

**ECONOMIC EVALUATION OF BOLLGARD
COTTON IN ARKANSAS**
K. J. Bryant, W. C. Robertson and G. M. Lorenz III
Cooperative Extension Service,
University of Arkansas
Little Rock, AR

Abstract

In 1996, 1997 and 1998, fields of Bollgard cotton were grown adjacent to fields of non-Bt cotton in an effort to compare the profits per acre of Bollgard cotton varieties to those of non-Bt varieties. Partial budgeting was used to calculate the net change in profit. Changes in profit ranged from a \$175 per acre decrease to a \$251 per acre increase. The change in profit was positive for 13 out of 20 observations and averaged \$39 per acre.

Introduction

Cotton varieties containing the Bollgard gene have been planted on a significant number of Arkansas' cotton acreage since 1996. The success of these varieties has been mixed. The purpose of this study was to compare the profits per acre of Bollgard cotton varieties to those of non-Bt varieties.

Extension specialists, county agents and farmers in Lafayette, Crittenden, Jefferson and Desha counties worked together to compare the net returns of Bollgard cotton to non-Bt varieties in 1996, 1997 and 1998. The farm cooperators were chosen based on their willingness to cooperate, good record keeping habits, and an intent to grow some Bollgard cotton. The cooperators kept field records on Bt and non-Bt fields throughout the season. After harvest, yields on each field and any differences in input use between the fields were reported to the authors.

Methodology

Very similar fields on the same farm were used to make comparisons. One field in each comparison was planted in Bollgard cotton while the other was planted in a non-Bt variety. Each field was farmed with the goal of maximizing profits. Because of the similarities of the two fields in each comparison, the differences between the Bollgard and non-Bt fields were in the areas of technology fee, insecticide, growth regulator, application costs, second harvest costs and yields.

Partial budgeting was used to calculate the net change in profit associated with growing a Bollgard variety instead of a non-Bt variety. Individual farmer costs were used if provided. Otherwise, input prices were taken from the

Cooperative Extension Service cotton budgets. The season average prices for cotton were used to calculate gross revenue. These prices were \$0.71/lb in 1996, \$0.66/lb in 1997 and \$0.68/lb in 1998 (Arkansas Agricultural Statistics Service).

Results

The net change in returns, costs and profits per acre for each of the observations in 1996 are listed in Table 1. The Bollgard varieties fared very well against the non-Bt varieties. The change in net income associated with the Bollgard variety was positive in five of the six observations and averaged \$86.74/acre. Most of this benefit came from higher yields on the Bollgard varieties which increased gross returns by \$91.12/acre on average. Costs were actually higher on the Bollgard varieties in five of the six observations. On average, the increase in costs associated with growing the Bollgard variety was \$4.38/acre.

The net change in returns, costs and profits per acre for 1997 are listed in Table 2. This time the Bollgard cotton fields had less profit per acre than the non-Bt fields in five of the seven observations. Across all seven observations, the Bollgard varieties yielded 23.58 lbs/acre less than the non-Bt varieties, and averaged \$26.95 per acre less profit. Again the cost of producing the Bollgard varieties was greater than that of the non-Bt varieties, this time by an average of \$11.39/acre.

In 1998, the Bollgard varieties again out performed the non-Bt varieties (Table 3). The change in net income per acre associated with the Bollgard varieties was positive in five of the seven observations and averaged \$64.52/acre. Much of the benefit again came from higher yields on the Bollgard varieties than on the non-Bt varieties. This year, however, cost savings occurred on five of the seven observations making the Bollgard varieties \$10.22/acre less expensive, on average, than the non-Bt varieties.

Across all three years, the Bollgard varieties resulted in a higher profit per acre than did the non-Bt varieties. The change in profit was positive for 13 out of 20 observations. Gross returns averaged \$40.90/acre higher and costs averaged \$1.72/acre higher for the Bollgard varieties. This results in a \$39.17/acre increase in profits associated with growing the Bollgard varieties.

Discussion

Bollgard cotton performed satisfactorily in Arkansas in 1996 and 1998. In 1997, its performance was marginal. The decision of planting a Bollgard variety instead of a non-Bt variety must consider expected yield. As long as the Bollgard varieties yield better than the non-Bt varieties, profits can be increased.

It is reasonable to expect Bt varieties to provide greater profit than non-Bt varieties in some years and lesser profit than non-Bt varieties in other years. In 1996 the Bollgard varieties averaged an \$87/acre increase in net income. In 1997 they averaged a \$27/acre decrease in net income. And in 1998, they averaged a \$65/acre increase in net income.

These are not scientific results but instead are strictly observations on cases in Arkansas over three years. Fields with similar characteristics and in very close proximity to each other were selected before the season started in order to make fair comparisons.

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Table 1. Net change in returns, costs, and profits per acre associated with planting Bollgard cotton instead of the non-Bt variety: 1996.*

County	Change in Gross Returns**	Change in Variable Cost	Change in Profit
Jefferson	\$207.32	\$3.03	\$204.29
Jefferson	\$189.57	\$10.33	\$179.24
Jefferson	\$76.86	\$ 5.71	\$70.97
Lafayette	\$58.22	(\$10.16)	\$68.38
Crittenden	\$24.14	\$14.62	\$9.52
Jefferson	(\$ 9.23)	\$ 2.73	(\$11.96)
Average	\$91.12	\$4.38	\$86.74

* Parentheses indicate a decrease in returns, cost or profit.

** A market price of \$0.71/lb was used to value yield.

Table 2. Net change in returns, costs, and profits per acre associated with planting Bollgard cotton instead of the non-Bt variety: 1997.*

County	Change in Gross Returns**	Change in Variable Cost	Change in Profit
Desha	\$116.16	(\$18.21)	\$134.37
Lafayette	\$68.64	\$13.63	\$55.01
Desha	\$18.48	(\$17.31)	\$35.79
Jefferson	\$10.56	\$32.76	(\$22.20)
Desha	(\$58.08)	(\$8.04)	(\$50.04)
Jefferson	(\$153.78)	\$12.87	(\$166.65)
Jefferson	(\$110.88)	\$64.02	(\$174.90)
Average	(\$15.56)	\$11.39	(\$26.95)

* Parentheses indicate a decrease in returns, cost or profit.

** A market price of \$0.66/lb was used to value yield.

Table 3. Net change in returns, costs, and profit per acre associated with planting Bollgard cotton instead of the non-Bt variety: 1998.*

County	Change in Gross Returns**	Change in Variable Cost	Change in Profit
Desha	\$189.72	(\$61.24)	\$250.96
Desha	\$118.32	(\$2.99)	\$121.31
Desha	\$79.56	(\$2.99)	\$82.55
Lafayette	\$91.80	\$24.97	\$66.83
Desha	\$34.68	(\$6.86)	\$41.54
Jefferson	(\$4.76)	\$0.34	(\$5.10)
Crittenden	(\$129.20)	(\$22.75)	(\$106.45)
Average	\$54.30	(\$10.22)	\$64.52

* Parentheses indicate a decrease in returns, cost or profit.

** A market price of \$0.66/lb was used to value yield.