2004 CORN ROOTWORM SOIL INSECTICIDE / SEED TREATMENT EFFICACY AND YIELD EXPERIMENT

University of Nebraska
Agricultural Research and Development Center
Mead, Nebraska

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Background information pertaining to the experiment conducted at the ARDC, near Mead, Nebraska during 2004.

Background Information - Agronomic	Background Information - Entomology
Experimental Design	Environmental Conditions at Planting
Rainfall and Irrigation	Root Damage Evaluations

Agronomic

Hybrids:	DKC 60-15, DKC-12
Row Spacing:	30 inches
Planting Date:	23 April 2004
Planter:	Kinze model 2100, 4 row cone
Planting Depth:	2 inches
Application Equipment:	Granular insecticide Planting: planter mounted cone-belt system Liquid insecticide Planter mounted CO_2 pressurized sprayer
Field Preparation:	20 April 2004 - disked
Herbicides Applied:	23 April 2004: Harness Xtra, 2.5 qt/A, pre emerge 10 June 2004: 1.0 oz Permit + 0.67 oz Accent / A
Fertilizer Applied:	150 lb. N/A applied as NH_3, 15 April 2004
Previous Crop:	Continuous corn (trap crop)
Harvest date:	Hand harvested 100 ft of center two rows per plot, October 2004

Soil Information:

Type:	Silty clay loam
Ph:	6.4
CEC:	29.4
% organic matter:	2.8
% clay:	29.05
% silt:	66.67
% sand:	4.28

Plant Population: There were significant differences ($P < 0.05$) among treatment stand count means at harvest. Final stand counts presented in Table 1.

Insecticide History: Insecticide free: 1997, 1999, 2001, 2003

Multiclass soil insecticide trials: 1996, 1998, 2000, 2002

Entomological

Species present: Northern corn rootworm, *Diabrotica barberi* Smith and Lawrence, and western corn rootworm, *D. virgifera virgifera* LeConte. Initial rootworm egg hatch occurred between 22-23 May 2004 (predominantly western corn rootworm).

Root Evaluation: 1-6 (Hills and Peters 1971) and 0-3 root rating scales (J. Oleson, Iowa State University) were used to evaluate larval corn rootworm damage in each treatment. Five roots per replication were evaluated in each treatment.

Root Evaluation Date: 14 July 2004

Experimental Design

Design: Randomized complete block design
Replicated four times
Four-row treatments

Row Length: 60 feet

Statistical Analysis: Stand Counts, Root Ratings, Yields: Used SAS Mixed Procedure; Protected LSD test was used for mean separation ($P \leq 0.05$) .

Environmental

Conditions at planting:

Air temperature:	24EC
Wind speed:	12 mph at 5 ft height
Wind direction:	N - NE
Soil temperature 2" depth:	17EC
Soil temperature surface:	27EC
Soil moisture, 0-3" depth:	9 % water (gravimetric method)
% cloud cover:	70 % cloud cover (high haze)
% relative humidity:	not recorded

Residue on surface: 20% of soil surface covered with crop residue; soil moist, some clods on surface

Rainfall

April	09	0.039 inches
	18	0.039 inches
	20	0.039 inches
	24	0.787 inches
Total		**0.904 inches**

May	01	0.039 inches
	10	0.512 inches
	12	0.039 inches
	13	0.079 inches
	14	0.039 inches
	15	0.039 inches
	16	0.039 inches
	17	0.039 inches
	18	0.118 inches
	22	1.890 inches
	24	0.236 inches
	26	0.157 inches
	29	1.063 inches
Total		**4.289 inches**

June	05	0.236 inches
	12	2.323 inches
	13	0.079 inches
	15	0.118 inches
	18	0.236 inches
	21	0.236 inches
	24	0.039 inches
Total		**3.267 inches**

July	02	0.906 inches
	03	0.236 inches
	05	0.157 inches
	06	0.079 inches
	07	0.354 inches
	08	0.039 inches
	11	0.118 inches
	14	0.236 inches
	22	0.039 inches
	23	0.039 inches
	24	0.039 inches
	29	0.039 inches
	30	0.039 inches
Total		**2.320 inches**

August	08	0.039 inches
	12	0.039 inches
	25	1.496 inches
Total		**1.574 inches**

Irrigation:

Sprinkler irrigation was applied periodically as needed.

July	02	1.0 inch
	20	1.0 inch
	21	1.0 inch
	30	1.5 inch
August	17	0.5 inch

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Table 1. 2004 Corn Rootworm Soil Insecticide / Neonicotinoid
Seed Treatment Efficacy and Yield Experiment

University of Nebraska Agricultural Research and Development Center, near Mead, NE

Root Damage Rating, Final Stand, and Lodging ± SE

Treatment	Treatment Rate	Mean Root Rating[1] 1 - 6 Scale	Mean Root Rating[1] 0 - 3 Scale	Final Stand[2]	Percentage Lodging[3]
MON 863 DKC 60-12 plus Poncho 250	Clothianidin 0.25 mg ai/seed	2.25 ± 0.2a	0.08 ± 0.03a	143.0 ± 6.5a	0.0 ± 0.0
Isoline DKC 60-15 plus Poncho 1250 and Force 3G	Force 3.0G 0.12 oz ai/1000' T-band Clothianidin 1.25 mg ai/seed	2.50 ± 0.1ab	0.14 ± 0.01a	146.7 ± 6.0a	0.0 ± 0.0
Isoline DKC 60-15 plus Regent 4 SC	0.13 lb ai/A, 5 gpa microtube infurrow application	3.15 ± 0.3abc	0.62 ± 0.2ab	146.0 ± 2.3a	1.9 ± 1.0
Isoline DKC 60-15 plus Force 3G	Force 3.0G 0.12 oz ai/1000' T-band	3.40 ± 0.6bc	0.85 ± 0.6ab	149.7 ± 3.1a	2.6 ± 1.0
Isoline DKC 60-15 plus Poncho 1250	Clothianidin 1.25 mg ai/seed	3.80 ± 0.3cd	1.16 ± 0.3bc	150.5 ± 6.3a	5.1 ± 2.6
Isoline DKC 60-15 plus Poncho 250	Clothianidin 0.25 mg ai/seed	4.50 ± 0.3de	1.75 ± 0.2cd	149.0 ± 5.8a	24.5 ± 2.9
Isoline DKC 60-15 plus Cruiser 5 FS	Thiamethoxam 1.25 mg ai/seed	4.85 ± 0.3ef	2.06 ± 0.2de	147.2 ± 1.9a	29.4 ± 8.8
Isoline DKC 60-15		5.75 ± 0.2f	2.83 ± 0.1e	93.5 ± 3.0	

Planting date: 23 April 2004; Plot size: four rows x 60 ft per treatment per replication, 4 replications; means within columns followed by the same letter are not significantly different (P > 0.05, Fishers Protected LSD Test).

[1] Root evaluation date: 14 July 2004, rated 5 roots per treatment per replication

[2] Final stand = number of plants per 100 ft harvested in two center rows of each plot, stands recorded during October 2004

[3] Percentage lodging = proportion of final stand leaning >45 degree angle x 100

Table 2. 2004 Corn Rootworm Soil Insecticide / Neonicotinoid
Seed Treatment Efficacy and Yield Experiment
University of Nebraska Agricultural Research and Development Center, near Mead, NE
Yield ± SE

Treatment	Treatment Rate	Bulk Yield [1] Per Acre (bushels)	Yield Per [2] Plant (lbs)
Isoline DKC 60-15 plus Poncho 1250 and Force 3G	Force 3.0G 0.12 oz ai/1000' T-band Clothianidin 1.25 mg ai/seed	217.50 ± 8.0 a	0.478 ± 0.02a
MON 863 DKC 60-12 plus Poncho 250	Clothianidin 0.25 mg ai/seed	214.00 ± 7.2 a	0.482 ± 0.01 a
Isoline DKC 60-15 plus Regent 4 SC	0.13 lb ai/A, 5 gpa microtube infurrow application	209.67 ± 4.1a	0.462 ± 0.01ab
Isoline DKC 60-15 plus Force 3G	Force 3.0G 0.12 oz ai/1000' T-band	208.36 ± 8.8 a	0.448 ± 0.02ab
Isoline DKC 60-15 plus Poncho 1250	Clothianidin 1.25 mg ai/seed	204.32 ± 4.5 a	0.438 ± 0.01 ab
Isoline DKC 60-15 plus Poncho 250	Clothianidin 0.25 mg ai/seed	200.69 ± 8.8 a	0.432 ± 0.01 ab
Isoline DKC 60-15 plus Cruiser 5 FS	Thiamethoxam 1.25 mg ai/seed	190.86 ± 7.4 a	0.416 ± 0.01 b
Isoline DKC 60-15		117.99 ± 21.4 b	0.313 ± 0.04 c

Planting date: 23 April 2004; Plot size: four rows x 60 ft per treatment per replication, 4 replications; means within columns followed by the same letter are not significantly different (P > 0.05, Fishers Protected LSD Test)

[1] Bulk yields: hand harvested and shelled middle 50 ft of the two inside rows / plot during October 2004, presented as bushels of corn @ 15.5% moisture

[2] Yield per plant = lbs. bulk yield divided by final stand count