Southwestern Corn Borer Control in Field Corn

Paul D. Gerhardt, Entomologist

Summary

Control of the southwestern corn borer, Diatrea grandiosella, can be controlled in field corn with two aerial-applied insecticide sprays. Sprays should be applied to coincide with or shortly after the peak emergence of the first and second generation of adult moths.

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Plots for this and earlier studies were located near Sunizona, Arizona in Cochise County on the A. J. Becker ranch. NK PX4 variety of field corn was planted in field 2, April 22 - 29, 1981. The entire field received Furadan 10G at 0.5 lb ai/Acre at planting time at the grower's request.

Plots in this study were 40 rows wide by 1235 feet long which represented 2.9 acres. There were seven insecticide treatments which were replicated 3 times, plus untreated check plots which were replicated only twice. Table 1 lists the insecticides plus rates of application. All sprays were applied at 5 gallons of spray mixture per acre with an Ag-Cat aircraft. Sprays were applied in the early A.M. on July 8 and August 4.

Table 1

Insecticide	Formulation	Rate/Acre
Pounce	E.C. 3.2 lbs/gal	0.1 lb ai/A
Pounce	E.C. 3.2 lbs/gal	0.2 lb ai/A
Furadan	4F 4.0 lbs/gal	0.5 lb ai/A
Furadan	4F 4.0 lbs/gal	1.0 lb ai/A
Penncap	M 2.0 lbs/gal	1.0 lb ai/A
Pydrin	E.C. 2.4 lbs/gal	0.1 lb ai/A
Dyfonate	E.C. 4 lbs/gal	1.0 lb ai/A

During the course of the study a black-light trap was operated in the area and the daily catches of southwestern corn borer as well as several other lepidopteran pests such as corn earworm and fall army worm were recorded beginning on May 1 and continued through September 1. Also, daily maximum and minimum temperatures were recorded on the ranch on a hygrothermograph beginning on January 1.

First generation moth emergency was light, beginning on June 20 with 4 moths and averaging 5-6 moths per night peaking around July 1 with 9 moths. This was when the first spray application was scheduled for July 8. The buildup of the second generation of moth emergence began about mid-July increasing from July 23 to July 30 as follows: July 23 - 187 moths, July 24 - 143, July 25-26 - 268, July 27 - 311, July 28 - 151, July 29 - 361, July 30 - 904. The second spray application was scheduled for August 4.

During the growing season, counts of southwestern corn borer eggs and larvae were made on 50 plants from each treatment. These counts were made on May 19, June 3, June 16 and July 7. Very few eggs were found in the counts with larvae showing up in the June 16 and July 7 count. Dyfonate-treated plots had the highest number of larvae followed by the Furadan 4-F plots. Little difference between the 0.5 lb and 1.0 lb rate. This was followed by the Pydrin treatment, then the Penncap-M, with the Pounce treatments of 0.1 lb and 0.2 lb showing the fewest number of larvae.

On September 3, 25 corn plants from each treatment were examined for exit holes of S.W.C.B. Results are given in Table 2.

Table 2

Insect Counts on Field Corn Receiving Various Insecticide Treatments

September 3, 1981

Treatments	Rate/Acre	Southwestern Corn Borer	
		Exit Holes	Larvae
Pounce E.C.	0.1 lb.ai	10	0
Pounce E.C.	0.2 lb.ai	5	0
Furadan 4-F	0.5 lb.ai	9	0
Furadan 4-F	1.0 lb.ai	3	0
Penncap-M	1.0 lb.ai	14	0
Pydrin E.C.	0.1 lb.ai	5	0

Dyfonate E.C.	1.0 lb.ai.	25	0
Untreated check	-	43	5

These data indicate that the synthetic pyrethroids, Pounce at 0.1 and 0.2 lb and Pydrin at 0.1 lb, gave good control of the S.W.C.B. as did Furadan 4-F at 1.0 lb ai/A. Furadan 4-F at 0.5 lb and Penncap M at 1.0 lb were next with Dyfonate E.C. at 1.0 lb the least effective. The untreated check plots had the highest infestation with 43 exit holes per 25 plants.

A severe hail storm hit the field the afternoon of July 21 at the critical pollinating time. As a result of this storm, leaves were badly shredded in most of the field which greatly affected the yields.

Yields were obtained by harvesting the middle 12 rows of each plot with a John Deere 6-row combine on September 17. Yield data are shown in Table 3. As indicated, yields were lower because of the hail storm. Pydrin at 0.1 lb/A and Pounce at 0.2 lb/A were top yielders with 8501.9 and 8662.7 lb., respectively. This was followed by Penncap M at 1.0 lb and Pounce at 0.1 lb with yields of 8023.5 and 7525.9 lb/A. These were followed by Furadan 4-F at 2 rates and Dyfonate at 1.0 lb. The untreated check produced 6264.7 lbs of corn/A.

Table 3

Field Corn Yields from Plots Receiving Various Insecticide Treatments

Treatment	Rate/A	Yield/Plots In pounds	Yields/Acre In Bushels	Yields/Acre Pounds
Pydrin E.C.	0.1 lb	7226.7	135.3	8501.9
Pounce E.C.	0.1 lb	6396.7	122.8	7525.9
Pounce E.C.	0.2 lb	7023.3	134.5	8662.7
Penncap M	1.0 lb	6820.0	128.2	8023.5
Furadan 4-F	0.5 lb	6150.0	117.7	7235.3
Furadan 4-F	1.0 lb	6296.7	121.7	7407.8
Dyfonate E.C.	1.0 lb	5240.0	102.5	6164.7
Untreated check	-	5325.0	102.9	6264.7

Results of the 1981 field corn trials indicate that two applications of insecticide spray are necessary. The first application around July 1, to coincide with the first generation S.W.C.B. flight and the second application the last of July or first of August when the second generation moth flight reaches its peak.

The synthetic pyrethroid insecticides were again the most effective materials in the trial.

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THE IRRIGATION GRADIENT AS A RESEARCH TOOL TO IDENTIFY DROUGHT TOLERANT SORGHUM GENOTYPES

Robert L. Voigt, Professor, Department of Plant Sciences and Peter J. Bourque, Director, Hunger Action Center, formerly Graduate Research Assistant, Department of Plant Sciences.

Summary

Nine sorghum genotypes visually selected for drought tolerance under an irrigation gradient system in 1979 had an average group grain yield under drought stress of 21% over the group yield of nine sorghum genotypes in 1980 similarly visually selected for drought susceptibility. The irrigation gradient system can be utilized to visually select for or against drought tolerance. Sorghum grain hybrids exhibit greater grain yields under moisture stress relative to yields under non-stress than do varieties or lines.

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