

# ECONOMIC EVALUATION OF BOLLGARD COTTON IN ARKANSAS: 1997

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## Abstract

In 1997, eight observations in four Arkansas counties provided data for the economic evaluation of Bollgard cotton varieties. The change in net income per acre of the Bt fields versus the non-Bt fields was determined by partial budgeting. Changes in net income ranged from a \$327.35 per acre decrease to a \$127.33 per acre increase. Five of the eight observations incurred smaller net incomes on the Bollgard fields. The eight observations averaged a \$62.89 per acre decrease in net income attributable to the Bollgard varieties.

## Introduction

Cotton varieties containing the Bollgard gene were planted on approximately 12% of the cotton acreage in Arkansas in 1997. The Bollgard varieties performed very well in Arkansas in 1996 by out yielding the non-Bt varieties. While farmer's reactions to Bollgard cotton in 1996 were mixed, economic studies from most of the Delta and Southeastern states showed a substantial increase in net income per acre where Bollgard cotton was planted.

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 again in 1997. 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 (Table 1). 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 and 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. A \$0.62/lb cotton price was assumed.

## Results

The net changes in returns, costs and profit per acre for each of the eight observations are listed in Table 2. The worst scenario for the Bollgard variety occurred in Crittenden county where low yields and very small cost savings associated with the Bollgard cotton resulted in a reduction in returns of \$297.60 per acre and an increase in costs of \$29.75 per acre. In contrast, Bollgard cotton in one of the observations in Desha county increased returns by \$109.12 per acre and reduced costs by \$18.21 per acre.

The Bollgard cotton fields had less profit per acre than the non-Bt fields in five of the eight observations. Across all eight observations, the Bollgard varieties yielded 81 lbs/acre less than the non-Bt varieties, and averaged \$62.89 per acre less profit. These averages are influenced heavily by the Crittenden county stacked gene observation which yielded 480 lbs/acre less than the non-Bt variety. If we average the seven NuCOTN 33b observations, NuCOTN yielded 24 lbs/acre less than the non-Bt varieties and averaged \$25/acre less profit.

## Discussion

Bollgard cotton performed satisfactorily in much of the cotton belt in 1996. In 1997, its performance in Arkansas left something to be desired. Insect pressures were light in 1997, so we would expect the savings on insecticide to be small in this year. However, the Bollgard varieties did not yield as well as the non-Bt varieties. As this technology is improved and the gene is inserted into other varieties, perhaps a Bollgard variety better suited to southern Arkansas will emerge.

It is reasonable to expect the 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 a \$79/acre increase in net income (Bryant, Robertson and Lorenz). In 1997 they averaged a \$63/acre decrease in net income.

These are not scientific results but instead are strictly observations on eight cases in Arkansas in 1997. 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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### References

Bryant, K.J., W.C. Robertson and G.M. Lorenz III. 1996. "Economic Evaluation of Bollgard Cotton in Arkansas: 1996." Beltwide Cotton Conf. Proc., pp. 358-59.

Table 1. Locations and varieties used to compare Bollgard cotton to non-Bt cotton.

County	Bollgard Variety	Non-Bt Variety
Lafayette	DP NuCOTN 33B	SG 125
Crittenden	PM 1220 BGRR	ST 474
Jefferson	DP NuCOTN 33B	SG 125
Jefferson	DP NuCOTN 33B	SG 125
Jefferson	DP NuCOTN 33B	ST 474
Desha	DP NuCOTN 33B	SG 501
Desha	DP NuCOTN 33B	DP 5415
Desha	DP NuCOTN 33B	DP 5409

Table 2. Net change in returns, cost, and profit per acre associated with planting Bollgard cotton instead of the non-Bt variety.\*

County	Change in Gross Returns	Change in Variable Cost	Change in Profit
Lafayette	\$64.48	\$13.63	\$50.85
Crittenden	(\$297.60)	\$29.75	(\$327.35)
Jefferson	(\$144.46)	\$ 6.37	(\$150.83)
Jefferson	\$9.92	\$32.76	(\$22.84)
Jefferson	(\$104.16)	\$64.02	(\$168.18)
Desha	\$17.36	(\$17.31)	\$34.67
Desha	(\$54.56)	(\$8.04)	(\$46.52)
Desha	\$109.12	(\$18.21)	\$127.33

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