

MANAGING GLYPHOSATE-RESISTANT PALMER AMARANTH USING 2,4-D SYSTEMS IN DHT COTTON IN GA, NC, AND TN**A. Stanley Culpepper****University of Georgia****Tifton, GA****J. S. Richburg****Dow AgroSciences LLC****Indianapolis, IN****A. C. York****North Carolina State University****Raleigh, NC****L. E. Steckel****University of Tennessee****Jackson, TN****L. B. Braxton****Dow AgroSciences****Travelers Rest, SC****Abstract**

Glyphosate-resistant Palmer amaranth has changed cotton production forever in Southeast and Midsouth. Since the development of glyphosate-resistant Palmer amaranth, many cotton growers in the most severely infested areas have employed residual herbicides, cultivation, and hand-weeding. A 2010 survey of Georgia cotton growers noted that 92% of these growers hand weeded 54% of the crop with an average expense of \$23.70/A. Growers are in desperate need of new herbicide chemistry that can be applied topically to cotton while improving control of emerged Palmer amaranth. With cotton resistant to 2,4-D in development, an experiment was conducted to aid in the understanding of managing glyphosate-resistant Palmer amaranth with 2,4-D-based systems.

The experiment was conducted in DHT cotton at two locations in Georgia, and one location each in Tennessee and North Carolina during the summer of 2010. Five total POST systems, six residual systems, and a non-treated control were implemented on Palmer amaranth. Total POST systems included Durango (24 oz/A), 2,4-D (Weedar® 34 oz/A), Ignite® (29 oz/A), Durango® + 2,4-D, or Ignite + 2,4-D followed by Direx® (2 pt/A) + MSMA (2.5 pt/A) at layby. Residual programs included Prowl H₂O® (34 oz/A) or either Reflex® (16 oz in GA and NC) or Cotoran® (32 oz/A) PRE followed by two applications of 2,4-D, 2,4-D + Ignite, or 2,4-D + Durango POST, with all systems receiving Direx + MSMA at layby.

Rainfall occurred between 2 and 11 days of PRE applications. All early POST applications were made to 2- to 3-inch Palmer amaranth and late POST applications were made to 4- to 9-inch Palmer amaranth. At layby, size ranged from 2- to 12-inches, depending on previous herbicide applications. Palmer amaranth populations ranged from 30 to 300 plants per square yard.

Just prior to layby and combined over all locations, Durango provided 43% control of Palmer amaranth, a predominately glyphosate-resistant population. Sequential 2,4-D applications controlled Palmer amaranth 74%, and control was less effective than sequential Ignite or 2,4-D + Durango applications (85 to 86%). The most effective total POST system included sequential applications of Ignite + 2,4-D (97%). With residual systems, control ranged from 92 to 93% when sequential 2,4-D or 2,4-D + Durango POST applications were made, but control was less with these systems as compared to the residual systems including sequential applications of 2,4-D + Ignite (99%).

Late in the season, after layby applications had been made, the total POST Durango system controlled Palmer amaranth only 28% when averaged over both Georgia locations and the North Carolina location. The sequential 2,4-D system (84%), sequential Ignite system (75%), and sequential Durango + 2,4-D (90%) systems were more effective. However, the total POST Ignite + 2,4-D system controlled Palmer amaranth 97%, and control was similar to all of the residual systems (95 to 97%).

Seed cotton yield was taken at both Georgia locations and it was directly influenced by Palmer amaranth control. Greatest yields were noted with all six residual herbicide systems and the one total POST system that included sequential Ignite + 2,4-D applications.

Numerous weed management systems in DHT cotton will effectively manage glyphosate-resistant Palmer amaranth. However, this research noted that 2,4-D will only be effective when included in a total systems management approach. Residual herbicides should be included throughout the season.