

**2005 CORN ROOTWORM SOIL INSECTICIDE / SEED TREATMENT
EFFICACY AND YIELD EXPERIMENT¹**

Final Report

University of Nebraska
Agricultural Research and Development Center
Mead, Nebraska

Lance J. Meinke, Jim Brown,
Laura Campbell, Bill McCormick

Department of Entomology
University of Nebraska
Lincoln, Nebraska 68583-0816

Background information pertaining to the experiment conducted at the ARDC, near Mead, Nebraska during 2005.

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

Agronomic

Hybrids: DKC 60-15, DKC-12

Row Spacing: 30 inches

Planting Date: 29 April 2005

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 CO₂ pressurized sprayer

Field Preparation: 17 March 2005 - chopped and disked, 18 April 2005 -

disked

Herbicides Applied: 4 May 2005: Harness Xtra, 2.0 qt/A, pre emerge

7 June 2005: 1.0 oz/A SPIRIT

Fertilizer Applied: 150 lb. N/A applied as NH₃, 1 April

2005

Previous Crop: Continuous corn (trap crop)

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

Insecticide History: Insecticide free:
1998, 2000, 2002

Multiclass soil insecticide trials: 1997, 1999, 2001, 2003

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 30-31 May 2005 (predominantly western corn rootworm).

Root Evaluation: 0-3 root rating scale (Oleson et al. 2005) was used to evaluate larval corn rootworm damage in each treatment. Ten roots per replication were

evaluated in each treatment.

Root Evaluation Date: 14 July 2005

Experimental Design

Design: Randomized complete block design

Replicated four times

Four-row treatments

Row Length: 60 feet

Statistical Analysis: Root ratings, final stand, lodging, yields: Used SAS Mixed Procedure; Protected LSD test was used for mean separation (P # 0.05) .

Environmental

Conditions at planting:

Air temperature:	15EC
Wind speed:	15 mph at 5 ft height
Wind direction:	N - NW
Soil temperature 2" depth:	13.5EC
Soil temperature surface:	27EC
Soil moisture, 0-3" depth:	17.2 % water (gravimetric method)
% cloud cover:	10-15 % cloud cover
% relative humidity:	not recorded

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

Rainfall

April	06	0.08 inch
	10	0.21
	11	0.98

12 0.57

16 0.01

18 0.25

20 0.84

21 0.10

22 0.13

Total 3.17

May 10 0.22 inch

11 0.86

12 1.12

18 0.05

25 0.21

26 0.01

29 0.09

31 0.65

Total 3.21

June 01 0.11 inches

03 0.61

04 0.63

05 0.04

09 0.68

10 0.23

11 0.06

21 0.01

25 0.04

27 0.14

29 0.01

Total 2.56

July 02 0.01 inches

17 0.82

18 0.02

25 2.92

26 0.18

Total **3.95**

Aug 10 0.34 inches

12 0.01

13 0.01

17 0.01

26 0.28

Total **0.65**

Irrigation (through August 2005):

Sprinkler irrigation was applied as needed throughout the season.

July 01 1.75 inches

August 02 1.5 inches

07 1.5

10 1.0

11 0.5

12 2.0

22 1.5

Table 1. 2005 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, Percentage Lodging \pm SE

Treatment	Treatment Rate¹	Mean Root Rating ² 0 - 3 Scale	Final³ Stand	Percentage⁴ Lodging
MON863 DKC 60-12 plus Poncho	Clothianidin 0.25mg ai/seed, ST	0.07 \pm 0.03 a	151.3 \pm 3.6 a	0.0 \pm 0.0 a
Isoline DKC 60-15 plus Poncho 250 and Aztec 2.1G	Clothianidin 0.25 mg ai/seed, ST Aztec: 0.141 oz ai/1000row-ft, TB	0.14 \pm 0.01 a	143.0 \pm 4.4 a	0.0 \pm 0.0 a
Isoline DKC 60-15 plus Poncho 1250 and Aztec 2.1G	Clothianidin 1.25 mg ai/seed, ST Aztec: 0.141 oz ai/1000 row-ft, TB	0.16 \pm 0.02 a	157.8 \pm 2.5 a	0.0 \pm 0.0 a

Isoline DKC 60-15 plus Cruiser 5 FS and Force 3G	Thiamethoxam 1.25 mg ai/ seed,ST Force: 0.12 oz ai/1000 row- ft, TB	0.18 ± 0.05 a	148.0 ± 9.8 a	0.0 ± 0.0 a
Isoline DKC 60-15 plus Poncho 1250 and Force 3G	Clothianidin 1.25 mg ai/ seed, ST Force: 0.12 oz ai/1000 row- ft, TB	0.20 ± 0.06 a	152.8 ± 6.4 a	0.0 ± 0.0 a
Isoline DKC 60-15 plus Regent 4 SC	0.13 lb ai/A, I, 5 gpa , MT	0.24 ± 0.08 a	143.5 ± 4.5 a	2.3 ± 2.3 a
Isoline DKC 60-15 plus Aztec 2.1G	Aztec: 0.141oz ai / 1000 row-ft, TB	0.24 ± 0.09 a	148.3 ± 5.6 a	0.0 ± 0.0 a
Isoline DKC 60-15 plus Force 3G	Force: 0.12 oz ai / 1000 row- ft, TB	0.33 ± 0.08 a	153.5 ± 5.7 a	0.0 ± 0.0 a
Isoline DKC 60-15 plus Poncho 250 and Regent 4 SC	Clothianidin 0.25 mg ai/ seed, ST Regent: 3.25 oz/A rate, I, 5gpa, MT	0.34 ± 0.20 a	148.8 ± 5.3 a	0.0 ± 0.0 a
Isoline DKC 60-15 plus Poncho 1250	Clothianidin 1.25 mg ai/ seed, ST	0.40 ± 0.13 ab	151.8 ± 3.7 a	0.0 ± 0.0 a
Isoline DKC 60-15 plus Poncho 250	Clothianidin 0.25 mg ai/ seed, ST	0.73 ± 0.17 bc	48.0 ± 7.9 a	2.1 ± 1.3 a
Isoline DKC 60-15 plus Cruiser 5 FS	Thiamethoxam 1.25 mg ai/ seed, ST	0.82 ± 0.29 c	139.5 ± 7.9 a	0.9 ± 0.9 a
Isoline DKC 60-15		1.66 ± 0.33 d	147.8 ± 2.5 a	23.4 ± 14.4 b

Planting date: 29 April 2005; 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 I=placement into open seed furrow, ST=seed treatment, TB=T-band (7 inch band placed over open seed furrow), MT=microtube application

² Root evaluation date: 14 July 2005, rated 10 roots from two outside rows per treatment per replication using 0-3 node injury scale (Oleson et al. 2005)

³ Final stand = number of plants per 100 ft harvested in two center rows of each plot, stands recorded during October 2005 during harvest

⁴ Percentage lodging = proportion of final stand leaning >45 degree angle x 100

Table 2. 2005 Corn Rootworm Soil Insecticide / Neonicotinoid

Seed Treatment Efficacy and Yield Experiment

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

Mean Root Damage Rating and Yield \pm SE

Treatment	Treatment Rate ¹	Mean Root Rating² (0 - 3 Scale)	Bulk Yield ³ (bushels per acre)
MON 863 DKC 60-12 plus Poncho	Clothianidin 0.25 mg ai/seed, ST	0.07 \pm 0.03 a	236.4 \pm 5.3 a
Isoline DKC 60-15 plus Poncho 250 and Aztec 2.1G	Clothianidin 0.25 mg ai/seed, ST Aztec: 0.141 oz ai/ 1000 row-ft, TB	0.14 \pm 0.01 a	227.2 \pm 5.5 ab

Isoline DKC 60-15 plus Poncho 1250 and Aztec 2.1G	Clothianidin 1.25 mg ai/ seed, ST Aztec: 0.141 oz ai/ 1000 row-ft, TB	0.16 ± 0.02 a	231.8 ± 2.2 ab
Isoline DKC 60-15 plus Cruiser 5 FS and Force 3G	Thiamethoxam 1.25 mg ai/ seed, ST Force: 0.12 oz ai/ 1000 row- ft, TB	0.18 ± 0.05 a	225.3 ± 9.8 ab
Isoline DKC 60-15 plus Poncho 1250 and Force 3G	Clothianidin 1.25 mg ai/ seed, ST Force: 0.12 oz ai/ 1000 row- ft, TB	0.20 ± 0.06 a	224.0 ± 5.9 ab
Isoline DKC 60-15 plus Regent 4 SC	0.13 lb ai/A, I, 5 gpa , MT	0.24 ± 0.08 a	217.9 ± 4.4 b
Isoline DKC 60-15 plus Aztec 2.1G	Aztec: 0.141oz ai / 1000 row-ft, TB	0.24 ± 0.09 a	223.2 ± 8.5 ab
Isoline DKC 60-15 plus Force 3G	Force: 0.12 oz ai / 1000 row- ft, TB	0.33 ± 0.08 a	218.6 ± 5.6 ab
Isoline DKC 60-15 plus Poncho 250 and Regent 4 SC	Clothianidin 0.25 mg ai/ seed, ST Regent: 3.25 oz/A rate, I, 5 gpa, MT	0.34 ± 0.20 a	225.2 ± 6.1 ab
Isoline DKC 60-15 plus Poncho 1250	Clothianidin 1.25 mg ai/ seed, ST	0.40 ± 0.13 ab	233.1 ± 6.6 ab
Isoline DKC 60-15 plus Poncho 250	Clothianidin 0.25 mg ai/ seed, ST	0.73 ± 0.17 bc	216.2 ± 10.3 b
Isoline DKC 60-15 plus Cruiser 5 FS	Thiamethoxam 1.25 mg ai/ seed, ST	0.82 ± 0.29 c	217.3 ± 2.5 b
Isoline DKC 60-15		1.66 ± 0.33 d	198.4 ± 18.8 c

Planting date: 29 April 2005; 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 I=placement into open seed furrow, ST=seed treatment, TB=T-band (7 inch band placed over open seed furrow), MT=microtube application

² Root evaluation date: 14 July 2005, rated 10 roots from two outside rows per treatment per replication using 0-3 node injury scale (Oleson et al. 2005)

³ Bulk yields: hand harvested and shelled middle 50 ft of the two inside rows / plot during October 2005, presented as bushels of corn @ 15.5% moisture