Palmer Amaranth Control with Dicamba and Glufosinate as Influenced by Weed Size and Herbicide Rate

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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. Dicamba can also provide control of small Palmer amaranth, but not much is known about the control of larger plants. The objective of this study was to provide data that would support the use of dicamba and glufosinate-resistant cotton to gain optimum control of glyphosate-resistant Palmer amaranth.

BACKGROUND INFORMATION

Glufosinate-resistant cotton was commercially released in 2004. Currently Monsanto is testing glufosinate/dicamba resistant cotton, which could provide opportunity for controlling glyphosate-resistant Palmer amaranth with over the top herbicide applications. More information was needed on control of Palmer amaranth with glufosinate and dicamba as affected by herbicide rate and weed size.

RESEARCH DESCRIPTION

A trial was established in Rohwer, Ark. on the Southeast Research and Extension Center in a Hebert silt loam soil in 2009 to evaluate Palmer amaranth control. The trial was arranged in a randomized complete block design with four replications. Parameters evaluated were visual ratings of Palmer amaranth control from 0-100 with 0 being no control and 100 being complete control. Evaluations were based on weed size at application. Two rates of each herbicide were applied at four timings. Dicamba was applied at 0.25 and 0.5 lb ae/acre and glufosinate

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was applied at 0.53 and 0.73 lb ai/acre. The application timings were 3-6, 6-9, 9-12, and 24-28 inch Palmer amaranth.

RESULTS

Forty days after treatment, dicamba applied at 0.25 and 0.5 lb ae/acre to 3-inch Palmer amaranth and dicamba at 0.5 lb ae/acre applied to 6-inch Palmer amaranth provided 99 to 100% control (Fig. 1). Dicamba at 0.25 lb ae/acre applied to 6-inch Palmer amaranth provided 75% control. Dicamba applied at 0.25 and 0.5 lb ae/acre to 9-inch Palmer provided less than 65% control and less than 40% control of 12-inch Palmer. Seed suppression was noted with both rates when applied to weeds less than 24 inches. Dicamba applied at 0.25 and 0.5 lb ae/acre to 24-28-inch Palmer amaranth provided less than 40% control and did not suppress seed production.

Glufosinate applied at 0.53 and 0.73 lb ai/acre provided 100% control of 3- and 6-inch Palmer amaranth (Fig. 2). Glufosinate applied at 0.53 and 0.73 lb ai/acre provided greater than 90% control of 9, 12, 24, and 28-inch Palmer amaranth. All glufosinate treatments suppressed Palmer amaranth seed production.

PRACTICAL APPLICATIONS

Dicamba and glufosinate can be used to control and suppress seed production of glyphosate-resistant Palmer amaranth. The stacked genetic technology of glufosinate/dicamba resistant-cotton may prove to be a valuable asset in controlling and preventing seed production of glyphosate-resistant Palmer amaranth in Arkansas. 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. Dicamba control of Palmer amaranth at 40 days after application.

Fig. 2. Glufosinate control of Palmer amaranth at 40 days after application.