

**MANAGING GLYPHOSATE-RESISTANT PALMER AMARANTH WITH RESIDUAL HERBICIDES IN  
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Roundup Ready and Flex production systems and the historical effectiveness of glyphosate have led to decreased use in residual herbicides to control problem weeds. However, this reduction has conversely led to a need for multiple glyphosate applications for control comparable to residual herbicides in cotton. Furthermore, glyphosate-resistant Palmer amaranth has developed into a tremendous problem in the midsouthern United States. Research was initiated in 2009 at multiple sites in Arkansas, Louisiana, Mississippi, and Tennessee to address management of glyphosate-resistant Palmer amaranth using sequential applications of residual herbicides.

Treatments were replicated four times in a randomized complete block experimental design with a factorial arrangement of four preplant (PP) and four preemergence (PRE) herbicide applications. Preplant treatments included no PP treatment (Utilized to evaluate control from PRE-only applications), Valor (2 oz/A) applied 30 days PP, Reflex (1 pt/A) applied 14 days PP, and Direx (1.6 pt/A) applied 0 day PP. Preemergence herbicides were applied immediately after planting and included no PRE (Included to evaluate control from PP-only applications), Cotoran (2 pt/A), Caparol (1.5 pt/A), and Prowl H2O (2.1 pt/A). Visual estimates of Palmer amaranth control and cotton injury were recorded 7, 14, and 28 d after PRE application.

Multiple problems were encountered at the different research sites in 2009. Excessive rainfall hindered treatment application at most sites and appropriate application timings were not achieved. Palmer amaranth control with Valor (47 to 93%) or Reflex (64 to 97%) alone varied across sites 14 days after planting. Following Valor with an at-planting application improved control 14 days after planting. At Rohwer, AR, and Stoneville, MS, injury from Direx-based treatments was severe. Control at three of four sites was higher 28 days after planting when Valor or Reflex were followed with at-planting applications. In most cases, sequential programs using residual herbicides controlled Palmer amaranth early in the season. Direx-based treatments provided most consistent early-season control and lint yields across sites. However, additional control measures would be required for season-long control.