EFFICACY OF DICAMBA FORMULATION ON PPO-RESISTANT PALMER AMARANTH RELATED TO NOZZLE TYPE AND GPA W. Coffman University of Arkansas Fayetteville, AR L.T. Barber University of Arkansas – Extension Lonoke, AR J.K. Norsworthy University of Arkansas

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Abstract

The release of dicamba-resistant (Xtend) crops occurred almost simultaneously with Palmer amaranth's (Amaranthus palmeri) confirmed evolution of resistance to protoporphyrinogen oxidase (PPO)-inhibiting herbicides. Because PPOinhibiting herbicides have been staples in cotton weed control programs, the release of Xtend varieties can potentially give growers options to control broadleaf weeds like PPO-resistant Palmer amaranth postemergence (POST). Previous research has shown that tank-mixed combinations of the dicamba product Engenia and glyphosate more effectively control PPO-susceptible Palmer amaranth when applied at higher volumes and with nozzles that produce finer droplet sizes. To test the effect of two different dicamba formulations labeled for use in new dicamba-resistant cotton, field trials were conducted on-farm in Marion, Arkansas and at the Lon Mann Cotton Research Station near Marianna, Arkansas in 2017. Treatments were arranged in a three-factor factorial, with the first being dicamba formulation and rate (Engenia and XtendiMax at 0.5 or 1 lb ae/A). The second factor examined was nozzle type (AirMix or TTI) and the third was spray volume (7.5 or 15 gallons per acre (GPA)). Applications were made to non-crop plots infested with 2- to 4-inch tall PPO-resistant Palmer amaranth. Weed control ratings and counts to assess Palmer amaranth density relative to the non-treated control were collected 14 days after treatment. There were no interactions between factors; therefore, significant main effects were averaged over all other factors. Significant differences in control of PPO-resistant Palmer amaranth were observed between 0.5 lb ae/A (88%) and 1 lb ae/A (93%) rates of XtendiMax. Relative densities of Palmer amaranth corresponded with control levels by chemical and rate. Treatments of 0.5 lb ae/A of XtendiMax had a mean Palmer amaranth density of 13% relative to the non-treated control, compared to treatments of 1 lb ae/A, which had a mean Palmer amaranth density of 7% relative to the non-treated control. When applications were made with AirMix nozzles, which produce finer droplets, control levels were significantly greater (91%) than when coarser droplets were produced by TTI nozzles (88%). A spray volume of 15 GPA provided 92% control of PPO-resistant Palmer amaranth, which was significantly greater than the 87% control provided by a spray volume of 7.5 GPA. If physical drift of dicamba could be minimized, AirMix nozzles and spray volumes of 15 GPA would potentially offer greater control of PPO-resistant Palmer amaranth.