Texas Cooperative EXTENSION
The Texas A&M University System

Applied Research Report

Sugarcane Borers in Corn of Calhoun, Refugio and Victoria Counties

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Summary

Borers were found in the ears of corn plants in 2004 and were thought to cause discoloration in the kernels resulting in the inability of the farmer to sell the grain as chicken feed. An investigation was initiated in 2005 to identify the borer, characterize the plant injury caused by the borer, and determine the distribution of the borer within a corn field and in Calhoun, Refugio and Victoria Counties.

Caterpillars and pupae found in corn plants were reared to adults and found to be sugarcane borers (*Diatraea saccharalis* (Fabricius)). These borers were found in all above ground portions of the plant including stalks, shanks and ears in all portions of the field. Fields in each of the counties were found to be infested with sugarcane borers.

Additional research must be done to determine the economic impact and appropriate economic thresholds of this pest insect.

Introduction

In 2004, a corn grower in Calhoun County found borers in the ears of corn fields resulting in discoloration of the kernels. The result of the discoloration was the loss of chicken feed market. This corn boring insect was suspected to be the sugarcane borer. Researchers in Louisiana have found that sugarcane borers are less susceptible to the toxin in Bt corn than European Corn Borers. The borers have been found in corn fields in 2005 and will be studied to determine the impact of this pest.

Objectives

1. Positively identify borers in corn fields of Calhoun, Refugio and Victoria Counties
2. Determine distribution of sugarcane borers in a corn plant
3. Determine distribution of sugarcane borers in a corn field
4. Determine distribution of sugarcane borers in Calhoun, Refugio and Victoria Counties

Materials and Methods

Insect Identification and Bt Resistance

Twelve corn fields of Calhoun, Refugio and Victoria Counties were sampled and borer larvae and pupae were collected to rear into adults. Positive identification of larvae found in corn fields was made through two methods: larvae identification and adult identification.

Larvae will be boiled in water for one minute then transferred to vials containing 70% ethyl alcohol. These larvae will be taken to Ed Riley at Texas A&M University for positive identification. Larvae will be reared into adults for positive identification in a rearing chamber in the Extension Agent – IPM office.

Distribution of Sugarcane Borers within the plant and field

Twenty plants will be evaluated for presence of borers in each of two locations in three conventional corn fields of Calhoun County on the 5^{th}, 25^{th} and 50^{th} row from the field margin. Fields studied included early and later planted corn. The three fields were used as three replications for statistical purposes.

The plants were dissected with the following measurements taken:

1. Number of borers found dead and alive
2. Number of tunnels
3. Length of tunnels
4. Percent stalks and ears infested
5. Average length of feeding scar

Distribution of Sugarcane Borers in Calhoun, Refugio and Victoria Counties

Various corn fields in Calhoun, Refugio and Victoria Counties were sampled for presence of borers.

Results and Discussion

Insect Identification and Bt Resistance

Ninety-eight larvae and pupae were extracted from corn plants. Of these 76 were successfully reared to adults in a rearing chamber. All of the adults were determined to be sugarcane borers. No parasitoids were reared from the larvae and pupae. No borers were found in Bt-corn fields.

Distribution of Sugarcane Borers within the plant and field

Borers were found in all, above ground portions of the corn plants. Infestation rates ranged from 36.7 to 48.3% in the stalk, 18.3 to 32.5% in the ear and 40.0 to 55.8 in the whole plant. No differences were found with regard to infestation and plant injury between locations in the field (Tables 1, 2 and 3).

Visual observations of plant damage concur with previously documented records. The tunnels tend to be clean of frass, which is pushed back out the entry hole. Boring tunnels tend to be slightly larger in diameter than the borer itself. Damage to the ear occurred on the shank, cob and kernels. The shanks were bored through the center, with narrow tunnels in difference to that of the fall armyworm, which bores a wide tunnel. Boring in the ear may be through the middle portion of the cob and may also exit the cob at any portion of the ear to feed on the "corners" of the kernels just underneath the shuck. Most common kernel feeding is near the base of the ear.

Boring in the shank averaged 0.66 to 0.84 inch per ear. Cob boring averaged 0.13 to 1.14 inch per ear. And kernel damage averaged 1.42 to 1.78 inches per ear.

Stalk boring in the stalk was analyzed as boring per plant and boring per infested plant in the whole plant and only boring below the ear. Average boring in plants was 2.59 to 3.50 inches per plant with 1.59 to 2.08 inches below the ear. Infested plants averaged 5.10 to 7.10 inches per plant with 4.16 to 5.55 inches below the ear.

Distribution of Sugarcane Borers in Calhoun, Refugio and Victoria Counties

Sugarcane borers were found in corn fields of all three counties inspected. In Calhoun County, all non-Bt fields inspected had sugarcane borers. In Refugio County, only one field was inspected on the Eastern portion of the county, this field contained sugarcane borers. In Victoria County, seven fields were inspected for sugarcane borers. Of these fields three fields on the eastern side of the county had borers while borers were not found in fields west of Highway 87.

One field was identified in Victoria County that had as much as a 700 pound grain loss due to boring typical of the fall army worm. However, there was no correlation between ear drop and sugarcane borer presence.

Conclusion

The sugarcane borer can be found in non-Bt corn fields of the mid-Texas Coast. This borer can cause damage to all above ground portions of the plant and is not found in different populations at different lengths from the field margin. Additional research must be done to determine the economic impact and appropriate economic thresholds of this pest insect.

Table 1. Percent of stalks, ears and whole plants infested by sugarcane borers (2005).

	Stalk	Ear	Whole Plant
1 5th Row	48.3	32.5	55.8
2 25th Row	36.7	18.3	40.0
3 50th Row	38.3	26.7	46.7
LSD (P=.05)	42.29	26.06	44.27
Standard Deviation	21.16	13.04	22.16
CV	51.48	50.49	46.65
Treatment F	0.267	0.894	0.386
Treatment Prob(F)	0.7745	0.4573	0.6954

Table 2. Average tunnel lengths (in.) in the shank, cob and kernels of the ear (2005).

	Shank	Cob	Kernel
1 5th Row	0.84	0.13	1.42
2 25th Row	0.73	1.14	1.66
3 50th Row	0.66	0.32	1.78
LSD (P=.05)	1.133051	2.0718	2.0145
Standard Deviation	0.567102	1.0370	1.0083
CV	76.22	195.86	62.18
Treatment F	0.078	0.807	0.099
Treatment Prob(F)	0.9255	0.4892	0.9071

Table 3. Average tunnel lengths (in.) in the total corn stalk and below the ear of corn stalks of all plants and infested plants (2005).

	Total Stalk		Below Ear	
	per plant	per infested plant	per plant	per infested plant
1 5th Row	2.59	5.10	1.59	5.08
2 25th Row	3.45	7.10	2.08	5.55
3 50th Row	3.50	6.40	1.73	4.16
LSD (P=.05)	4.7247	4.259	2.9418	4.0988
Standard Deviation	2.3648	2.132	1.4724	2.0515
CV	74.4	34.38	81.83	41.61
Treatment F	0.139	0.680	0.087	0.361
Treatment Prob(F)	0.8731	0.5417	0.9181	0.7112