BOLLGARD II PERFORMANCE IN ARKANSAS

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Abstract

Bollgard II, Monsanto line DPX-9C985-EB, was compared to Bollgard and conventional cotton in two field trials to determine efficacy against the Heliothine complex in cotton. In the Jefferson County trial where insect pressure was greatest, results indicated that there was significantly less damaged squares, less live larvae, and increased yield in Bollgard and Bollgard II plots compared to conventional cotton whether or not it was sprayed. The same trend was shown in the Lincoln County trial although significant differences were not shown.

Introduction

Bollgard cotton (*Gossypium hirsutum* (L.) containing the CryIAc endotoxin of *Bacillus thuringiensis* Berliner, became commercially available to cotton producers in 1996. Bollgard varieties since that time have provided growers excellent control of the tobacco budworm, *Heliothis virescens* F., for growers in Arkansas. Control of bollworm, *Helicoverpa zea* (Boddie), and other lepidopterous pests has been less dependable and foliar insecticide applications are sometimes needed for control.

Bollgard II was developed to contain an additional toxin, CryX , to enhance the control of lepidopterous pests in cotton and hinder the development of resistance. Previous studies have shown Bollgard II to have increased efficacy for bollworm and soybean looper (Allen et. al 2000; Stewart et. al 2000; Ridge et. al 2000).

The purpose of this study was to compare the efficacy of Bollgard II to Bollgard and conventional cotton for control of lepidopterous pests. Observations were also made to compare agronomic characteristics of these varieties.

Materials and Methods

Studies were conducted on the Fratesi Farm in Jefferson County, AR and on the McGraw Farm in Lincoln County, AR. Both studies were planted on May 25, 2000 and the same plan was used at both locations. The test consisted of a randomized complete split block design with four replications. The three main treatments were the varieties: DPL 50, DPL 50 BG, and DPX-9C985-EB. Each plot was 8 rows X 50 feet at Jefferson County and 4 rows X 50 ft at Lincoln County. The subtreatment consisted of unsprayed or sprayed with a foliar larvicide. Larvicides used in the study were cyfluthrin (Baythroid 2E) and spinosad (Tracer 4E). Applications were based on weekly samples taken from mid-June to early-August. Application dates at the Jefferson County location using Baythroid were July 6, 20, 27, and Aug 3, and , one application of Tracer on Aug 14. Application dates at Lincoln County were July 3 and 26 and Aug 4 using Baythroid and Aug 14 using Tracer. Scouting data taking included damaged fruit counts and larval counts. Plots were machine picked Oct 13 (Jefferson County) or October 20 (Lincoln County). All data were analyzed using Analysis of Variance and LSD (P=.05)

Results and Discussion

Heliothine pressure was considerably greater at the Jefferson County location compared to Lincoln County and probably gives a better indication of the efficacy of Bollgard II compared to Bollgard and conventional cotton.

At the Jefferson County location, seasonal averages of the percent damaged squares and larval counts (Table 1) showed significantly higher damage and larval counts in both conventional sprayed and unsprayed compared to Bollgard II. However, no significant difference was observed between Bollgard and Bollgard II regardless of whether or not they were sprayed. Also, Bollgard and Bollgard II had significantly higher yields than conventional sprayed which yielded significantly higher than conventional unsprayed (Table 2). Results were not as conclusive at the Lincoln County site although trends were somewhat similar to that seen in Jefferson County. These results indicate that both Bollgard and Bollgard II were effective in controlling Heliothine larvae. However, we still have much to learn about the value of Bollgard in cotton production particularly with Bollgard II where it will fit in the production scheme for Arkansas growers.

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Table 1. Seasonal average of percent damaged squares and live larval counts in conventional, Bollgard, and Bollgard II cotton. 2000.

	% Dam. Sq[2]		Larval Counts[2]	
Variety/Treatment[1]	Jefferson	Lincoln	Jefferson	Lincoln
DPL 50 U	11.9 a	4.0 a	29.5 a	4.0 a
DPL 50 S	5.4 b	1.0 b	16.8 b	1.0 b
DPL 50 BG U	1.8 c	1.0 b	8.8 bc	1.0 b
DPL 50 BG S	1.6 c	1.0 b	5.5 c	1.0 b
DPX-9C985-EB U	1.2 c	0.0 b	2.5 c	1.0 b
DPX-9C985-EB S	1.5 c	0.0 b	0.8 c	0.0 b

[1]U=unsprayed or no larvicide; S=sprayed as needed indicated by scouting.
[2]Means within a column followed by the same letter are not significantly different (LSD=0.05).

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Table 2. Lint Yield in conventional, Bollgard, and Bollgard II cotton.

	Lint Yield (lbs/A)	
Variety/Treatment[1]	**Jefferson**	**Lincoln**
DPL 50 U	413 c	799 ab
DPL 50 S	774 b	763 b
DPL 50 BG U	1091 a	820 ab
DPL 50 BG S	1119 a	826 ab
DPX-9C985-EB U	1058 a	823 ab
DPX-9C985-EB S	1037 a	911 a

[1]U=unsprayed or no larvicide; S=sprayed as needed indicated by scouting.
[2]Means within a column followed by the same letter are not significantly different (LSD=0.05).