Evaluation of Dual Magnum, Warrant, and Zidua Pre-Emergence in Arkansas Cotton

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RESEARCH PROBLEM

Cotton (Gossypium hirsutum L.) growers in Arkansas are still battling Glyphosate-resistant Palmer amaranth (Amaranthus palmeri) along with barnyardgrass (Echinochloa crus-galli). Multiple control options give growers the ability to increase control of these troublesome weeds. The objective was to evaluate Dual Magnum, Warrant, and Zidua preemergence in Arkansas cotton for crop response and weed control. Each herbicide was evaluated at the ½, ¾, 1, and 2× use rates.

BACKGROUND INFORMATION

Cotton growers have been battling glyphosate-resistant Palmer amaranth since 2007. Currently there is no single herbicide that will control glyphosate-resistant Palmer amaranth after it reaches 4-5 inches in height. Early-season residual control is imperative. More information was needed on Palmer control with Zidua and Warrant.

RESEARCH DESCRIPTION

One trial was established at the Rohwer Research Station, near Rohwer, Ark., in a Hebert silt loam soil in 2012 and 2013 to evaluate crop response, Palmer amaranth, and barnyardgrass control in cotton. In 2012, Fiber Max 1944 GTLL B2 was planted on 10 May and in 2013 Stoneville 4946GL B2 was planted on 28 May. The trial was arranged in a randomized complete block design with four replications. Parameters evaluated were visual ratings of crop injury, Palmer amaranth, and barnyardgrass control and cotton yield.

RESULTS AND DISCUSSION

In 2012, visual cotton injury was not caused by any treatment. In 2013 no occurrence of cotton chlorosis or necrosis was recorded, but stunting did occur.

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Zidua was the only herbicide that caused visual stunting. Zidua at 4 oz/acre or 2× rate caused the most injury at 16% plant height reduction (Fig. 1).

In 2012, twenty-five days after application (DAA) barnyardgrass control was above 76% with all herbicides and rates. Warrant provided less barnyardgrass control than Dual Magnum or Zidua at all rates. In 2013 20 DAT the same trend occurred with Warrant being the weaker product on barnyardgrass control (Figs. 2 and 3).

Palmer amaranth control 25 DAT in 2012 was above 81% with all herbicides and rates. In 2013, 20 DAT Warrant at 48 oz/acre, Dual Magnum at 16 oz/acre, and Zidua at 2 oz/acre provided 55%, 68%, and 98% control of Palmer amaranth respectively. Zidua provide the most consistent Palmer amaranth control across rates and across years (Fig. 4).

In 2012, all treatments provided equal yields to that of the weed-free check except for Zidua at 2 oz/acre which provided less (Fig 5). In 2013, all treatments provided cotton yield greater than the untreated check and equal to the weed-free check. In 2012, the highest yield numerically (3086 lb/acre) was provided by Warrant at 96 oz/acre. In 2013, the highest yield numerically (4134 lb/acre) was provided by Dual Magnum at 32 oz/acre (Figs. 4 and 6).

**PRACTICAL APPLICATION**

Early-season Palmer amaranth control is necessary in Arkansas cotton. The herbicides tested in this trial provide early–season control options, although some provided better control than others. The information from this trial will be used to make Palmer amaranth control recommendations throughout the state.
Fig. 1. Effect of herbicide treatment on cotton stunting 2013 at the Rohwer Research Station, near Rohwer, Ark. UTC - untreated check, DAA - days after application.

Fig. 2. Effect of herbicide treatment on Barnyardgrass control 2012 at the Rohwer Research Station, near Rohwer, Ark. UTC - untreated check, DAA - days after application.
Fig. 3. Effect of herbicide treatment on Barnyardgrass control 2013 1 X at the Rohwer Research Station, near Rohwer, Ark. UTC - untreated check, DAA - days after application.

Fig. 4. Effect of herbicide treatment on Palmer amaranth control 1 X at the Rohwer Research Station, near Rohwer, Ark. UTC - untreated check, DAA - days after application.
Fig. 5. Cotton yield in herbicide treatments 2012 at the Rohwer Research Station, near Rohwer, Ark. UTC - untreated check, LSD - least significant difference.

Fig. 6. Cotton yield in herbicide treatments 2013 at the Rohwer Research Station, near Rohwer, Ark. UTC - untreated check, LSD - least significant difference.