

ASCENCION, CHIHUAHUA, MEXICO A POTENTIAL REGION FOR Bt COTTON PRODUCTION
J. González-García, J.E. Magaña-Magaña, A.J. Obando-Rodríguez and A.Segovia-Lerma
Faculty of Agricultural and Forestry Sciences
University of Chihuahua
México

Abstract

Bt cotton varieties have expanded their demand in Ascención, Chihuahua, Mexico since 1998. This was due to the presence of insect pests such as the complex tobacco bud/bollworm and pink bollworm. Cotton growers planted 14,265 ha total (249 ha of Bt cotton) in 1998, 8,994 ha total (1,626 ha of Bt cotton) in 1999, 8,789 ha total (2,391 ha of Bt cotton) in 2000, and 8,938 ha total (6,703 ha of Bt cotton) in 2001.

Introduction

Mexican government allows to plant only 40% of transgenic cotton of the total surface. The incidence of insect pests such as the complex tobacco bud/bollworm, pink bollworm and others favored that Ascención cotton growers decided to use Bollgard® varieties. Thus the surface of transgenic planted in 1998 represented 1.75% of the total surface, while in 2001 this value became 25.96% (Table 1). Besides of the tolerance of Bt cotton varieties to some insect pests mentioned above, the superior yield of those compared to their recurrent parents and conventional varieties (González et al., 1999 a, 1999 b) were the main reasons to increase the surface planted with Bollgard® cotton. The purpose of this study was to demonstrate how Bt cotton use can increase the benefits compared with non-Bt cotton use.

Material and Methods

Data were collected in field trials in Ascención, Chihuahua. Three experiments were conducted in a single lattice design with two replicates each. The Bt varieties evaluated were NuCOTN 35B, NuCOTN 33B, DP 90B DP 428B. The non-Bt varieties used were DP 90, DP 20, Sure Grow 125, Sure Grow 747 and Acala 1517. The experimental plot consisted of 5 rows long, separated to 0.90 m. The main variables considered here were yield (ton/ha), costs of production (\$/ha, Mexican pesos), average rural price (\$/ha Mexican pesos), and benefits (\$/ha, Mexican pesos) (Table 2). Benefits were calculated as the difference between the harvest value and costs of production. Costs were estimated considering the Bollgard® technology cost, seed cost, and the cost of the insect pest control. Harvest value was estimated based on fiber and seed profits.

Results and Discussion

General information about surface harvested of cotton from 1998 to 2001 in Ascención, Chihuahua appears in Table 1. Total surface harvested went down from 1998 to 2001 because of the low rural price and marketing problems. However, the surface planted and harvested of Bt cotton increased (1.75% in 1998, 18.08% in 1999, 27.20% in 2000, and 75.00% in 2001), due to the incidence of pink bollworm mainly, which presence changed from 4.5 % in 1998 to 25.00 % in 2001. According to the economic analysis (in Mexican pesos), when Bt cotton and non Bt cotton were compared, the benefits of using the Bollgard® technology were higher than the use of non Bt cotton (Table 2). It is important to mention that the production costs are always higher with Bt technology when lepidopteran pests are no present. In spite of that consideration, it has been proved that benefits are superior by using Bollgard® cotton because of the higher yields obtained with that technology compared to non Bt varieties (González et al, 2001).

Conclusions

1. While surface harvested of cotton in Ascención, Chihuahua decreased from 1998 to 2001, surface harvested of Bt cotton increased from 1998 to 2001.
2. Cotton growers obtained higher benefits when they used Bt technology

References

González-García, J., Obando-Rodríguez A.J., Olivas-García J.M., Magaña-Magaña J.E., and Martínez-García A. 1999 a. Agronomic evaluation of transgenic cotton varieties in Delicias, Chih., Mex. In: 1999 Proceedings Beltwide Cotton Conferences. January 3-7, Orlando, Fl. p 596-598.

González-García, J., Obando-Rodríguez A.J., and Delgado-García S. 1999b. Efectividad biológica de variedades de algodón transgénico con el gene Bollgard® contra el complejo bellotero-rosado en la región de Delicias, Chih. Informe de actividades. Facultad de Ciencias Agrícolas y Forestales. Universidad Autónoma de Chihuahua. 14 p.

González-García, J., J.E. Magaña-Magañan, and E. Barrón Del Val. 2001. Analysis of the Bollgard® cotton in Chihuahua, Mexico. In: 2001 Proceedings Beltwide Cotton Conferences. January 3-8, Anaheim, CA. p 426

Table 1. Cotton surface harvested (ha) in Ascención, Chihuahua.

Year	Cotton	Surface (ha)	Percent
1998	Bt	249	1.75
	Non Bt	14,016	
	Total	14,265	
1999	Bt	1,626	18.08
	Non Bt	7,368	
	Total	8,994	
2000	Bt	2,391	27.20
	Non Bt	6,398	
	Total	8,789	
2001	Bt	6,703	75.00
	Non Bt	2,235	
	Total	8,938	

Source: Department of Agriculture of Chihuahua. 2002

Table 2. Average gross income comparison (Mexican \$/ha), Bt cotton versus conventional varieties. Ascención, Chihuahua Years 1999 and 2000.

Variable	Bt cotton	Non Bt cotton	Diff
Yield (ton/ha)	2.59	2.42	0.17
Benefits (x 1,000 \$/ha)	14.325	10.132	4.143