

**HERBICIDE PROGRAM ALTERNATIVES FOR GLYPHOSATE-RESISTANT PALMER AMARANTH
(*AMARANTHUS PALMERI*) CONTROL IN COTTON**

Michael W. Marshall
Clemson University
Blackville, SC

Abstract

Roundup-Ready cotton varieties account for nearly 100% of cotton acres in production in South Carolina. Glyphosate-resistant Palmer amaranth has emerged as one of the most severe threats to reduced tillage cotton production in the southeast. Field studies were conducted at Edisto Research and Education Center (EREC) and Pee Dee Research and Education Center (PDREC) in 2008 to evaluate different combinations preemergence and postemergence herbicides for glyphosate-resistant Palmer amaranth control in South Carolina. Preemergence treatments included pendimethalin (Prowl H2O) at 1.0 lb ai/A, alachlor (Micro-Tech) at 1.0 lb ai/A, fluometuron (Cotoran) at 1.0 lb ai/A, and fomesafen (Reflex) at 0.375 lb ai/A. Postemergence treatments included glyphosate (Roundup PowerMAX) at 0.75 lb ae/A, s-metolachlor (Parrlay) at 1.3 lb ai/A, and pyriithobac (Staple LX) at 0.095 lb ai/A. Preemergence (PRE) treatments were applied shortly after planting. Postemergence (POST) treatments were applied at the 1 to 2 and 4 to 5 leaf stage. An untreated check was included for comparison. The study was arranged as a randomized complete block design with 4 replications. Individual plot sizes were 12.7 by 40 ft. Since rainfall is sporadic during cotton planting in South Carolina, supplemental overhead irrigation was provided at both locations. At EREC, all PRE treatments, except Micro-Tech + Cotoran fb glyphosate + Staple, controlled Palmer amaranth greater than 95% (Figure 1). Treatment containing Reflex preemergence provided good to excellent control of Palmer amaranth, regardless of tank mix partner. Although not significant across all Micro-Tech treatments, Prowl treated cotton yield was higher compared to the Micro-Tech treatments (Figure 2). In the Prowl + Reflex PRE treatments, glyphosate + Staple EPOST cotton yields were significantly higher than the glyphosate + Parrlay EPOST yields. In contrast to EREC, Micro-Tech plus Reflex or Micro-Tech plus Cotoran in the glyphosate treated blocks at PDREC provided nearly 100% Palmer amaranth control (Figure 3). However, Micro-Tech plus Reflex or Cotoran in the Ignite only blocks did not provide the same level of control (60%). Cotoran was inconsistent in controlling Palmer amaranth at PDREC (Figure 3). Micro-Tech + Cotoran fb glyphosate + Parrlay EPOST had the highest cotton yield compared to all other treatments (Figure 4). Stinkbugs were a problem at PDREC which explains the significantly lower yield compared to the EREC location. Staple controlled Palmer amaranth at both locations indicating that these were not ALS-resistant populations. Overall, the addition of Reflex to the preemergence herbicide program dramatically improved Palmer amaranth control in cotton, despite some cases where injury occurred during emergence. Cotoran provided good to excellent control of Palmer amaranth; however, inconsistencies were noted in control due to soil textural differences commonly found in South Carolina. Ignite is a fair to good herbicide alternative for control of small Palmer amaranth (less than 3" tall) where glyphosate-resistant biotypes exist. If irrigation or rainfall is timely, preemergence programs combined with LibertyLink programs will continue to play an important role in managing glyphosate-resistant Palmer amaranth.