WEED MANAGEMENT SYSTEMS IN 2,4-D TOLERANT COTTON

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Abstract

A glyphosate dominated weed management strategy in corn, soybean, and cotton in the southern U.S. has resulted in the selection and rapid increase of glyphosate-resistant Palmer amaranth. The recent commercialization and release of 2,4-D tolerant cotton by Dow AgroSciences has given growers more herbicide options to manage this difficult-to-control weed. This recent technology allows topical application of glyphosate, Liberty, and 2,4-D choline herbicides. Current research is lacking on in-season efficacy of 2,4-D choline on broadleaf weeds in cotton. Therefore, studies were initiated in 2017 to determine the efficacy of 2,4-choline and Liberty combinations on selected broadleaf weeds. To determine efficacy of 2,4-D choline based herbicide systems on selected broadleaf weeds and the impact on cotton growth and yield. Field experiments were conducted at Edisto Research and Education Center (EREC) located near Blackville, SC. Cotton variety Phytogen 490 W3FE was planted at 3.0 seeds/ft. row on May 22, 2017. At-plant preemergence (PRE) treatment was Reflex at 12 fl oz./A plus Diuron at 16 fl oz./A for all treatments except the untreated check Postemergence (POST) treatments were (1) none, (2) glyphosate at 28.4 fl oz./A POST1 fb glyphosate at 28.4 fl oz./A POST2; (3) Enlist Duo at 75 fl oz./A POST1 fb Liberty at 29 fl oz./A plus 2,4-D Choline at 32 fl oz./A plus Dual Magnum at 16 fl oz./A POST2; (4) Liberty at 29 fl oz./A plus 2,4-D Choline at 32 fl oz./A plus Dual Magnum at 16 fl oz./A POST1 fb Enlist Duo at 75 fl oz./A POST2; (5) Liberty at 29 fl oz./A plus Dual Magnum at 16 fl oz./A POST1 fb Liberty at 29 fl oz./A plus glyphosate at 28.4 fl oz./A POST2; (6) Enlist Duo at 75 fl oz./A POST1 fb Liberty at 29 fl oz./A plus Dual Magnum at 16 fl oz./A POST2; (7) Liberty at 29 fl oz./A + Dual Magnum at 16 fl oz./A POST1 fb Enlist Duo at 75 fl oz./A POST2. The POST1 treatments were applied at the 2-3 lf cotton growth stage (APT1), and POST2 was applied at the 6-8 lf cotton growth stage (APT2). Percent visual Palmer amaranth and pitted morningglory control were evaluated at APT1, APT2, and 2 weeks after APT2 (2WAPT2). Percent visual cotton injury was also evaluated at APT1, APT2, and 2WAPT2 timings. Seed cotton yield was collected from the center two rows on each plot on November 6, 2017. Percent Palmer amaranth and pitted morningglory visual control data were analyzed using ANOVA and means separated at the P = 0.05 level. Percent cotton visual injury and seed cotton yield data were analyzed using ANOVA and means separated at the P = 0.05 level. In the PRE treatment, Palmer amaranth residual control at APT1 was excellent (100%); however, diuron plus Reflex PRE treatment only provided limited residual activity on pitted morningglory (75-85%). Palmer amaranth control decreased rapidly in glyphosate POST only treatment to 62% indicating significant glyphosate resistance in the population. In addition, pitted morningglory control also decreased significantly (52%) in the glyphosate POST treatment by 2WAPT2. Overall, POST treatment 3-7 provided excellent control Palmer amaranth and pitted morningglory control by 2 WAPT2 timing (100%). No in-season cotton visual injury was observed. Cotton yield ranged from 205 to 3209 lb./acre. In the glyphosate POST only treatment, cotton yield was significantly reduced (311 lb./A) compared to the other POST treatments and differences were not observed among the treatments 3-7. In conclusion, a preemergence herbicide program provided good to excellent control of Palmer amaranth. The addition of Liberty and/or 2,4-D choline provided excellent control of Palmer amaranth and pitted morningglory. Seed cotton yields across the 2,4-D choline and Liberty programs were not affected. The key to resistance management is to spray when weeds are small (less than 4 inches) and the use of multiple modes-of-action at each timing.