# GLYPHOSATE RESISTANT PALMER AMARANTH - A THREAT TO CONSERVATION TILLAGE

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## The Problem

Glyphosate resistant Palmer amaranth is now present in Alabama, Arkansas, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee. Hundreds of thousands of conservation tillage cotton acres, some currently under USDA Natural Resources Conservation Service (NRCS) conservation program contracts, are at risk of being converted to higher-intensity tillage systems. The shift to higher intensity tillage facilitates seed burial as well as preplant incorporated and preemergence herbicide control of this problematic weed, especially in dryland cotton production.

## Conservation Agriculture

NRCS defines conservation agriculture as cropping systems that maintain a minimum 30% residue on the soil surface. Recent NRCS programs such as EQIP, the Conservation Security Program and the recently enacted 2008 Farm Bill Conservation Stewardship Program offer incentive contracts rewarding conservation. Cropping systems with higher resource conservation receive higher payments; in many states, use of high residue cover crops increase payments.

Previous research by Cardina et al. has shown that redroot pigweed density decreased with increasing tillage intensity. Also, redroot pigweed density dropped by half following moldboard plowing (MP) *after three years of plowing; thus, bringing seed back to the surface*. Moonen & Barberi (2003) showed that cover crop residue can result in lower *Amaranth* spp. emergence when used in a conservation system compared to a conventional system that included MP. Price et al. (2008) also showed that higher amounts of rye residue decreased *Amaranth* spp. emergence and growth; while conservation systems with little or no winter cover had the highest A*maranth* emergence and growth. Due to the threat of glyphosate resistant pigweed to conservation agriculture, a USDA-ARS/Cotton Inc. sponsored workshop involving southeastern stakeholders was held in Athens, GA on Aug. 11th, 2008. The following is an abbreviated list of the solutions offered:

## Potential Solutions

- Crop rotation intensification (including pasture-based rotations )
- Improve residual herbicide performance in dry-land conservation systems
- Weed management intensification (scouting, timely applications, ect.)
- Integration of cultural solutions (high residue cover crops, delayed cotton planting, etc.)
- High residue cultivators
- Deep tillage to bury seed bank followed by a continuous high residue conservation system
- Alternative herbicide chemistries
- New cotton herbicide paradigm for Coastal Plain /Uplands/ Delta regions: site-specific
- Use of fall residuals on harvested fallow fields to reduce weed seedbank

## Conclusions

Depending on the severity of glyphosate Palmer amaranth infestation, multiple strategies involving integration of cultural as well as chemical weed control will be needed to overcome this threat. Integrating high-residue cover crop systems may help facilitate Palmer control in row middles; however, Palmer emerging in the crop row remains

a threat to cotton performance, especially in dryland cotton. Much research is needed to solve this threat to conservation tillage cotton production.

## Literature Cited

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