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FIELD CORN: *Zea mays* L. (TA566-31)

Evaluation of Seed Treatments and At-Plant Soil Insecticides for the Control of Wireworms (Coleoptera: Elateridae) in Field Corn, 2015

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Corn (hybrid, maize, sweet) | *Zea mays*

Wireworms | *Melanotus* spp. (Coleoptera: Elateridae)

Wireworms are an important pest of corn, other field crop seedlings, and vegetables and can cause significant damage if not controlled. This field trial was established to evaluate the efficacy of neonicotinoid seed treatments and in-furrow soil insecticides to protect seedling field corn under a heavy wireworm pressure scenario. The trial was conducted on a commercial production field in Perkins County near Madrid, NE (40.781993° N, –101.463666° W). The field was selected for its likelihood to have heavy wireworm pressure due to the following: 1) past farmer observations of crop damage when planted to field corn in 2012; 2) sandy soils (soil type: Valent loamy sand, 3 to 9% slopes); and 3) recent cropping history (livestock were grazed on double cropped rye and sorghum-sudangrass in 2013 and 2014). An RCB design with four treatments (including an untreated check [UTC]) and four replications was used. Each plot was four rows by 30 ft. The trial was planted on 1 May using a small plot research planter at 32,000 seeds per acre at an approximate depth of 1.4–1.75 inches in 30-inch rows. The hybrid planted was TA566-31 (T.A. Seeds, Jersey Shore, PA) with the Agrisure Viptera 3111 Bt trait package. All seed, including the UTC was treated with fungicide Maxim Quattro at 0.064 mg AI/seed. The tested insecticides were applied in-furrow, with calculations based on an application volume of 5 gal/acre. The at-plant insecticide treatments were applied on 1 May at rates given in Table 1. The plots received irrigation, fertilization, and weed management inputs following standard agronomic practices for the region, with no insecticide applications other than the experimental treatments. Plant stand counts and symptoms of wireworm feeding damage (wilting, feeding on leaf, stem, seed or root, or stem scarring) and presence of wireworms for 20 plants per plot were recorded at 7, 14, 21, 28, 35, and 56 days after planting (DAP). Cool, wet weather following planting led to slow plant emergence; therefore, all stand counts at 7 and 14 DAP were zero and are not presented below. The data were analyzed across sample dates using repeated measures PROC MIXED with mean separation by least square means ($P = 0.05$) in SAS version 9.4.

At 21 DAP, the Ampex 50WG (in-furrow insecticide) treatment resulted in significantly higher stand count when compared with Poncho (seed treatment) and the UTC. However, the stand counts were statistically equivalent amongst all treatments on the remaining dates. Stand counts within the Poncho-treated plots increased over time and were statistically higher at 35 and 56 DAP compared with 21 DAP. The percentage of plants with wireworm feeding show that peak feeding damage occurred at 35 DAP in the UTC, Aztec, and Ampex-treated plots, with percent of plants with symptoms at 35 DAP being significantly higher than at 21 DAP.

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Table 1.

Treatment/Formulation	Rate	Plant density (plants per acre)				Percentage of plants with wireworm-feeding symptoms			
		21 DAP[a]	28 DAP	35 DAP	56 DAP	21 DAP	28 DAP	35 DAP	56 DAP
Untreated check	–	20,250bc	24,750abc	25,750abc	23,250abc	3.75c	20.00abc	40.00a	21.25abc
Poncho 5FS[b]	0.5[c]	19,500c	25,250abc	26,250ab	26,000ab	6.25c	20.00abc	27.50abc	26.25abc
Aztec 4.67GR[d]	3.0[e]	25,500abc	27,250a	26,000ab	26,250ab	5.00c	13.75bc	35.00ab	21.25abc
Ampex 50WG[f]	5.12[g]	27,250a	28,750a	27,000a	26,750a	6.25c	15.00bc	41.25a	23.75abc

Means within each response type (plant density or percentage of plants with symptoms) followed by a common letter are not significantly different (FPLSD, $P \leq 0.05$).

[a]Days after planting.

[b]Seed treatment (clothianidin).

[c]mg AI per seed.

[d]In-furrow granule at planting (tebupirimphos + cyfluthrin).

[e]lb product per acre.

[f]In-furrow spray at planting (clothianidin).

[g]oz wt product per acre (0.16 lb AI/acre).