

HERBICIDE PROGRAMS IN STONEVILLE COTTON FOR LONG-TERM GLYPHOSATE-RESISTANT PALMER AMARANTH CONTROL

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Abstract

Cotton (*Gossypium hirsutum*) is a major crop in Mississippi. 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 Stoneville cotton for: 1) long-term glyphosate-resistant Palmer amaranth control; and 2) reducing weed seed deposition to the soil seedbank. Stoneville (ST 4550) cotton was planted (four rows plot) on April 27, 2021, and emerged on May 03. The experiment was designed as a randomized complete block with four replications. 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 (A); 7) Brake (fluridone) at 16 (A) fb Liberty + Dual Magnum (B); 8) Brake + Direx (diuron) at 16 (A) fb Liberty + Dual Magnum (A); 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. Time of herbicide applications were as follows: A) preemergence (PRE) on April 28; B) 4- to 5-leaf cotton / 2- to 4-inch weeds on May 27; C) 2- to 3-weeks after B on June 14; and D) weed flowering on July 7.

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 [Brake + Flexstar PRE (A) fb Liberty + Dual Magnum (B)] provided the best level of glyphosate-resistant Palmer amaranth control. This treatments (11) provided 96% control of Palmer amaranth by 13 WAE. Glyphosate-resistant Palmer amaranth populations in treatment 1 [Cotoran PRE (A) fb Roundup (B) fb Roundup (C)] produced 81% seed production as compared to weedy check (100%) (visual observation). Treatment 11 stopped glyphosate-resistant Palmer amaranth seed production (1%). Plot that received the application of treatment 5 and 12 provided the highest (numerically) seedcotton yield as compared to the other herbicide treatments. Plot that received the application of treatment 1 produced 62% less seedcotton yield as compared to weed-free check. Weed interference (weedy check) reduced seedcotton yield 99.7% as compared to weed-free check. Palmer amaranth seed deposition to the soil seedbank must be stopped/reduced for long-term weed management and delaying/stopping the evolution of herbicide-resistant weed.