Palmer Amaranth and Barnyardgrass Control as Influenced by Weed Size, Glufosinate Rate, Volume, and Spray Tip

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RESEARCH PROBLEM

Palmer amaranth (Amaranthus palmeri) is known to be glyphosate-resistant and one of the most common and troublesome weeds in Arkansas cotton production. Glufosinate is known to provide good control of 1-4 inch Palmer amaranth, but control of larger weeds is erratic. The lack of control provided by glufosinate on large weeds may be caused by coverage issues. The objective of this study was to evaluate the effects of weed size, glufosinate rate, carrier volume, and spray tip on Palmer amaranth and barnyardgrass control.

BACKGROUND INFORMATION

Liberty Link® cotton was introduced in 2004 and grown on 1.9% of total cotton acreage. In 2010, 39% of total U.S. cotton acreage was established in Liberty Link® cotton. Liberty Link® technology is the preferred technology for controlling glyphosate-resistant Palmer amaranth in cotton. More information was needed on control of Palmer amaranth and barnyardgrass with glufosinate as influenced by weed size, glufosinate rate, carrier volume, and spray tip.

RESEARCH DESCRIPTION

A trial was established at in 2010 at Rohwer, Ark. in a Hebert silt loam soil. The trial was arranged in a randomized complete block design with a factorial treatment arrangement of three factors (glufosinate rate, volume, and spray tip) and four replications. Glufosinate was applied at two rates 19 and 29 oz/acre and four volumes 6, 8, 10, and 12 gal/acre (GPA). Tips used were Green Leaf Air Mix, Green Leaf AI XR, Tee Jet XR Flat Fan, and Tee Jet AI XR. Palmer amaranth and barnyardgrass control was recorded on a 0-100 scale with 0 being no control and 100 being complete control. Weed sizes evaluated were 12 inch and 18 inch Palmer amaranth and 12 inch barnyardgrass.

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RESULTS AND DISCUSSION

Twenty eight days after application Green Leaf Air Mix provided 66% control of 18 inch Palmer amaranth which was statistically lower than all other tips. Tee Jet AI XR provided lower control (96% and 87%) of 12 inch Palmer and barnyardgrass respectively (Fig. 1). Lower control was noted with 19 and 29 oz/A rates of glufosinate at 6 GPA (Figs. 2 and 3). At 6 GPA, Tee Jet AI XR provided less weed control than all other tips (Fig. 4). Weed control at 8, 10, and 12 GPA among tips and herbicide rates was equal. Treatments applied at 12 GPA provided the highest percent weed control (Fig. 4).

PRACTICAL APPLICATION

Liberty Link® technology can be a useful tool in controlling glyphosate–resistant Palmer amaranth. Glufosinate and glufosinate-resistant cotton have already made an impact on cotton production and in the control of glyphosate-resistant weeds in Arkansas. The information from this trial will be used to make recommendations throughout the state.

Fig. 1. Weed control differences among tips. *Indicates significant differences (P = 0.05).
Fig. 2. Weed control differences among volumes at 19 oz/acre. *Indicates significant differences ($P = 0.05$).

Fig. 3. Weed control differences among volumes at 29 oz/acre. *Indicates significant differences ($P = 0.05$).
Fig. 4. Weed control at 6 GPA. *Indicates significant differences ($P = 0.05$).

Fig. 5. Weed control at 12 GPA.