

EVALUATION OF SOIL APPLIED AND SEED TREATMENT INSECTICIDES ON CORN FOR CONTROL OF SOIL INSECT PESTS

Gerald and John Donaldson Farm, Wharton County, 1999

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OBJECTIVES: Seed treatment and in-furrow applied insecticides were evaluated on corn to determine (1) effectiveness in reducing plant damage, (2) impact on yield and (3) economic effects.

MATERIALS/METHODS: Corn (Dekalb 668 hybrid) was planted on 23 Feb near Boling, TX in a silty clay loam soil (8% sand, 64% silt, 28% clay) classified as Norwood loam. The soil contained 1.5% organic matter and the pH was 8.1. Soil moisture at planting was excellent and soil temperature was 58°F. The test was planted at 25,000 kernels per acre (12.75 lb/acre) with a John Deere 8-row model 1700 air planter and rows were spaced on 36-inch centers. Corn had been planted in the test site for at least the 4 previous years. Fertilizer applied was 98-0-0+4S+ZN and herbicide applied at-planting was Prowl (1.2 pt/acre) + Atrazine (1.0 lb/acre) + 2, 4-D (1 qt/acre).

Plots were 8 rows wide x 900 ft (average harvested length) with 3 replications arranged in a RCB design. Granular insecticides were applied into the seed furrow using the John Deere equipment. Regent 8WG (fipronil) was applied as a liquid through microtubes (RHS Flomax Unit) into the open seed furrow and calibrated to deliver 2 gpa total volume at a pressure of 32 psi and 6 mph speed. Kernel Guard was mixed with the planting seed.

Treatment effects were assessed by (1) counting plants on 4 Apr in 14.5 ft row at 4 locations in the center 2 rows of each plot, (2) conducting visual plant damage ratings on 1 and 16 Apr (average of the two ratings was analyzed) where 1 = rapidly growing, dark green plants with no obvious stunting and 5 = uneven, reduced growth vigor or yellowing of plants, (3) extracting 6 plants approximately 30 paces apart from the center 2 rows of each plot on 14 May for root damage rating using the Iowa State University 1-6 rating scale and (4) harvesting 8 rows x 900 ft of each plot with a commercial machine on 4 Aug. Due to the effects of a large tree in the test field, 125 ft less was harvested in 5 plots. Grain weights were corrected to a 15% moisture standard. Dollar returns for insecticides were based on numerical difference between insecticide treatments compared with the untreated corn.

RESULTS/DISCUSSION: Statistical differences in plant stands were observed (Table 1). Counter (6.0 oz/1000 row ft) and Counter (3 oz/1000 row ft) + Kernel Guard (3.6 oz/cwt seed) had higher plant populations than the untreated check.

Plant population in the Counter (3.0 oz/1000 row ft) treatment just missed separating statistically from the untreated check. Plant damage ratings were reduced in insecticide treated corn compared to the untreated check except for the Kernel Guard treatment. We were not able to determine which factors contributed to plant

population and damage rating results. Surprisingly, MCR were not severe enough to cause significant root damage; although, numerically the untreated corn showed more damage. Additionally, all insecticide treatments produced more corn than the untreated check except for the Kernel Guard treatment. Dollar returns were positive for all insecticides but the lower cost treatments were more favorable, possibly due to the relatively low pest infestation.

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Table 1. Plant population, plant and root damage ratings, yield and dollar return in corn treated with at-planting insecticides, Gerald and John Donaldson Farm, Wharton County, TX, 1999.

Treatment/ formulation	Rate ^a	Application method ^b	Plants 1000's/acre	Damage rating		Yield bu/acre	Return \$/acre over untreated ^f
				Plant ^d	Root ^e		
Counter 20CR	6.0	IFGAP	24.7 ab	1.75 b	1.95 a	106.5 a	0.43
Counter 20CR	3.0	IFGAP	24.2 abc	2.08 b	2.11 a	109.9 a	12.93
Counter 20CR+ Kernel Guard ^e	3.0 + 3.6	IFGAP + ST	25.3 a	2.13 b	1.89 a	108.3 a	9.79
Regent 80WG	2.16	IFSAP	22.3 d	2.21 b	1.72 a	107.1 a	2.44
Kernel Guard ^e	3.6	ST	23.4 bcd	3.33 a	1.53 a	104.9 ab	11.41
Untreated			22.8 cd	3.58 a	2.11 a	97.6 b	
LSD (P=0.05)			1.922	.678	NS	7.8	
P>F			.0211	.0005	.3493	.0529	

Means in a column followed by the same letter are not significantly different by ANOVA (LSD).

^a Formulated rates are expressed as oz/1000 row ft for IFGAP, oz/acre for IFSAP and oz/cwt seed for ST.

^b IFGAP = in-furrow granule at planting, IFSAP = in-furrow spray at planting and ST = seed treatment.

^c Kernel Guard is a mixture of captan (14.6%), diazinon (15.0%) and lindane (25.0%).

^d Plant damage rating based on an average of visual observations made 4/1 and 4/16 with 1 = rapidly growing, dark green plants with no obvious stunting up to 5 = uneven, reduced vigor and yellowing of plants.

^e Root damage by Mexican corn rootworm.

^f Corn value based on \$2.00/bu; costs include Counter 20CR (\$2.54/lb), Regent 80WG (5.95/oz) and Kernel Guard (\$0.038/lb planting seed at 12.75 lb seed planted/acre). Application cost for the granular and liquid products was \$0.25/acre and \$0.05/acre for mixing Kernel Guard with seed. Harvesting and hauling costs for extra yield above the untreated check were calculated at \$0.65/cwt.