FIELD DAY 2001

Southwest Research–Extension Center

Report of Progress 877

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

EFFICACY OF REGENT AND COUNTER ON CORN ROOTWORM AND SOUTHWESTERN CORN BORER LARVAE

by

Larry Buschman, Phil Sloderbeck and Randall Currie

SUMMARY

This trial was conducted to evaluate planting time applications of Regent 80WG and Counter 20CR against corn rootworm and southwestern corn borer larvae. Both insecticides provided significant protection against corn rootworm injury. The Regent plots had significantly less southwestern corn borer infestation than did the Counter plots. In addition, the Regent plots had significantly less fallen corn as a result of lodging caused by second generation southwestern corn borer injury than did either the untreated or the Counter treatments. Thus, there is evidence that the Regent treatment reduced damage significantly from corn rootworms, as well as first and second generation southwestern corn borer. Total yield for the Regent and Counter plots was similar and both were significantly greater than yield of the untreated plots.

PROCEDURES

These plots were machine planted 10 May 2000 at the Southwest Research-Extension Center near Garden City, KS using Pioneer 3162IR corn seed. The plots were 6 rows wide (15 ft) and 50 ft long with 10-ft alleys. The plot design was a randomized block design with 4 replicates. Counter 15G was applied with planter-mounted granular applicator boxes at 6 oz per 1000 ft. A 7-inch bander was mounted before the press-wheel to apply the insecticide in a “T-Band." Regent 80WG was mixed with water and applied at 3 gal of solution per acre at 14 psi through a microtube directed into the seed furrow.

There were strong dry winds on 19 June (during an extended dry period) that caused some plants to lean from lack of root support and show serious wilting. The leaning and wilting appeared to be associated with loss of roots from corn rootworm damage. The plots were rated for leaning using a 1-3 scale, where 1 was no leaning and 3 was extensive leaning. The plants were rated for wilting using a 1 to 5 rating scale, where a 1 was no wilting and a 5 was severe wilting. On 7 July 4 corn plants were dug from each plot and rated for rootworm damage using the Iowa 1 to 6 root damage scale.

Ten plants in each plot (reps 1-3) were infested with an average of 2 SWCB neonate larvae per plant on 22 June. First generation infestation was evaluated on 13 July using a modified Guthrie rating (0-9 scale) on 10 infested plants per plot. The plants were then dissected to record the number of larvae, the length of tunneling and percent plants infested. Two rows of each plot were harvested in early October by hand harvesting the SWCB lodged corn and then machine harvesting the standing corn. Grain yield (adjusted to 15.5% moisture) was calculated per acre for standing corn, fallen grain, and for total grain. Data were analyzed by ANOVA and means separated using LSD (P=0.05).

RESULTS AND DISCUSSION

Corn rootworm pressure in the plots was high enough that some plants in the untreated plots died from desiccation during the dry winds of 19 June. The wilting index was significantly lower for the two insecticide-treated plots relative to the untreated plots (Table 1). Corn rootworm pressure averaged 4.9 on the Iowa 1 to 6 root damage scale, and both Regent and Counter treatments had significantly lower corn rootworm injury than the untreated check (Table 1). The root rating for Counter was significantly lower than that of Regent.

The artificial infestation of first generation SWCB was remarkable with only 2 neonates per plant. The modified Guthrie ratings averaged 2.9 to 3.4 on the 0 to 9 scale with 34 to 62 percent of the plants infested (Table 1). There were 0.3 to 0.8 larvae per plant and 0.9 to 2.0 inches of tunneling per plant. The southwestern corn borer infestation was higher in the Counter-treated plots than in the control plots. This was unexpected, since these two treatments should not have affected the corn borers. Apparently, the desiccation stress from corn rootworm damage reduced corn borer survival in the control plots. Therefore, the meaningful comparison should be between the Counter- and the Regent-treated plots. The Regent-treated plots had a significantly lower southwestern corn borer infestation relative to the Counter-treated plots.

Total yield for the Regent and Counter plots was similar and both were significantly higher than that of the untreated plots. The Regent plots had significantly less fallen corn as a result of lodging caused by second generation southwestern corn borer injury than did either the untreated or the Counter treatments. Thus, there is evidence that Regent reduced damage significantly from second-generation southwestern corn borer, as well as first-generation southwestern corn borer and corn rootworms.

Table 1. Efficacy of Regent and Counter for controlling western corn rootworm on corn in SW Kansas, Garden City, KS, 2000.

		Corn Rootworm Damage			
Treatment	Rate	Leaning Plants 1-3 scale	Wilting Plants 1-5 scale	Root Rating 1-6 scale	Plants Rated 3.5+
Untreated	--	2.9 a	3.4 a	4.9 a	3.5 a
Regent 80WG	0.13 lb ai/a	1.6 b	1.8 b	3.6 b	2.8 a
Counter 20CR	1.3 lb ai/a	1.3 b	1.7 b	3.1 c	1.4 B
F-Test Prob.		0.007	0.004	0.0002	0.0463
LSD value at p=0.05		0.8728	0.793	0.453	1.612

Means within a column followed by the same letter do not differ significantly (LSD, P=0.05)

Table 2. Efficacy of Regent and Counter for controlling southwestern corn borer larvae plus associated grain yields. Garden City, KS, 2000.

		First Generation Southwestern Corn Borer Larval Injury				Grain Yield		
Treatment	Rate	Modified Guthrie Rating 0-9	% Plants Infested	SWCB Per plant	Tunneling Inches per Plant	Standing Bu/a	Fallen Bu/a	Total Bu/aA
Untreated	—	2.9	47 ab	0.4 b	1.4 ab	88.1 b	14.7 a	102.7 b
Regent 80WG	0.13 lb ai/a	3.0	34 b	0.3 b	0.9 b	128.2 a	4.8 b	132.9 a
Counter 20CR	1.3 lb ai/a	3.4	62 a	0.8 a	2.0 a	125.2 a	17.9 a	143.1 a
F-Test Prob.		<0.50	0.056	0.011	0.029	0.045	0.006	0.031
LSD value at p=0.05		0.807	2.51	0.374	0.89	33.2	6.4	28.5

Means within a column followed by the same letter do not differ significantly (LSD, P=0.05).

Fig. 1. Plant wilting associated with plants treated or untreated with soil insecticides

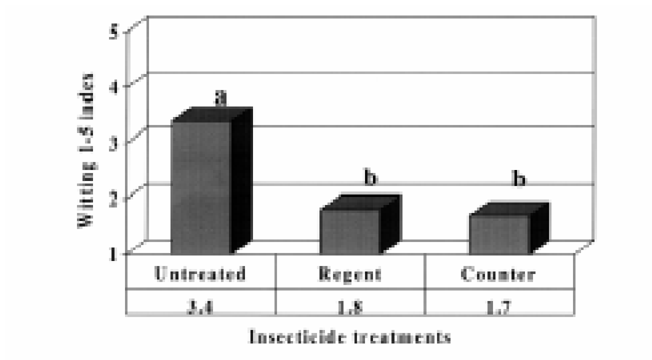


Fig. 2. Corn rootworm damage to roots treated or untreated with soil insecticides

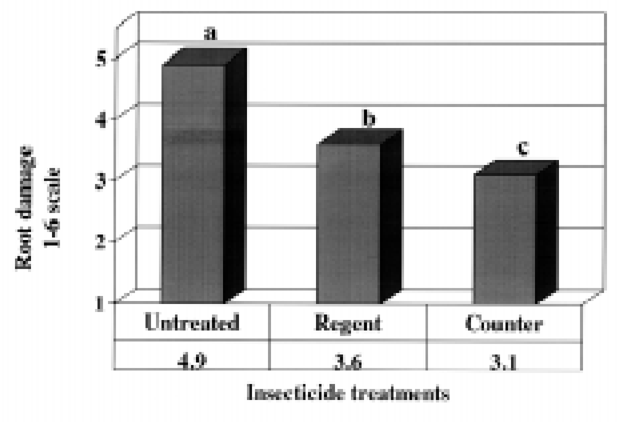


Fig. 3. First generation SWCB in plants treated or untreated with soil insecticides

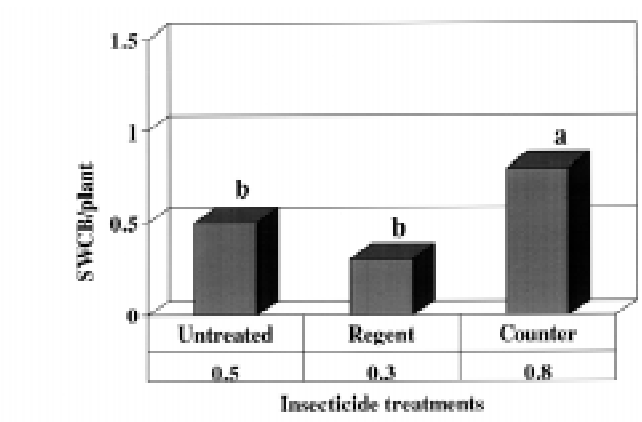


Fig. 4. First generation SWCB in plants treated or untreated with soil insecticides

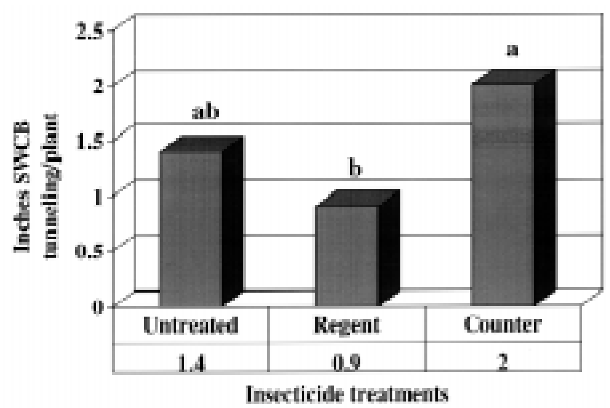


Fig. 5. Grain yield lost to SWCB girdling in plots treated or untreated with soil insecticides

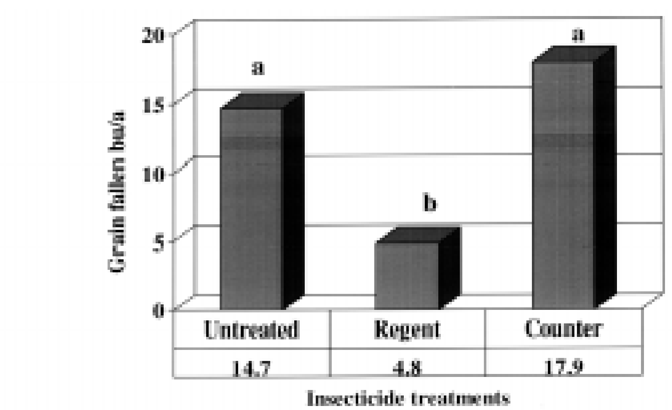
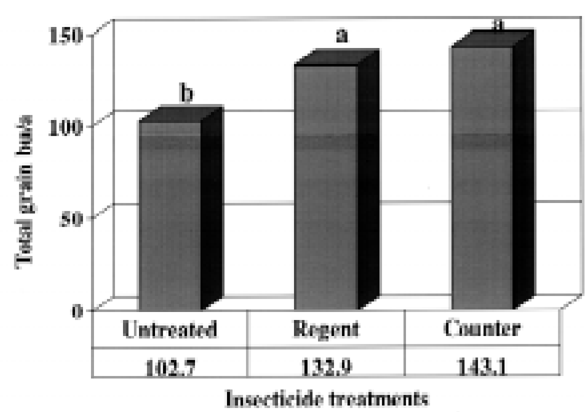


Fig. 6. Total grain yield in plots treated or untreated with soil insecticides



Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan 66506

SRP 877 August 2001