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**CORN:** *Zea mays* L. ' Pioneer P1173HR'

# EVALUATION OF INSECTICIDES APPLIED AT PLANTING FOR LARVAL CORN ROOTWORM CONTROL, 2012

**Terry A. DeVries**

South Central Agricultural Laboratory

University of Nebraska-Lincoln

842 Road 313, P.O. Box 66

Clay Center, NE 68933

Phone: (402) 762-4405

Fax: (402) 762-4411

Email: tdevries1@unl.edu

**Robert J. Wright**

Department of Entomology

University of Nebraska-Lincoln

213 Entomology Hall

Lincoln NE 68583-0816

Email: rwright2@unl.edu

Western corn rootworm (WCR): *Diabrotica virgifera virgifera* LeConte

Granular and liquid insecticides were applied at planting time to evaluate their effectiveness for larval corn rootworm (CRW) control in field corn near Clay Center, NE during 2012. Trial site was late-planted corn and pumpkins (insecticide free) during 2011. Experimental design was a RCB with 4 replicates. Plot size was 2 rows x 145 ft length in 30-inch row spacing. Soil type was a Crete silt loam. 'Pioneer P1173HR' (contains Herculex I insect traits) corn hybrid was planted on 23 Apr with a 2-row JD 7100 Maximerge planter with finger pickup seed units. The corn hybrid received a seed-applied treatment of Pioneer Premium Seed Treatment 250 (thiamethoxam @ 0.25 mg/kernel). A south wind @ < 12 mph occurred at planting. Granular insecticides were applied via the SmartBox application system and directed into the open seed furrow (IF). Liquid insecticides were applied in a 5 GPA water solution via a $CO_2$ pressurized system and directed IF. Initial CRW egg hatch occurred on approximately 08 May. Plant populations were evaluated on 09 May. The total number of plants per plot was recorded and converted to plants per acre. The total number of dead plants per plot was recorded on 27 Jun. Larval feeding damage was evaluated on 02 Jul. Five randomly selected plants were dug from each plot, washed, and rated using the Iowa State 0-3 scale (0 = no feeding, 1 = one node of roots pruned to within 1.5 inches of the stalk, 2 = two nodes of roots pruned to within 1.5 inches of the stalk, 3 = 3 or more nodes of roots pruned to within 1.5 inches of the stalk). The total number of pre-harvest root lodged plants per plot was recorded on 25 Sept. Plots were machine harvested on 26 Sept. Percent moisture and lbs of grain were recorded and corrected to 56 lbs/bu @ 15.5% moisture. Data were analyzed by PROC MIXED with mean separation using differences of least square means (P = 0.05).

From planting (23 Apr) to larval feeding damage evaluation (02 Jul), rainfall totaled 8.55 inches

and overhead irrigation, 1.57 inches. A planting error occurred in the Aztec 2.1G plot of Rep 1. Table 1 contains data from Reps 1-4 for the two Force treatments and untreated check. Table 2 contains data from Reps 2-4 for the three insecticide treatments and untreated check. Larval CRW densities were moderate, with mean root injury ratings (Iowa 0-3 scale) in the untreated check, averaging 1.42 (Table 1) and 1.32 (Table 2). At planting applications of Force 3G and Force CS significantly enhanced root injury protection compared to the untreated check (Table 1). All treatments significantly reduced the number of pre-harvest root lodged plants compared to the untreated check (Table 1 & 2). Grain yield levels were not significantly increased by the application of a soil insecticide at planting (Table 1 & 2). This research was supported by industry gifts of pesticides and research funding.

Table 1

| Treatment[a]/ Formulation | Rate-amt form/ 1000 row ft | Placement | Plants/ Acre[c] | No. of Dead Plants[c] | Root Injury Rating[b] | No. of Root Lodged Plants[b] | Yield Bu/Acre[c] |
|---|---|---|---|---|---|---|---|
| Force 3G | 4 oz | IF | 30,354 | 0.3 | 0.66 a | 122.0 a | 207.8 |
| Force CS | 0.46 fl oz | IF | 30,292 | 0.0 | 0.73 a | 132.3 a | 208.2 |
| Untreated | | | 30,051 | 1.3 | 1.42 b | 316.8 b | 202.7 |
| | | P | 0.5407 | 0.3025 | 0.0395 | 0.0315 | 0.8494 |

Table 2

| Treatment[a]/ Formulation | Rate-amt form/ 1000 row ft | Placement | Plants/ Acre[c] | No. of Dead Plants[c] | Root Injury Rating[c] | No. of Root Lodged Plants[b] | Yield Bu/Acre[c] |
|---|---|---|---|---|---|---|---|
| Aztec 2.1G | 6.7 oz | IF | 30,477 | 0.3 | 0.34 | 33.0 a | 224.4 |
| Force 3G | 4 oz | IF | 30,323 | 0.3 | 0.65 | 138.0 a | 207.1 |
| Force CS | 0.46 fl oz | IF | 30,299 | 0.0 | 0.78 | 123.0 a | 207.3 |
| Untreated | | | 30,204 | 0.3 | 1.32 | 335.7 b | 202.9 |
| | | P | 0.8863 | 0.8022 | 0.0698 | 0.0252 | 0.4126 |

[a]Granular insecticides were applied via the SmartBox application system and liquid insecticides were applied in a 5 GPA water solution at planting.

[b]Means in column followed by the same lower case letter are not statistically different using the differences of least square means (MIXED; p|t|>0.05.

[c]Means in column are not statistically different using the differences of least square means (MIXED; p|t|>0.05

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| **Brand Name** | **Formulation** | **Common Name** | **Composition** | **Manufacturer** |
|---|---|---|---|---|
| Aztec | 2.1G | tebupirimphos and cyfluthrin | (*RS*)-[*O*-(2-*tert*-butylpyrimidin-5-yl) *O*-ethyl *O*-isopropyl phosphorothioate] AND (*RS*)-α-cyano-4-fluoro-3-phenoxybenzyl (1*RS*,3*RS*;1*RS*,3*SR*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate | Amvac 4100 E. Washington Boul. Los Angeles, CA 90023 |
| Force | 3G | tefluthrin | 2,3,5,6-tetrafluoro-4-methylbenzyl (1*RS*,3*RS*)-3-[(*Z*)-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,2-dimethylcyclopropanecarboxylate | Amvac 4100 E. Washington Blvd. Los Angeles, CA 90023 |
| Force | CS | tefluthrin | 2,3,5,6-tetrafluoro-4-methylbenzyl (1*RS*,3*RS*)-3-[(*Z*)-2-chloro-3,3,3-trifluoroprop-1-enyl]-2,2-dimethylcyclopropanecarboxylate | Amvac 4100 E. Washington Blvd. Los Angeles, CA 90023 |