Layby Timing for Ideal Late-Season Weed Control in Arkansas Cotton

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RESEARCH PROBLEM

Glyphosate-resistant Palmer amaranth (Amaranthus palmeri) is present in all cotton growing counties in Arkansas. This pest has driven weed control programs to herbicide systems that must contain overlapping residual herbicides. The application timing of the residual herbicides in the system may influence season-long control of this troublesome pest. Most of the cotton grown in Arkansas is furrow irrigated. Late season herbicide applications require driving over the plastic irrigation pipe often puncturing the pipe, thus, causing expensive repairs. Earlier layby applications would avoid or reduce the number of trips across the irrigation pipe and reduce repair costs. The objective was to determine the layby application timing and herbicide system that would provide optimum late-season weed control in Arkansas cotton.

BACKGROUND INFORMATION

Cotton weed control has changed drastically in the last five years, because of the presence of glyphosate-resistant Palmer amaranth. Currently there is no herbicide that will control glyphosate-resistant Palmer amaranth after it reaches 4 inches in height. More information was needed on the timing and herbicides used for control of Palmer amaranth with overlapping-residual herbicide systems.

RESEARCH DESCRIPTION

One trial was established in Rohwer, Arkansas, on the Southeast Research and Extension Center in a Hebert silt loam soil in 2011 to evaluate Palmer amaranth control in cotton. The trial was arranged in a randomized complete block design with four replications. Eight herbicide systems were evaluated at one or more of the three layby timings (8, 10, or 12 lf cotton). Parameters evaluated were visual control ratings of Palmer amaranth and cotton yield. Weed control was recorded on a 0-100 scale with 0 being no control and 100 being complete control.

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RESULTS AND DISCUSSION

At 95 days after the 8-leaf application, Cotoran at 1 lb ai/acre PRE followed by (fb) Roundup PowerMax at 0.77 lb ae/acre plus Dual Magnum at 0.95 lb ai/acre applied at 4-leaf cotton fb MSMA at 2 lb ai/acre plus Valor at 0.064 lb ai/acre applied at 8-leaf cotton provided 100% control of Palmer amaranth (Fig. 1). At 80 days after the 12-leaf application, Cotoran at 1 lb ai/acre PRE fb Roundup PowerMax at 0.77 lb ae/acre plus Dual Magnum at 0.95 lb ai/acre applied at 2-leaf cotton fb Roundup PowerMax at 0.77 lb ae/acre plus Dual Magnum at 0.95 lb ai/acre applied at 6-leaf cotton fb MSMA at 2 lb ai/acre plus Valor at 0.064 lb ai/acre applied at 12-leaf cotton provided 100% control of Palmer amaranth. All other herbicide systems applied at 10- and 12-leaf layby timings provided 93-100% control of Palmer amaranth (Fig. 2). Cotoran at 1 lb ai/acre PRE fb Roundup PowerMax at 0.77 lb ae/acre plus Dual Magnum at 0.95 lb ai/acre applied at 2-leaf cotton fb Roundup PowerMax at 0.77 lb ae/acre plus Dual Magnum at 0.95 lb ai/acre applied at 6-leaf cotton fb MSMA at 2 lb ai/acre plus Valor at 0.096 lb ai/acre applied at 8-leaf cotton provided the highest cotton yield numerically with 3320 lb/acre of seed cotton (Fig. 3). All other herbicide systems applied at 10- and 12-leaf layby timings provided statistically equal cotton yields. Herbicide systems that contained a 12-leaf layby did provide numerically higher weed control than the same system with the layby applied at 8- or 10-leaf cotton.

PRACTICAL APPLICATIONS

Residual-herbicides are a valuable tool in zero-tolerance weed control systems. These herbicide systems will aid in providing a sustainable cotton production system. When used in an aggressive Palmer management program, layby applications as early as the 12-leaf stage can provide excellent weed control and reduce the trips across irrigation pipe. The information from this trial will be used to make Palmer amaranth control recommendations throughout the state.
Fig. 1. 2011 Palmer Control, 95 DA 8-leaf stage. LSD(0.05) = 22.  
* = significantly different at $P = (0.05)$.

Fig. 2. 2011 Palmer control 90 DA for 10-leaf and 80 DA for 12-leaf cotton.  
LSD(0.05) = 22.
Fig. 3. Cotton seedcotton yield 2011. LSD(0.05) = 734.