

ECONOMICS OF BOLLGARD VERSUS NON-BOLLGARD COTTON IN 1998

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Abstract

The economics of Bollgard cotton was compared with non-Bollgard cotton at 109 sites across the Southern and Southeastern cotton growing states in 1998. In most cases the data was collected from actual grower experiences where a Bollgard variety was compared to a grower-selected, non-Bollgard variety with a similar maturity level and agronomic management requirements. Bollgard varieties included representatives from Delta and Pineland, Paymaster and Stoneville seed companies. Although results varied by area, all areas averaged higher net returns (calculated by Yield Value - Total Insect Control Costs) with Bollgard varieties compared to non-Bollgard varieties. For the 109 sites, the average Bollgard advantage was approximately \$40 per acre, resulting from both insect control savings returning an average of \$16 per acre, and higher yields returning an average of \$24 per acre.

Introduction

Since its introduction in 1996, Bollgard economic evaluations have been conducted by a number of researchers with most reporting their results in the Beltwide Cotton Conference Proceedings (Gibson et al. 1997, ReJesus et al. 1997, Stark 1997, Bryant et al. 1997, Roof et al. 1997, Carlson et al. 1998, Wier et al. 1998, Edens et al. 1998, Cooke and Freeland 1998, and Bryant et al. 1998). These reports with few exceptions demonstrate the Bollgard advantage in either insect control costs or yield advantages, or both. As would be expected, the Bollgard advantage is generally greater when insect pressure from bollworm/budworms is high, but many studies have also demonstrated Bollgard advantages even under lower insect pressure, presumably due to subthreshold protection or higher yield potential due to agronomic improvements in the Bollgard variety. The current survey study was conducted to provide information regarding Bollgard economic comparisons under 1998 growing conditions and insect pressures.

Methods and Materials

Growers, consultants and university/extension researchers were contracted by Monsanto to provide a full accounting of all costs, particularly insect control costs, incurred with a Bollgard and a nearby non-Bollgard variety. Grower fields selected for comparison were required to be in close

proximity (most were side by side), planted at or near the same date and on the same soil type, and managed the same agronomically. Individual comparisons were made with Bollgard varieties and non-Bollgard varieties within the same maturity category. Yields were recorded and yield value was calculated using \$0.65 per lb. value for lint. The Bollgard Tech Fee was recorded as the actual cost per acre in most cases (as opposed to the full \$32 per acre) when actual seeding rates were below the "standard" seed drop rates used to calculate per bag Tech Fees. Results from this study, as well as a grower survey conducted by Monsanto, indicated that growers paid an average of \$26 to \$27 per acre for Bollgard in 1998 based on their actual seeding rates.

Results

The results are presented regionally in Tables 1-4 and an overall summary presented in Table 5. The data was divided regionally to demonstrate the comparisons under four different cotton insect situations: 1 = No boll weevil pressure, typically low bollworm/budworm pressure (VA/NC/SC); 2 = No boll weevil pressure, typically moderate to high bollworm/budworm pressure (GA/AL); 3 = Boll weevil pressure, typically low bollworm/budworm pressure (North Delta - includes TN and N. AR); and 4 = Boll weevil pressure, typically moderate to high bollworm/budworm pressure (South Delta - includes MS, LA and S. AR).

Results demonstrate that in all regions tested Bollgard averaged less total insecticide used, fewer total insecticides sprays applied, less total cost for all insect control (including Tech Fee and application costs) and higher yields. In three of the four areas the average spent on a single Heliathine spray was significantly less in Bollgard than in conventional cotton, generally due to conventional cotton's requirement for higher rates or more expensive treatments to control pyrethroid resistant tobacco budworms. In general, bollworm and budworm pressure for the northern cotton growing areas (VA/NC/SC and the North Delta) was higher than what is considered typical, and certainly contributed to the insect control cost advantage observed with Bollgard in these areas. However the larger contribution to the overall return advantage in the northern areas was due to yield (62 and 85 lb. more lint, respectively). In the two southern areas (GA/AL and South Delta) the yield advantages with Bollgard averaged less (38 and 22 lb. more lint, respectively) than in the northern regions, but the total insect control cost advantage averaged more. Combining yield advantages and total insect control cost savings netted a similar total average Bollgard advantage of approximately \$40 per acre for all areas, with the exception of the North Delta (average Bollgard advantage = \$60 per acre) where Bollgard yields were significantly higher and insect control costs for non-Bollgard cotton was significantly more than in recent years. It should be noted that the averages computed for the total

area in summary (Table 5) are weighted toward the South Delta area since the majority of the comparisons (66) came from this area.

From an environmental and labor standpoint, the use of Bollgard averaged 2-3 less total insecticide applications for all pests, depending on the area. No attempt was made to assess any value to environmental benefits or reduced labor requirements in these comparisons, but these advantages should be considered as part of an overall decision by growers when selecting cotton varieties and planning insect control strategies.

Discussion

Results from these and past economic studies demonstrate the economic value of Bollgard under a variety of environmental and insect pressure conditions. Other values, such as environmental benefits, less labor required, insurance against pyrethroid resistant budworms, improved performance of insecticides, and overall less worry are more difficult to quantify with Bollgard, but these advantages must also be considered by growers as they choose their production strategies.

Although a number of surveys such as this one demonstrate Bollgard economic advantages when averaged across areas and insect conditions, it is important to note that not all comparison sites result in an economic advantage to the Bollgard variety. It is obvious from the individual comparisons in this study, as well as others cited in the introduction, that varietal selection, whether it is a Bollgard variety or a conventional variety, is very important. Growers must consider both the intrinsic value of the Bollgard insect control trait and the yield potential and agronomic "fit" of the Bollgard variety for their area, in order maximize their potential to profit from Bollgard. Because all currently available transgenic varieties are products of backcrosses of elite, conventional varieties to transformed varieties, it can not be assumed that the new transgenic variety will perform agronomically the same as their elite parental lines. In this light, it is important for growers to research and evaluate all new varieties, including Bollgard or other transgenic varieties, before committing a large percentage of their farm to those varieties, regardless of parental backgrounds.

References

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Table 1. Summary of 1998 Economic Comparisons conducted in North Carolina, South Carolina and Virginia (20 Comparisons).

Category (Average)	Conventional Variety	Bollgard Variety
No. BW/TBW Sprays*	3.7	1.2
Cost for Single BW/TBW Spray	\$6.82	\$7.28
Total BW/TBW Insecticide Cost	\$25.30	\$8.40
Total No. of ALL Insecticide Applic.	3.7	1.2
Total Insecticide Costs	\$25.30	\$8.40
Total Insect Control Costs**	\$36.40	\$35.21

Yield (Lb. Lint)	816	878 (+62)
Dollar Return	\$493.91	\$535.62

Bollgard Advantage \$41.71

*BW/TBW = Cotton Bollworm / Tobacco Budworm.

**Includes Insecticide Costs, Application Costs & Tech Fee for Bollgard

Table 2. Summary of 1998 Economic Comparisons Conducted in Georgia and Alabama (12 Comparisons).

Category (Averages)	Conventional Variety	Bollgard Variety
No. BW/TBW Sprays*	4.5	0.6
Cost for Single BW/TBW Spray	\$8.46	\$8.09
Total BW/TBW Spray Cost	\$40.13	\$5.57
Total No. of ALL Insecticide Applic.	5.8	2.8
Total Insecticide Costs	\$58.02	\$25.86
Total Insect Control Costs**	\$74.04	\$60.05

Yield (Lb. Lint)	898	936 (+38)
Dollar Return	\$509.66	\$548.40

Bollgard Advantage \$38.74

*BW/TBW = Cotton Bollworm / Tobacco Budworm.

**Includes Insecticide Costs, Application Costs & Tech Fee for Bollgard

Table 3. Summary of 1998 Economic Comparisons Conducted in Tennessee and North Arkansas (11 Comparisons).

Category (Average)	Conventional Variety	Bollgard Variety
No. BW/TBW Sprays*	3.6	1.0
Cost for Single BW/TBW Spray	\$8.95	\$6.80
Total BW/TBW Insecticide Cost	\$32.15	\$6.71
Total No. of ALL Insecticide Applic.	8.3	6.5
Total Insecticide Costs	\$66.16	\$39.77
Total Insect Control Costs**	\$95.13	\$89.56

Yield (Lb. Lint)	786	871 (+85)
Dollar Return	\$415.66	\$476.36

Bollgard Advantage \$60.70

*BW/TBW = Cotton Bollworm / Tobacco Budworm.

**Includes Insecticide Costs, Application Costs & Tech Fee for Bollgard

Table 4. Summary of 1998 Economic Comparisons Conducted in Mississippi, Louisiana and South Arkansas (66 Comparisons).

Category (Average)	Conventional Variety	Bollgard Variety
No. BW/TBW Sprays*	6.2	1.7
Cost for Single BW/TBW Spray	\$10.83	\$6.97
Total BW/TBW Insecticide Cost	\$70.39	\$11.66
Total No. of ALL Insecticide Applic.	10.1	7.9
Total Insecticide Costs	\$107.08	\$59.29
Total Insect Control Costs**	\$125.45	\$103.79

Yield (Lb. Lint)	834	856 (+22)
Dollar Return	\$416.53	\$452.56

Bollgard Advantage \$36.03

*BW/TBW = Cotton Bollworm / Tobacco Budworm.

**Includes Insecticide Costs, Application Costs & Tech Fee for Bollgard

Table 5. Summary of All 1998 Mid-South and Southeastern Economic Comparisons (Areas Combined - 109 Comparisons).

Category (Average)	Conventional Variety	Bollgard Variety
No. BW/TBW Sprays*	5.3	1.4
Cost for Single BW/TBW Spray	\$9.64	\$7.13
Total BW/TBW Insecticide Cost	\$54.93	\$9.96
Total No. of ALL Insecticide Applic.	8.3	6.0
Total Insecticide Costs	\$82.54	\$44.30
Total Insect Control Costs**	\$100.39	\$84.96

Yield (Lb. Lint)	833	870 (+37)
Dollar Return	\$440.89	\$480.75

Bollgard Advantage \$39.86

*BW/TBW = Cotton Bollworm / Tobacco Budworm.

**Includes Insecticide Costs, Application Costs and Tech Fee for Bollgard