OPTIONS FOR CONTROLLING PPO-RESISTANT PALMER AMARANTH PREEMERGENCE IN COTTON

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Abstract

Palmer amaranth (*Amaranthus palmeri*) is the primary weed threat to cotton (*Gossypium hirsutum*) production. Recently, Palmer amaranth in the state of Arkansas has been identified as resistant to all protoporphyrinogen oxidase (PPO)-inhibiting herbicides, eliminating another mode of action for weed control preplant or preemergence (PRE). Additionally, some PPO-resistant Palmer amaranth populations have been observed as more difficult to control with other herbicide modes of action. To determine if residual herbicides commonly used in cotton were still viable control options for PPO-resistant Palmer amaranth, a field experiment was conducted on-farm in Marion and Crawfordsville, AR in 2018. Neither site was irrigated. The objective was to evaluate the efficacy of common PRE cotton herbicides. Treatments were arranged in a single-factor randomized complete block with three replications at Marion and four replications at Crawfordsville. Visible Palmer amaranth control ratings were collected 2 and 4 weeks after application (WAA). Palmer amaranth density (plants m^{-2}) was measured at 4 WAA by counting surviving weeds in two 0.5 m quadrats in each plot. Treatments included Reflex as a PPO herbicide comparison, as well as various combinations of Brake and Cotoran with other PRE-applied herbicides common to cotton. Treatments were applied to freshly tilled soil at both locations. Control levels were much higher at Marion than Crawfordsville due to differences in rainfall and soil type. At 2 WAA, Brake + Xtendimax provided 99% control at Marion, and by 4 WAA, control was 95%. At Crawfordsville, Xtendimax at the labeled rate showed the highest numerical control level (89%) 2 WAA. At 4 WAA at the same location, Brake + Cotoran provided the highest numerical level of control at 76%. To determine the best recommendations for controlling PPO-resistant Palmer amaranth PRE, further research is needed under favorable conditions.