Evaluation of Reflex and Valor for Preplant and Preemergence Control of Palmer Amaranth in Cotton

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RESEARCH PROBLEM

Palmer amaranth is a common and very troublesome weed in cotton fields throughout the southern United States. It has been effectively controlled with glyphosate in Roundup Ready® cotton; however, glyphosate-tolerant Palmer amaranth is present in 11 counties in Arkansas. The ability of these plants to tolerate high rates of glyphosate has caused major problems and requires a different weed control system. The objective of this research was to evaluate the efficacy of preplant and preemergence residual herbicides for control of glyphosate-tolerant Palmer amaranth in Arkansas cotton.

RESEARCH DESCRIPTION

In 2006 and 2007, duplicate experiments were established in Rohwer, Ark., on the Southeast Research and Extension Center (Rohwer Branch) in a Hebert silt loam soil and in Keiser, Ark., on the Northeast Research and Extension Center in a Sharkey clay soil. The trials were arranged in a randomized complete block design with four replications. These trials were sprayed with a small-plot tractor equipped with a multi-boom and air mix 110015 nozzles on 19-inch spacing. The operating pressure was 55 PSI provided by CO₂ gas propellant and the spray volume was 12 GPA. Parameters evaluated were visual ratings of Palmer amaranth control, visual ratings of cotton injury, and cotton yield. Herbicides used in this experiment were Reflex at 0.187 and 0.25 lb ai/acre, Valor at 0.063 lb ai/acre, Cotoran at 1 lb ai/acre, Caparol at 1 lb ai/acre, Direx at 0.5 lb ai/acre, and Prowl H₂O at 1 lb ai/acre.

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RESULTS AND DISCUSSION

In 2006, cotton injury was noted with Reflex applied 14 and 0 days preplant (DPP) at 0.25 lb ai/acre; Reflex applied 7 and 0 DPP at 0.187 lb ai/acre; Valor, Cotoran, and Caparol applied 0 DPP; and Prowl H₂O applied 21 and 0 DPP at Rohwer and only with Valor 0 DPP at Keiser. Cotton yield was affected only by Valor applied 0 DPP, which caused death of the cotton at the Rohwer location. Fifty-one days after planting (DAP) at Rohwer, Reflex at 0.25 lb ai/acre and Prowl H₂O applied 14 DPP provided 98% control of Palmer amaranth, while Valor applied 21 DPP provided 99% control. Valor applied 14 and 7 DPP and Direx applied 0 DPP provided 100% control, while Cotoran and Caparol applied 14 DPP provided 96 and 83% control, respectively. Thirty DAP at Keiser, Reflex applied 21 and 14 DPP at 0.25 lb ai/acre and Valor applied 21, 14, and 7 DPP provided 99% control, while Reflex applied 14 DPP at 0.187 lb ai/acre, Cotoran applied 21 DPP, Caparol applied 14 DPP, Direx applied 14 DPP, and Prowl H₂O applied 21 DPP provided 97, 95, 97, 98, and 94% control, respectively.

In 2007, cotton injury was not noted with any treatment at Rohwer, while Valor applied 21, 14, 7, and 0 DPP caused injury at Keiser. Thirty-seven DAP at Rohwer, Reflex at 0.25 lb ai/acre applied 21, 7, and 0 DPP provided 92, 97, and 91% control, respectively, of Palmer amaranth, while Reflex at 0.187 lb ai/acre applied 14 and 7 DPP provided 90 and 93% control, respectively. Direx applied 0 DPP provided 93% control of Palmer amaranth. Twenty-eight DAP at Keiser; Valor applied 21, 14, and 7 DPP provided 95, 96, and 92% control of Palmer amaranth, respectively, while Reflex at 0.187 lb ai/acre applied 7 DPP provided 88% control. Residual herbicides applied preplant and preemergence did provide excellent control of glyphosate-tolerant Palmer amaranth in Arkansas cotton.

PRACTICAL APPLICATIONS

The information from this study is being used to make recommendations to county agents and growers. Knowing the presence of glyphosate-resistant Palmer amaranth provides growers the opportunity to make herbicide applications that will control this invasive weed. This information also aids in updating the Arkansas weed control recommendations (Scott et al., 2006).

LITERATURE CITED

Fig. 1. Percent Palmer amaranth control 37 days after planting at Rohwer, Ark., in 2007 with preplant and preemergence applications.

Fig. 2. Percent Palmer amaranth control 28 days after planting at Keiser, Ark., in 2007 with preplant and preemergence applications.