

**COMPARATIVE ANALYSIS OF PRODUCING
TRANSGENIC COTTON VARIETIES VERSUS
NO TRANSGENIC VARIETY
IN DELICIAS, CHIHUAHUA, MEXICO**

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Abstract

In 1997, the Mexican production of cotton was 1% of the world production, but did not satisfy the domestic demand for cotton. Chihuahuan farmers are trying to increase cotton yield, quality, and the health of the environment. Therefore, an interdisciplinary team at Universidad Autonoma de Chihuahua conducted a study in Delicias, Chihuahua to analyze and compare four Transgenic cotton varieties: DP-33B, DP-90B, DP-32B, DP-35B versus a conventional variety: DP-5690. The transgenic varieties had superior performance in yield.. The over seed cost of transgenic varieties was compensated by the lower cost of pest control. These varieties had higher returns to land and risk than the return to land and risk of the conventional variety. The variety DP-33B appears to be the promissory variety for Delicias, Chihuahua.

Introduction

Growers from the north of México, particularly those in the state of Chihuahua, have been facing a severe drought since 1992. Consequently, the dams have not held enough water to irrigate the acreage harvested in 1991. They are trying to be efficient in using the scarce water, therefore, they are looking for crops with higher returns like fruits and vegetables or to increase acreage of crops like cotton.

Fewer supervision and chemical restrictions in the application of pesticides have caused problems of contamination that impact on the health of people. Delicias has the first place of occurrence of cancer and allergies in Mexico according to its population size (IMSS, 1998).

Producers of cotton in Chihuahua are trying to introduce new varieties with high yield and quality, pest and disease resistance, and adaptability. The availability of water and the social pressure for looking a sustainable agricultural development are problems to be overcome through serious research.

Therefore, the University Autonomous of Chihuahua through its Faculty of Agriculture and Forestry Sciences located in

Delicias Chihuahua, has begun an ambitious cotton's program that includes genetics, irrigation systems, technology of the production process, economics and marketing, and extension.

Framework

This natural fiber is important because cotton is the raw material to produce products to satisfy the basic need of dressing. The demand for dresses with cotton as the main material has been increasing in the last 5 years. There are around of 70 countries that produce cotton in the world. The United States, China, India, Pakistan, and Uzbekistan produced 70% of the world cotton production in 1996/1997.(SAGAR, 1998) The Mexican production for that year was 1.12% of the world (Figure 1). Cotton is an important crop in México not only for its fiber use, but also for other products like oil.

Mexican cotton producers are price followers, this means that they do not have the market power to set up prices. Usually, Mexican farmers sell their cotton according to the prices of the United States cotton market.

In the period 1992-1997 the harvested acreage of cotton in Mexico was 279,275 hectares with a volume of 0.962 million of pacas (One paca=480 pounds=225 kg). The average yield was 4.4 pacas per hectare. The state of Baja California Norte was the largest producer at 26.75% of total 1997 Mexican cotton production even though it was the fourth harvested acreage. The state of Chihuahua was the second largest producer at 21.06% of total 1997 Mexican cotton production even though it was the third harvested acreage (Table 1)

Cotton production is very important to the economy of the state of Chihuahua. There are two main regions in which cotton have been produced: Juarez-Villa Ahumada and Delicias-Ojinaga. In 1997, the harvested acreage in Chihuahua was 45,925 hectares, and the average yield was 3.70 pacas per hectare The acreage of the region Juarez-Villa ahumada growth 71% while the region Delicias-Ojinaga was 29% (Figure 2).

The region Juarez-Villa Ahumada besides of its larger production has been achieving the good middling quality

Objective

The objective of this study was to analyze and compare the production costs and returns of four transgenic cotton varieties versus one no transgenic variety.

Methodology

An interdisciplinary team conducted this study in Delicias, Chihuahua, Mexico. In order to accomplish the objective, four transgenic cotton varieties: DP-33B, DP-90B, DP-32B,

DP-35-B an one no transgenic variety: DP-5690 were planted April 8, 1998. Plots had an area of one hectare each one. The management of the production process was the same for all varieties. The pest control for Boll weevil was 7 applications of Regent and one application of Vydate. There was no applications for Bud/Bolworm.

The enterprise budgets were estimated considering costs of each stage of the production process. The prices and costs estimated in the enterprise budgets were converted to dollars according to the exchange rate of November, 1998 which was in average, 9.45 Mexican pesos for one U.S. dollar.

Economic analysis

Table 2 shows a summary of production costs and returns per hectare of cotton varieties. Price was not reflected in gross returns. Yield made the difference between varieties. The average yield of transgenic varieties were higher than the average yield of the conventional variety. As a result, the gross returns of DP-33B was higher by 4%, 9%, and 13% than the gross returns of DP-90B, DP-32B, DP-35B. DP-33B was over by 30% than the gross return of the non transgenic variety:DP-5690.

There were no significant differences between the operating expenses of transgenic varieties. However, all of them were higher than the conventional variety. DP-33B had the highest operating expenses. It was higher by \$124.4 (8%), than the operating expenses of DP-5690.

The seed costs of transgenic varieties were higher by \$80 (203%) than the seed cost of conventional variety. However, the cost of pest control of the conventional variety was higher by \$95 (49%) than the cost of pest control of transgenic varieties. It appears to be that the higher seed cost of transgenic varieties was compensated by the lower cost of pest control as a result of their superior performance against the specific pests.

All transgenic varieties had higher returns to capital, land and risk than the conventional variety. DP-33B was over by \$592 (62%) than DP-5690. Transgenic varieties were over in returns to land and risk than the conventional variety. DP-33B had the highest return to land and risk because of its superior average yield. DP-33B was higher by \$578 (72%) than the return to land an risk of DP-5690.

Conclusion

Cotton is important in the economy of the state of Chihuahua, therefore Chihuahuan farmers, particularly those in Delicias are looking for new cotton varieties to increase their profit and to maintain the health of the environment. The transgenic varieties:DP-33B, DP-90B, DP-32B, and DP-35B had good results in yield and in controlling specific pests. The transgenic variety DP-33B

appears to be a good variety for the region of Delicias. Finally, the over seed cost of transgenic varieties it was compensated by the lower cost of pest control.

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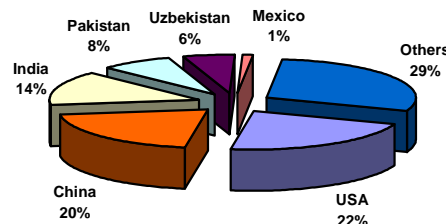
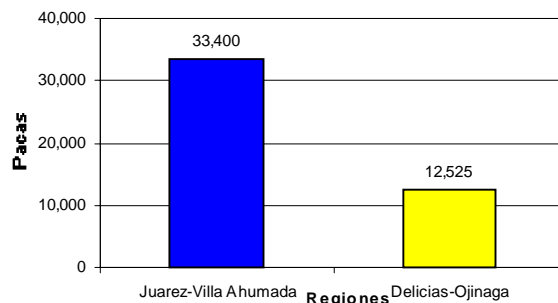


Figure 1. Principal cotton producers in the world, 1996/1997.



Source: SAGAR, 1998

Figure 2. Production of cotton by region, Chihuahua, 1997.

Table 1. Average Mexican Cotton production by states, 1992-1997.

State	Acreage hectares	Production Thousands of pacas	Production share %
Baja California Norte	36,866	257.18	26.75
Chihuahua	45,925	202.50	21.06
Sonora	65,685	198.88	20.68
Coahuila	12,641	122.33	12.72
Sinaloa	65,731	58.45	6.07
Tamaulipas	20,657	42.82	4.46
Others	31,770	79.43	8.26
Total	279,275	961.59	100.00

Source: SAGAR, 1997.

Table 2. Crop costs and returns per hectare of transgenic and no transgenic cotton varieties, Delicias, Chihuahua, 1998.

	Transgenic				No transg
	33B	90B	32B	35B	5690
Avg. Yield (Pacas ¹)	10.14	9.74	9.23	8.89	7.83
Price per paca (USA dollars)	\$310	\$310	\$310	\$310	\$310
Gross return	\$3,143.4	\$3,019.4	\$2,886.3	\$2,775.9	\$2,427.3
Operating expenses	\$1,593.5	\$1,572.0	\$1,544.8	\$1,526.3	\$1,469.1
1. Seed	\$119.4	\$119.4	\$119.4	\$119.4	\$39.4
2. Pest control	\$193.2	\$193.2	\$193.2	\$193.2	\$288.4
3. Land preparation, irrigations, fertilizers, harvest, and others	\$1,280.9	\$1,259.4	\$1,232.2	\$1,213.7	\$1,141.3
Return to capital, land and risk	\$1,549.9	\$1,447.4	\$1,341.5	\$1,249.6	\$958.2
Interest on operating capital	\$170.8	\$168.5	\$165.6	\$163.2	\$157.5
Return to land and risk	\$1,379.1	\$1,278.9	\$1,175.9	\$1,086.4	\$800.7

¹ One paca=480 pounds