no pigweed.

- When winter cover crops are planted early and managed for maximum growth, a dense residue mat is formed on the soil surface.
- Weed emergence and growth is suppressed by the physical barrier and shading by the residue. More residue gives better weed control.

- Most cover crop residues leach allelopathic chemicals that inhibit weed germination and/or growth.

In Alabama, an experiment (right) showed that cover crops residue is very effective for controlling pigweed.



Pigweed growth is suppressed by cover crop residue, the more the better. Green bars represent rye biomass (left axis); orange dots represent pigweed density (right axis). PD1, PD2, and PD3 correspond to cereal rye planting dates 1, 2, and 3 (4 weeks prior, 2 weeks prior, and on the average first frost date.) WF is winter fallow; CT is conventional tillage (multiple disking).

- Rye planted earlier produced greater residue and suppressed pigweed the best.
- Winter fallow and traditional tillage controlled pigweed poorly.

### Spot-spray / hand weeding

- Palmer amaranth usually appears in small patches of one or a few plants the first year.
- Eliminate the problem before it spreads.
- Removal by hand, hoe, or spot-spraying can do this.



Palmer amaranth seedling. Control it early before seed production. *Photo courtesy of Shawn Askeew, Virginia Tech.*

### Pre- and post-emergence herbicides

- Established weed populations can be controlled with herbicides.
- In high-residue systems, band herbicides in the planting row to get good soil contact and promote good weed control.



In-row pre-emergence applications will control weeds not covered by residue. *Photo courtesy of David Harkins, Alabama Agricultural Experiment Station.*



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