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BOLLGARD® II PERFORMANCE IN THE SOUTHEAST – 2003

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Abstract

Large scale field trials were conducted on southeastern cotton farms in 2003 to compare the efficacy of Bollgard® II for lepidopteran control. Trials were set up as field length, non-replicated strips using three treatments, a Bollgard II variety, a Bollgard variety, and a non-Bollgard variety. Each treatment was managed independently for insect control and sprayed based on local thresholds. Data was collected from trial cooperators from forty locations across the Southeast. Results from these trials, which included yield, economic inputs, boll retention, and boll damage indicated that Bollgard II demonstrates strong protection against lepidopteran insects under commercial production conditions.

Introduction

Bollgard® II cotton contains two *B.t.* genes for lepidopteran control, Cry1Ac and Cry2Ab. This technology has been evaluated in replicated small plot regulated trials for several years across the cotton belt. Results from these tests show Bollgard II with improved control of lepidopteran insects and greater potential for increased yields (Catchot et. al. 2003, Sherrick et. al. 2003). In December of 2002, Bollgard II received federal registration allowing commercial launch and, subsequently, large scale field trials with southeastern cotton farmers. This report summarizes the results from field trials conducted in southeastern U.S. during 2003. The objective of this study was threefold: (1) to compare the efficacy of Bollgard II to Bollgard and non-Bollgard cotton for lepidopteran insect control under commercial production conditions, (2) measure the agronomic benefits, associated boll retention patterns, maturity and yields, and (3) make economic comparisons based on inputs costs and returns.

Materials and Methods

Trials were set up as field length, non-replicated strips using three treatments, a Bollgard II variety, a Bollgard variety, and a non-Bollgard variety. For this data set, only sister line comparisons, or lines with similar genetic backgrounds, were used. In most cases, plot width corresponded to the cooperator's equipment for a sprayer width in order that each treatment could be managed independently for insect control. All plots were managed uniformly across treatments for agronomic practices such as irrigation, fertility, weed control, etc. Each variety was scouted and treated for worms based on local thresholds. Data was collected from trial cooperators from forty locations across the Southeast. Data was received from university, private consultant, and Monsanto trials.

Results and Discussion

Results from an end of season boll damage survey showed that Bollgard II sustained significantly less worm damage than Bollgard and non-Bollgard cotton (Table 1). The boll damage on Bollgard II was 0.4%, Bollgard - 1.8%, and non-Bollgard – 5.5%. The trials were sprayed based on local thresholds and only in two of the forty locations did the Bollgard II require supplemental treatment for worms. Bollgard treatments averaged only 0.8 sprays for worm control and the non-Bollgard treatments averaged 2.3 sprays across the forty trials.

The economic analysis for this data set included technology fees based on seed drop rate, cost of worm control insecticides as well as associated application fee, yields, and economic return based on $0.65/pound of lint. The summary of this data indicate that the average input for worm sprays for Bollgard II was $ 0.98 per acre, for Bollgard - $ 6.31 per acre, and for non-Bollgard - $ 21.32 per acre. The Bollgard II treatments averaged 857 lbs of lint cotton per acre with a net return of $526.25 per acre. The Bollgard treatments averaged 850 lbs. of lint cotton per acre with a net return of $ 520.78. The non-Bollgard treatments averaged 793 lbs. of lint cotton per acre with a net return of $ 489.10.

To measure boll retention patterns, end of of season plant mapping was conducted in eight of these trials. A more detailed summary has been reported (Montgomery et.al. 2004) but a smaller subset of data taken from these eight trials in North Carolina demonstrate a similar trend of increased first position boll retention with Bollgard II.

The results from these trials indicate that Bollgard II cotton continues to demonstrate strong protection against lepidopteran insects under commercial production conditions. While this data set demonstrates the extremely high level of lepidopterean control offered by Bollgard II technology, varietal performance, particularly yield, will be significant in overall grower economics with Bollgard II.

Literature Cited

Catchot, A.L., and Mullins, Walt. 2003. 2002 Bollgard Performance in the Mid-South.. pp.1031-1033. Proceedings of the 2003 Beltwide Cotton Conference. National Cotton Council, Memphis, TN.

Montgomery, Robert, Brown, R. Michael, and Mullins, Walt. 2004. Boll Retention Patterns in Bollgard II Cotton. Proceedings of the 2004 Beltwide Cotton Conference. National Cotton Council, Memphis, TN.

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Table 1. Performance data of Bollgard II, Bollgard, and non-Bollgard cotton from southeastern trials in 2003.

Treatment	% Worm Damaged Bolls	Average number of worm sprays	Cost of worm control sprays ($/acre)	% First Positon Boll Retention	Yield (lbs. lint per acre)	Net Return ($/acre)
Bollgard II	0.4	0.1	0.98	58.2	857	526.25
Bollgard	1.8	0.8	6.31	57.6	850	520.78
Non-Bollgard	5.5	2.3	21.32	54.9	793	489.10

Data includes forty locations across southeastern states of AL, GA, NC, SC, VA for all factors excluding % First Position Boll Retention which is from eight locations in NC.