

**INFLUENCE OF DEEP TILLAGE AND A RYE COVER CROP ON PALMER AMARANTH
EMERGENCE IN COTTON**

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Abstract

Glyphosate-resistant Palmer amaranth has become a major problem for Arkansas crop producers. With Arkansas cotton producers relying heavily on glyphosate-resistant cotton, an alternative solution to controlling resistant Palmer amaranth is needed. A field experiment was conducted during 2009 and 2010 at the Lon Mann Cotton Research Station in Marianna, AR, in which a rye cover crop was tested in combination with deep tillage and no tillage to determine the impact on Palmer amaranth emergence and soil seedbank numbers. This experiment was organized in a randomized complete block design with a two by two factorial arrangement of treatments replicated four times. Factor A was the use of deep tillage using a mouldboard plow. Factor B was the use of a rye cover crop. A 2-m² area was marked in the center of each plot (8 rows by 60 m) by GPS. Once marked, 500,000 glyphosate-resistant Palmer amaranth seed were placed within the 2-m², and then the plot was disked twice. Half of the plots were deep tilled and half were not (factor A – tillage). During each growing season, five counts were taken to determine the number of Palmer amaranth that emerged within the center of the plot. Soil cores were taken at 0 to 15 cm and 15 to 30 cm in the fall of 2008 immediately after deep tillage and again in the fall of 2009 and 2010 to determine the change in soil seedbank numbers over the duration of the experiment. In 2009, both the tillage and the cover crop reduced Palmer amaranth emergence in cotton but the combination of the two provided the greatest control with an 85% reduction in emergence. In 2010, only the cover crop reduced Palmer amaranth emergence in cotton with a 68% reduction in emergence. Obviously, cover crops and deep tillage will not eliminate glyphosate-resistant Palmer amaranth; however, use of these tools will likely reduce the risks of failures associated with residual herbicides. Additional efforts should focus on the integration of the best practices identified in this research with use of residual herbicides.