USE OF ACETOCHLOR FOR PALMER AMARANTH CONTROL IN COTTON

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Abstract

The introduction of glyphosate-resistant (GR) cotton in 1997 brought forth many changes to cotton weed management. Prior to this time, weed control was achieved with a combination of soil applied, postemergence (POST), and postemergence-directed herbicides (PD) in conjunction with. The repetitive use of glyphosate alone in GR cotton has helped facilitated the development of glyphosate resistant weeds. Palmer amaranth, which is a troublesome weed due to its long window of emergence, was first documented to be resistant to glyphosate in Mississippi in 2008. Due to the development of glyphosate-resistant Palmer amaranth, it has become important to utilize a weed control program that can control Palmer amaranth in order to maximize yield and reduce harvest problems. Acetochlor is currently labeled for weed control in corn and cotton. However, previous research to determine the level of cotton tolerance to acetochlor and Palmer amaranth control from acetochlor is lacking. Therefore, field experiments were performed to determine cotton tolerance and the level of Palmer amaranth control achieved with POST and PD applications of acetochlor.

Experiments were conducted in 2009 at 4 locations in Mississippi. These locations included 2 sites in Tunica, 1 site in Clarksdale, and 1 site in Starkville. The Tunica and Clarksdale locations were planted with Phytogen 375 WRF cotton seed and the Starkville location was planted with Stoneville 5458 B2RF cotton seed. Seeding rate at planting was 52,000 seeds per acre at all locations. Plot size consisted of four 38 inch rows measuring 40 feet in length. The experimental design was a randomized complete block with 4 replications of each treatment. Four application timings were utilized and included a burndown application, preemergence (PRE) application, early postemergence (early POST) application, and PD application. All herbicide treatments included a burndown application of Valor SX® (flumioxazin) at 0.0625 pounds active ingredient per acre (lb ai/A) and Roundup PowerMAX® (glyphosate) at 0.75 pounds acid equivalent per acre (lb ae/A) as well as a preemergence application of Cotoran® 4L (fluometuron) at 1.0 lb ai/A. Treatments included: early POST applications of Parrlay™ (metolachlor) at 1.33 lb ai/A, Dual® Magnum (s-metolachlor) at 0.98 lb ai/A, Prowl® H_2O (pendimethalin) at 0.95 lb ai/A, acetochlor at 1.125 lb ai/A, or no herbicide applied followed by a PD application of Direx® 4L (diruon) at 1.0 lb ai/A; Parrlay™ at 1.33 lb ai/A or acetochlor at 1.125 lb ai/A applied early POST followed by a PD application of acetochlor at 1.125 lb ai/A; and Parrlay™ at 1.33 lb ai/A applied early POST followed by a PD application of acetochlor at 1.5 lb ai/A. An untreated check was also included for comparison. Visual ratings for percent crop injury and Palmer amaranth control were taken 14 days after application timings.

Early POST application of acetochlor provided 96% control of Palmer amaranth 14 days after application. Similar control was observed following early POST applications of Parrlay™, Dual Magnum®, and Prowl H_2O®. Palmer amaranth control ranged from 75 to 91% after a PD application of Direx® 4L. Postemergence-directed application of acetochlor provided 86 to 89% control of Palmer amaranth. Crop injury was only significant where acetochlor was applied early post and as a PD application. No significant differences in seed cotton yields were observed. Acetochlor provides similar levels of Palmer amaranth control to that of Parrlay™, Dual Magnum®, and Prowl H20®. Minimal crop injury was observed following acetochlor application; however, further research is needed to determine crop safety following acetochlor application across a wide range of environments.