

HERBICIDE PROGRAMS IN XTEND COTTON IN THE ABSENCE OF XTENDIMAX, FEXAPAN, AND ENGENIA FOR LONG-TERM GLYPHOSATE-RESISTANT PALMER AMARANTH CONTROL**David A. Bell****Taghi Bararpour****Department of Plant and Soil Sciences****Mississippi State University – Delta Research and Extension Center****Stoneville, MS****Abstract**

Introduction of cultivars of cotton (*Gossypium hirsutum*) and soybean (*Glycine max*) genetically modified with resistance to the synthetic auxin herbicides dicamba and 2,4-D will allow these compounds to be used with flexibility but may expose susceptible soybean and cotton cultivars to nontarget herbicide drift. It is well known that soybean and cotton are both sensitive to low-dose exposures of dicamba and 2,4-D. Palmer amaranth (*Amaranthus palmeri*), is one of the most problematic and economically damaging weeds in row-crop production systems in the southern United States. A field study was conducted in 2021 at the Delta Research and Extension Center, in Stoneville, Mississippi, to evaluate herbicide programs in Xtend cotton technology for: 1) long-term glyphosate-resistant Palmer amaranth control in the absence of Xtendimax, Fexapan, and Engenia and 2) reducing weed seed deposition to the soil seedbank. Xtend (DP 1646 B2XF) cotton was planted (four rows plot) on April 27, 2021, and emerged on May 03. Herbicide treatments were as follows (rate in oz/a): 1) Cotoran (fluometuron) at 32 PRE (A) followed by (fb) Roundup (glyphosate) at 4- to 5-leaf cotton/2- to 4-inch weed (B) fb Roundup at 2- to 3-weeks after B (C); 2) Cotoran (A) fb Roundup (B) fb Liberty (glufosinate) at 29 (C); 3) Cotoran (A) fb Liberty (B) fb Roundup (C); 4) Cotoran (A) fb Dual Magnum (*S*-metolachlor) at 16 + Liberty (B); 5) Cotoran (A) fb Dual Magnum + Liberty (B) fb Liberty at weed flowering (D); 6) Cotoran + Caparol (prometryn) at 32 (A) fb Liberty + Dual Magnum (B); 7) Brake (fluridone) at 16 (A) fb Liberty + Dual Magnum (B); 8) Brake + Direx (diuron) at 16 (A) fb Liberty + Dual Magnum (B); 9) Brake + Cotoran at 16 (A) fb Liberty + Dual Magnum + Assure II (quizalofop) at 8 (B); 10) Brake + Cotoran at 24 (A) fb Liberty + Dual Magnum + Select (clethodim) at 12 + Agri-Dex (B); 11) Brake + Flexstar (fomesafen) at 12 (A) fb Liberty + Dual Magnum (B); 12) Brake + Cotoran at 16 (A) fb Liberty + Select + Agri-Dex (B) fb Liberty + Dual Magnum (D); 13) Brake + Warrant (acetochlor) at 36 (A) fb Liberty + Dual Magnum (B); 14) Weed-free check; and 15) Weedy check.

There was no cotton injury from any treatment. Treatment 1 provided 26% control of Palmer amaranth by 13 weeks after emergence (WAE). This result indicates that Palmer amaranth populations in the test area were glyphosate-resistant. Treatments 11 and 12 were the best treatments for controlling glyphosate-resistant Palmer amaranth. These treatments (11 and 12) provided 96 to 100% control of Palmer amaranth by 13 WAE. Glyphosate-resistant Palmer amaranth populations in treatment 1 produced 75% seed production as compared to weedy check (100%) (visual observation). Treatment 12 stopped glyphosate-resistant Palmer amaranth seed production and no seed was deposited to the soil seedbank. Plot that received the application of treatment 12 provided the highest (numerically) seedcotton yield. Weed-free check plot and the plots that received the application of treatments 11 provided seedcotton yield as comparable to treatment 12. Weed interference (weedy check) reduced seedcotton yield 98% as compared to weed-free check.