

BOLLGARD GENE COTTON AS AN ALTERNATIVE FOR COTTON GROWERS IN CHIHUAHUA, MEXICO

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Abstract

Bollgard Cotton varieties provide good control for boll/budworm and pink bollworm populations. Bollgard cotton varieties were evaluated at Northern Mexico under Commercial conditions during July to September of 1998 and 1999. The varieties evaluated were DP-33B, DP-35B, DP-90B, DP-32B, DP-5690, all of them from Delta Pine, and Stoneville 239, Stoneville 474, Sure Grow 125 and Fiber Max 963, which are conventional varieties. All bollgard cotton varieties exhibited a good control of boll/budworm and pink bollworm, in which the pest chemical control was reduced in one application, when they were compared to the conventional varieties. The DP-33B and DP-90B cultivars produced the highest yield, which was around 20% greater than conventional varieties. These results increased the demand of transgenic cotton varieties and expanded their commercial usage.

Introduction

The boll/budworm and pink bollworm have historically been cotton destructive pests in Chihuahua State. These pests have been reported to have some degree of resistance to pyrethroid and organophosphate insecticides. Such a characteristic has produced the interest of Chihuahua University researchers to find an alternative which conducts to provide a good control of lepidopterans in cotton crops and to reduce the pesticide impact on natural enemy populations and the environment. Such an alternative is represented by the usage of bollgard cotton cultivars.

Objective

The objective of this study was to demonstrate that bollgard gene cotton varieties exhibit both a greater control of bud/bollworm and pink boll worm pests and a greater yield, when they are compared to:

1. The Bt varieties reduced at least one application of insecticide as compared to the conventional varieties.
2. The transgenic varieties showed a good preventive control of bud/bollworm and pink bollworm.
3. As a consequence, the use of Bt varieties can reduce the human exposure to insecticide, avoiding its nocive effect over the environment.
4. The transgenic cultivars showed a yield 10 to 20% greater than that of conventional varieties, also generating a greater profit (data not shown).

References

Capps, C.D. et al. 1998. Performance of selected Bollgardcotton varieties in Southeast Arkansas Proc. Beltwide Cotton Conference pp. 1246-1249.

Obando-Rodriquez, A.J. et al. 1998. Confirm 2F and tracers a useful alternative for IPM against bollworm, tobacco budworm and beet armyworm in cotton in Northern Mexico. Proc. Beltwide Cotton Conference. Pp. 1228-1230.

The conventional varieties under Chihuahua, Mexico conditions.

Material and Methods

The present study was conducted at the experimental station of the Faculty of Agricultural and Forestry Sciences of Chihuahua University, during 1998 and 1999. The Bollgard gene varieties evaluated were DP-33B, DP-35B, DP-90B, DP-32B, DP-5690, all of them from Delta Pine, and Stoneville 239, Stoneville 474, Sure Grow 125 and Fiber Max 963, which are conventional varieties. The planting date was April 8 and April 10 in 1998 and 1999, respectively. The experiment was established using an experimental area of 1 ha per variety. The experimental data were analyzed by using the randomized complete block design model with 20 replicates. The Tukey's multiple range test was used at the 0.05 level of probability, when it was necessary. The useful plot consisted of two rows 6 m long and 0.90 m wide. The pest control consisted of 7

applications of Regent for boll weevil and 1 application of Vydate for bud/bollworm. None application was done for pink bollworm. Weed control and fertilizer management were given as needed, according to Delicias Region cotton production recommendations. Parameters evaluated were damage of both square and boll, yield, and profit.

Results

Tables 1 and 2 show that transgenic varieties exhibited a better yield than the conventional varieties. The cultivars DP-33B and 90 B were the best Bt varieties during both evaluation years, yielding about 20 % more than the conventional cotton varieties. Our results indicated a preferent usage of transgenic cotton cultivars by Delicias cotton growers. Also, our data indicated that the demand of transgenic cotton cultivars has increased considerably, given that 18 ha of such varieties were planted during 1998, while 841 ha were planted in 1999.

Conclusions

1. Bollgard cotton varieties exhibited a better control of bud/bollworm complex and pink bollworm than conventional varieties, during 1998 and 1999 in Chihuahua, Mexico.

Table 1. Cotton yield. Delicias, Chihuahua, Mexico.1998.FCAy F , UACH.1998

Varieties	Ton/ha.	bales/ ha.
DP-33B	6.084 a	10.139 a
DP-90B	5.842 ab	9.737 ab
DP-32B	5.540 ab	9.234 ab
DP-35B	5.334 b	8.889 b
DP-5690	4.669 c	7.831 c

Means within a column followed by the same letter are not significantly different.

Table 2 .Cotton yield, Delicias, Chihuahua, Mexico,FCAyF , UACH .1999.

Varieties	Ton/ha.	bales/ ha.
Stoneville 239	4.075 a	6.792 a
DP-90B	4.057 a	6.762 a
DP-33B	3.985 a	6.642 a
Sure Grow 125	3.776 a	6.294 a
Stoneville 474	3.455 ab	5.759 ab
DP-5415	3.183 ab	5.305 ab
Fiber Max 963	2.629 b	4.381 b

Means within a column followed by the same letter are not significantly different.