

Williamson County Result Demonstration Report



EVALUATION OF SOIL APPLIED INSECTICIDES AND SEED TREATMENTS FOR CONTROL OF CHINCH BUGS AND MEXICAN CORN ROOTWORM

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SUMMARY:

The Poncho seed treatments and Counter 20 CR provided the highest yields in this study. The three treatments that had Cruiser treated seed were the next three highest yielding treatments. Insect pest present included low level of white grubs, moderate levels of chinch bugs and Mexican corn rootworm.

OBJECTIVE:

To evaluate newly labeled seed treatments and other labeled soil applied insecticides for control of chinch bugs and Mexican corn rootworm (MCR) in corn. Chinch bugs generally appear during dry years and can cause significant damage to unprotected corn.

The Mexican Corn Rootworm (MCRW) is a serious pest of corn in the Central Texas area. As more continuous corn and sorghum are being grown in Williamson County, the potential for this pest to cause severe economic damage will increase as its population increases. MCRWs 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 selected seed treatments and soil insecticides for control of chinch bugs Mexican corn rootworm (MCR) in a field where continuous corn has been grown without rotation for five years.

MATERIALS & METHODS:

Pioneer 32R25 hybrid corn was 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 3 replications in 4-row wide by 100-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. Granular insecticide was banded over the open seed furrow. 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 4. When monitoring the plots, it was evident that different treatments had higher levels of dead June beetles in the plots, therefore, numbers of dead June beetles were taken for each plot on April 9. The number of dead adult June beetles were counted along the entire length of the plot in the center 2 rows. Also, all plants in each plot were observed for signs of stunting as a result of damage caused by white grubs. Each stunted plant was counted and recorded for each plot. Also, the roots were dug up from each stunted plant and inspected for white grubs or adult June beetles and the number of those found in each plot were recorded.

On April 24 and May 2, 5 consecutive plants from the second row of each plot was inspected for chinch bug adults and nymphs. In addition, each plot was rated for vigor on a 1-10 scale, with 1 being least amount of vigor (plants very stressed, stunted, and yellow in color) and 10 being very healthy, vigorous plants (plants taller than other, green, healthy looking).

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). The 6 roots from each plot were cut just above the third collar of roots, stored in a labeled paper bag and allowed to dry until July 25. They set of 6 roots from each plot were weighed together providing a root mass measurement from each plot.

Each entire plot was machine harvested with agGrain combine on August 11 and were weighed for yield.

RESULTS AND DISCUSSION:

Plant stand, mean dead June beetles per treatment, mean stunted corn plants per plot and healthy grubs and June beetles from under stunted plants per plot are provided in Table 1. Plant population in the Poncho 250, Cruiser 400 and Cruiser 100 + Force 3 G was significantly less than in the untreated check while population in the Counter 20 CR was significantly greater than the check. Cruiser 400 and Cruiser 100 + Force 3 G @ 3 oz/1000 row feet had the lowest plant stand counts of 14,000 and 19,000 plants per acre, respectively. Each of the plots that had either Cruiser or Poncho seed treatment had significantly higher levels of dead June beetles laying in the middle of the plots compared to the remaining treatments. June beetles emerging from the

soil apparently fed on the Poncho and Cruiser treated plants and were quickly killed whereas in other plots the emerging beetles flew away. Low levels of stunted plants caused by white grub/June beetle were observed across the study. The Poncho and Cruiser seed treatments generally had fewer stunted plants per plot than the untreated check. The Empower granular and Regeant 4 SC liquid and untreated check were the only treatments to average over 1 or more white grubs and/or June beetles per plot. Several treatments averaged 0 grubs and/or June beetles per plot.

Table 1. Stand counts, dead June beetles, stunted plants and healthy June beetles and grubs from under stunted plants. Morris Zieschang, Williamson Co., TX. 2003.

Treatment and formulation	Rate	Plant Population (1/1000 ac) ¹	Dead June Beetles/plo t ²	Stunted plants ₃	Grubs and June beetles ⁴
Poncho 1250	1.25 mg/kernel	21 cde	46.3 a	0.3c	0.0b
Poncho 250	0.25 mg/kernel	20 de	55.0 a	1.0bc	0.7ab
Counter 20 CR	6 oz/1000 ft row	26 a	6.3 b	4.3ab	0.3b
Aztec 2.1G	6.7 oz/1000 ft row	22bcd	8.7b	1.3abc	0.7ab
Cruiser 400	1.25 mg/kernel	14f	62.3a	0.0c	0.0b
Cruiser 50 + Force 3G	0.125 mg/kernel + 3 oz/1000 ft row	21cde	43.7a	1.0bc	0.7ab
Cruiser 100 + Force 3G	0.25 mg/kernel + 3 oz/1000 ft row	19e	52.0a	1.0bc	0.0b
Force 3G	5 oz/ 1000 ft row	24ab	5.0b	0.7bc	0.0b
Empower	8 oz/ 1000 ft row	22bcd	5.0b	4.3ab	2.3a
Fortress 2.5 G	9 oz/ 1000 ft row	24ab	4.7b	2.3abc	0.3b
Fortress 2.5 G	6 oz/ 1000 ft row	22bcd	2.7b	2.7abc	0.3b
Regeant 4 SC	3.3 fl oz/ac	22bcd	5.3b	2.7abc	1.0ab
Untreated		23bc	1.3b	5.0a	1.7ab
LSD (P=.10)		2.3	27.27	3.96	1.90

Treatment Prob (F)	0.0001	0.0007	0.44	0.64
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¹ Means within a column followed by the same letter do not significantly differ

² Mean number of dead June beetles from center 2 rows of each plot.

³ Mean number of stunted plants per 4 rows of each plot.

⁴ Mean number of healthy June beetles and grubs found under stunted plants.

Corn vigor rating, and average number of adult and nymph chinch bugs per 5 plants are presented in Table 2. The two Poncho treatments, Counter 20 CR, Aztec 2.1 G, all three Cruiser treatments, the Force 3 G, and Regeant 4 SC had significantly better mean plant vigor ratings than the untreated check. The number of chinch bugs per 5 plants increased substantially between the two monitoring dates. The two Poncho treatments, Counter 20 CR, and each of the three treatments that had Cruiser maintained chinch bug nymphs at or below 10/5 plants, compared to 79 chinch bugs/5 plants for the untreated check.

Table 2. Corn vigor rating and mean number of adult chinch bugs on Apr 24 and May 2 and chinch bug nymphs on May 2. Morris Zieschang, Williamson Co., TX. 2003.

Treatment and formulation	Rate	Plant Vigor (1-10) ^{1,2}	Adult chinch bugs ³		Nymph chinch ⁴ bugs
			Apr 24	May 2	May 2
Poncho 1250	1.25 mg ai/kernel	8.67 ab	0.3 c	0.7 d	0.0 f
Poncho 250	0.25 mg ai/kernel	8.83 a	1.0 c	0.0 d	4.0 ef
Counter 20 CR	6 oz/1000 ft row	8.00ab	2.7c	3.0bcd	2.3ef
Aztec 2.1G	6.7 oz/1000 ft row	7.67bc	0.0c	0.7d	13.7def
Cruiser 400	1.25 mg/kernel	7.67bc	0.3c	0.0d	0.7d
Cruiser 50 + Force 3G	0.125 mg/kernel + 3 oz/1000 ft row	8.20ab	1.3c	0.3d	7.0def
Cruiser 100 + Force 3G	0.25 mg/kernel + 3 oz/1000 ft row	8.00ab	1.3c	1.3d	10.0def
Force 3G	5 oz/ 1000 ft row	6.83c	4.7c	9.0a	46.3bc
Empower	8 oz/ 1000 ft row	5.00de	12.7ab	5.7abc	36.3cd
Fortress 2.5 G	9 oz/ 1000 ft row	5.33d	14.3ab	6.7ab	59.7abc
Fortress 2.5 G	6 oz/ 1000 ft row	4.17e	10.7b	7.3a	67.7ab
Regeant 4 SC	3.3 fl oz/ac	6.83c	2.3c	1.7cd	32.0cde
Untreated		4.33de	17.0a	9.3a	79.3a
LSD (P=.10)		1.09	5.74	4.23	30.83
Treatment Prob (F)		0.0001	0.0001	0.0014	0.0005

¹ Means within a column followed by the same letter are not significantly differ.

² Mean plant vigor, with 1 being least amount of vigor (plants very stressed, stunted, and yellow in color) and 10 being very healthy, vigorous plants (plants taller than other, green, healthy looking).

³ Mean adult chinch bugs per 5 plants.

⁴ Mean chinch bug nymphs per 5 plants.

Mean MCR root damage rating, mean dry root mass and mean treatment yield are provided in Table 3. All treatments except the two Fortress treatments had significantly lower mean MCR root damage ratings compared to the untreated check, 1.6. The two Poncho treatments and three treatments containing Cruiser and Regeant 4 SC had significantly higher mean dry root mass weight compared to the untreated check. Mean yields ranged from 12.7 bu/ac for the untreated check to 85.5 bu/ac for Poncho 250 and all treatments yielded significantly more than the check, except Fortress 2.5 G @ 6 oz/1000 ft row. Poncho 250 significantly out-yielded all treatments other than Poncho 1250 and Counter 20 CR.

Table 3. Mean Mexican corn rootworm rating, mean dry root mass, and yields. Morris Zieschang, Williamson Co., TX. 2003.

Treatment and formulation	Rate	MCR root damage rating (0-3) ¹	Mean dry root mass (gram/6 plants)	Mean yield (bu/ac) ²
Poncho 1250	1.25 mg ai/kernel	0.4 bc	63.0	82.3 ab
Poncho 250	0.25 mg ai/kernel	0.8 b	65.5 ab	85.5 a
Counter 20 CR	6 oz/1000 ft row	0.3 c	55.9 bcd	81.1 abc
Aztec 2.1G	6.7 oz/1000 ft row	0.4 bc	50.7 cd	54.9 de
Cruiser 400	1.25 mg/kernel	0.3 c	71.2 a	67.5 cd
Cruiser 50 + Force 3G	0.125 mg/kernel + 3 oz/1000 ft row	0.4 bc	59.5 abc	68.4 bcd
Cruiser 100 + Force 3G	0.25 mg/kernel + 3 oz/1000 ft row	0.2c	67.6 ab	69.6 bc
Force 3G	5 oz/ 1000 ft row	0.4 bc	55.4 bcd	45.0 ef
Empower	8 oz/ 1000 ft row	0.6 bc	56.0 bcd	38.1 fg
Fortress 2.5 G	9 oz/ 1000 ft row	1. 4a	50.6 cd	24.6 gh
Fortress 2.5 G	6 oz/ 1000 ft row	1.2 a	54.3 bcd	19.3 h
Regeant 4 SC	3.3 fl oz/ac	0.5 bc	60.3 abc	54.9 de
Untreated		1.6 a	43.2 d	12.7 h
LSD (P=.10)		0.43	13.92	14.55
Treatment Prob (F)		0.0001	0.11	0.0001

¹ Means within a column followed by the same letter are not significantly differ.

² 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.

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