Williamson County
Result Demonstration Report

Texas Cooperative EXTENSION
The Texas A&M University System

EVALUATION OF Bt CORN FOR MANAGEMENT OF MEXICAN CORN ROOTWORM

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SUMMARY:

The Yield-Gard Corn Rootworm transgenic corn technology should be a great tool for producers to implement in their pest management program to assist with control of Mexican corn rootworms (MCR) in fields of continuous corn. However, the results from this study show that the technology will limit rootworm damage, but does not totally make corn immune to rootworms. Growers who utilize this technology in fields of continuous corn where populations of MCR exist, should realize that they will still sustain some damage, although probably well below the economic threshold. Also, this study reinforces the fact that this technology is specific to MCR and does not help at managing other pests, such as chinch bugs in this case. Therefore, plans are to have all Yield-Gard Corn Rootworm seed be treated with a insecticide seed treatment which will provide control of many of the early season pests of corn.

OBJECTIVE:

To evaluate new transgenically modified corn for control of Mexican corn rootworm (MCR) compared to conventional soil applied insecticides and seed treatments.

The Mexican Corn Rootworm (MCRW) is a serious pest of corn in the Central Texas area. They are especially a problem in fields that have had continuous corn for three or more years, although there is a potential for fields of second year corn to be completely destroyed even with the use of full label rates of soil insecticides. Crop rotation to any other crop other than corn therefore is the most effective control practice for MCR. However, the economic benefit of corn production and limited land and available for rotation often requires continuous corn production without rotation.

Therefore, the objective of this trial was to evaluate new transgenic MCR technology to control MCR in a field where continuous corn has been grown without rotation for five years.

MATERIALS & METHODS:

TXP260-f transgenic MCR corn hybrid and DKC 60-15 hybrid corn varieties were planted on the Morris Zieschang Farm 3 miles southeast of Taylor on March 18, 2003 with a 4-row JD 7100 planter equipped with granular insecticide boxes. Treatment were arranged in a randomized complete block design with 4 replications in 4-row wide by 25-ft long plots with rows on 38-inch centers. Corn had been grown at the site for more than 5 years. The soil type is a Houston Blackland Clay. Force 3G @ 5 oz/ac was applied in-furrow at-plantto one of the two KDC 60-15 plots as a standard insecticide treatment. Fertilizer consisted of 96-20-0 + 2 qts Zn.

Treatments were assessed by taking stand counts on 2- 1/1000th ac units in middle 2 rows of each plot on April 24. Also, 5 consecutive plants from the second row of each plot was inspected for chinch bug adults on April 24.

The roots of six plants were dug from the two center rows of each plot on May 22 and were cleaned and rated on a 0-3 scale for damage from Mexican corn rootworm(MCR). Plant stand counts were taken again on June 26 in order to demonstrate the impact the chinch bugs had on the plot.

RESULTS AND DISCUSSION:

Plant stand, mean adult chinch bugs/5 plants and mean MCR root damage ratings are provided in Table 1. On April 24, there were no differences among treatments in plant stand. However, by June 26, stand counts were dramatically lower in some treatments compared to the initial sample date. The two treatments that contained the seed treatment Mon 47832 and the Force 3 G treated hybrid had significantly higher stand counts than did the TXP260B-F corn hybrid and DKC60-15 that did not have any insecticide protection. Chinch bug levels were significantly higher in the two previously mentioned treatments compared to the treatments that contained either the seed treatment of granular insecticide. The two transgenic MCR treatments and the two conventional hybrids treated with Mon 47835 seed treatment and Force 3 G had significantly lower mean root damage ratings compared to the untreated, conventional check.

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Trade names of commercial products used in this report are included only for better understanding and clarity. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Texas A&M University System is implied. Readers should realize that results from one experiment do not represent conclusive evidence that the same response would occur where conditions vary.

Table 1. Stand counts, mean chinch bugs per 5 plants, and mean MCR root damage rating. Morris Zieschang, Williamson Co., TX. 2003.

Treatment and formulation	Rate of insecticide	Plant Population (1/1000 ac)[1] Apr 24	Plant Population (1/1000 ac) Jun 26	Chinch bugs [2]	MCR root damage rating (0-3)[3]
TXP 260B-F		20	12 b	11 a	0.45 b
TXP 260B-F + Mon 47835	0.25 mg/ai kernel	21	21 a	2 b	0.16 c
DKC60-15 + Mon 47835	1.25 mg/ai kernel	23	20 a	0 b	0.29 bc
DKC 60-15		25	12 b	14 a	1.77 a
DKC 60-15 + Force 3 G	5 oz/1000 row ft	23	18 a	4 b	0.32 bc
LSD (P=.10)			3.6	6.2	0.18
Treatment Prob (F)			0.003	0.009	0.0001

[1] Means within a column followed by the same letter do not significantly differ

[2] Mean adult chinch bugs per 5 plants.

[3] Iowa State University 0-3 MCR rating scale: 0 = no feeding damage, 1 = 1 node of roots eaten within 2 inches of stalk, 2 = 2 nodes of roots eaten, and 3= = 3 or more nodes of roots eaten.