Comparison of Herbicides Acetochlor, Metolachlor, and Pyroxasulfone Applied Post-Emergence to Cotton

L. Collie1, T. Barber2, R. Doherty3, and J. Meier3

RESEARCH PROBLEM

Arkansas cotton (Gossypium hirsutum L.) growers are currently relying on residual herbicides to control glyphosate-resistant Palmer amaranth (Amaranthis palmeri L.). Current recommendations for resistant pigweed control involve overlapping residual herbicides to prevent pigweed emergence. In this trial, the objective was to evaluate weed control and compare crop injury with currently labeled and potential herbicides.

BACKGROUND INFORMATION

Though Dual Magnum (metolachlor) and Warrant (acetochlor) are both labeled for use in cotton there have been reports of crop injury when these products are tank mixed with Liberty (glufosinate). More information was needed on damage caused with the combination of these products.

RESEARCH DESCRIPTION

This trial was conducted at the Lon Mann Cotton Station, in Marianna, Ark., during the 2013 season. Applications were made in a Liberty Link system Stoneville cultivar 4946 GLB2. The trial was arranged in a randomized complete block design with four replications. Each block was 30ft by 4 rows. Dual Magnum, Warrant, and Zidua were applied post-emergence (Post) at $\frac{1}{2}\times$, $\frac{3}{4}\times$, $1\times$ and $2\times$ rates, and each rate was applied at the 1-2 and 4-6 leaf growth stage.

Crop injury, weed control, and cotton yield were evaluated 7, 14, 21, and 28 days after the applications. Palmer amaranth (Amaranthis palmeri L.), pitted morningglory (Ipomoea lacunose L.), barnyardgrass (Echinochloa crus-galli L.), and broadleaf signalgrass (Brachiaria platyphylla Nash) were over seeded at planting to provide a consistent weed population. Also, at planting, an application of Cotoran (fluometeron) was applied at 1 lb ai/acre across all treatments. Liberty was added to each application at 29 oz/acre.

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1Program technician, Department of Crop, Soil, and Environmental Sciences, Lonoke.
2Assistant professor, Department of Crop, Soil, and Environmental Sciences. Little Rock.
3Program technician and program technician, respectively, Southeast Research and Extension Center, Monticello.
RESULTS AND DISCUSSION

Crop injury was present with higher rates of all residual herbicides at both 1-2 leaf and 4-6 leaf applications. The Warrant tank mixtures of 2.3 lb ai/acre provided 18% injury at 14 days after the 1-2 leaf application and 26% at 7 days after the 4-6 leaf application (Fig. 1). Cotton recovered at 21 days with either application. Dual Magnum at 1.9 lb ai/acre produced 25% damage at 14 days after the 1-2 leaf application, by 21 days there was no visual damage. There was 13% injury present with 2 pt/acre Dual Magnum 7 days after the 4-6 leaf applications (Fig. 2), but by 14 days the plants recovered and there was no visible injury present. Zidua produced significant damage at high rates at both 1-2 leaf and 4-6 leaf applications. At 14 days after the 4-6 leaf treatment, there was 44% damage noted; but only the highest rate (0.21 lb ai/acre) of Zidua produced significant damage at 21 days after application (Fig. 3). Though significant injury was observed, there was no substantial yield reduction. Also, there were no notable differences in weed efficacy.

PRACTICAL APPLICATION

Post-emergence Palmer amaranth control is necessary in Arkansas cotton. The residual herbicides tested in this trial provide post-emergence control options. Based on information received from this trial we believe that Zidua (pyroxasulfone) will have a better fit post directed or as a layby application. The information from this trial will be used to make recommendations throughout the state.

Fig. 1. Injury from Warrant applied on 1-2 and 4-6 leaf cotton. LSD - least significant difference.
Fig. 2. Injury from Dual applied on 1-2 and 4-6 leaf cotton. LSD - least significant difference.

Fig. 3. Injury from Zidua applied on 1-2 and 4-6 leaf cotton. LSD - least significant difference.