

**2007 Herculex Corn Rootworm Soil Insecticide / Seed
Treatment Efficacy Experiment.¹**

Data Summary

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

¹ The data presented in this report are not to be released to the public without the written permission of the Department of Entomology, University of Nebraska, Lincoln, Nebraska.

Background information pertaining to the experiment conducted at the ARDC, near Mead, Nebraska during 2007.

Agronomic

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|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hybrids: | Pioneer Brand 33D12, Pioneer Brand 33D14 |
| Row Spacing: | 30 inches |
| Planting Date: | 1 May 2007 |
| Planter: | Kinze model 2100, 4 row cone |
| Planting Depth: | 2 inches |
| Application Equipment: | <u>Granular insecticide</u> Planting: planter mounted cone-belt system or Smartbox system |
| Field Preparation: | 20 April 2007 - chopped and disked, 23 April 2007 - disked |
| Herbicides Applied: | 2 May 2007: 2.4 qt BicepII Mag 15 June 2007: Spirit 1.0 oz/ac |
| Fertilizer Applied: | 150 lb. N per acre applied as NH ₃ , 23 April 2007 |
| 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 |
| Plant Population: | There were no significant differences ($P > 0.05$) among treatment stand count means at V3 growth stage (Hanway 1997). The overall mean number of plants per 33.5 row-ft \pm SEM = 46.02 \pm 0.8 |
| Insecticide History: | Insecticide free: 2000, 2002, 2004, 2006 Multiclass soil insecticide trials: 1999, 2001, 2003, 2005 |

Entomological

| | |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Species present: | Northern corn rootworm, <i>Diabrotica barberi</i> Smith and Lawrence, and western corn rootworm, <i>D. virgifera virgifera</i> LeConte (predominantly western corn rootworm). Initial rootworm egg hatch occurred 25 May 2007. |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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

Root Evaluation Date: 31 July 2007

Experimental Design

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

Row Length: 33.5 feet

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

Environmental

Conditions at planting:

| | |
|----------------------------|-----------------------------------------------------------------------------------|
| Air temperature: | 25°C |
| Wind speed: | 10-15 mph at 5 ft height |
| Wind direction: | N-NE |
| Soil temperature 2" depth: | 25°C |
| Soil temperature surface: | 28°C |
| Soil moisture, 0-3" depth: | 20.1% (gravimetric method) |
| % cloud cover: | 30 % |
| % relative humidity: | not recorded |
| Residue on surface: | 20% of soil surface covered with crop residue; soil very moist, good planting bed |

2007 Rainfall

| | | | | | |
|-------|----|-------------|-------|----|------------------------------------------------------------------------|
| April | 01 | 0.01 inch | Aug | 01 | 0.13 inch |
| | 02 | 0.18 | | 02 | 0.02 |
| | 22 | 0.21 | | 05 | 0.21 |
| | 23 | 0.01 | | 06 | 1.62 |
| | 24 | 2.71 | | 07 | 0.04 |
| | 25 | 0.35 | | 08 | 1.26 |
| Total | | 3.47 | | 09 | 0.50 |
| | | | | 10 | 0.48 |
| May | 03 | 0.12 inch | | 12 | 2.02 |
| | 04 | 0.04 | | 16 | 0.13 |
| | 05 | 2.52 | | 17 | 0.02 |
| | 06 | 1.01 | | 20 | 0.47 |
| | 07 | 0.03 | | 22 | 0.44 |
| | 14 | 0.39 | | 23 | 0.76 |
| | 15 | 0.17 | Total | | 8.10 (total does not include rainfall recorded after 23 Aug 07) |
| | 22 | 0.02 | | | |
| | 23 | 0.40 | | | |
| | 24 | 0.84 | | | |
| | 26 | 0.17 | | | |
| | 27 | 0.01 | | | |
| | 28 | 0.03 | | | |
| | 29 | 0.03 | | | |
| | 30 | 0.03 | | | |
| | 31 | 0.47 | | | |
| Total | | 6.28 | | | |
| June | 02 | 0.14 inch | | | |
| | 03 | 0.18 | | | |
| | 04 | 0.15 | | | |
| | 06 | 0.02 | | | |
| | 13 | 0.97 | | | |
| | 14 | 0.02 | | | |
| | 22 | 0.10 | | | |
| Total | | 1.58 | | | |
| July | 09 | 0.53 inch | | | |
| | 12 | 0.06 | | | |
| | 13 | 0.01 | | | |
| | 15 | 0.01 | | | |
| | 19 | 0.51 | | | |
| | 27 | 0.21 | | | |
| | 28 | 0.02 | | | |
| Total | | 1.35 | | | |

Irrigation (through August 2007):

Sprinkler irrigation was applied as needed throughout the season.

June 26 1.00 inches
27 0.75

July 6 1.5 inches
17 0.5
26 0.75

Table 1. 2007 Herculex Corn Rootworm Soil Insecticide/Seed Treatment Experiment.
University of Nebraska Agricultural Research and Development Center, near Mead, NE.

Root Damage and Lodging Evaluation

| Treatment (Pioneer Brand Hybrids) | Seed Treatment / Insecticide Rate ^a | Mean Root Damage Rating (0-3 scale) ^b | Mean Percentage Lodged Plants ^c |
|-------------------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------------------|
| 33D14, Herculex XTRA, + Poncho 250 | ST = Clothianidin 0.25 mg ai/seed | 0.11 a | 4.00 b |
| 33D12, Herculex I + Poncho 250 and Aztec 4.67G | ST = Clothianidin 0.25 mg ai/seed ; Aztec: 0.141 oz ai/1000 row-ft, IF smartbox application | 0.27 a | 0.25 a |
| 33D12, Herculex I + Poncho 250 and Counter 15 G | ST = Clothianidin 0.25 mg ai/seed; Counter: 1.2 oz ai/1000 row-ft, TB smartbox application | 0.34 a | 1.25 a |
| 33D12, Herculex I + Poncho 250 and Lorsban 15G | ST = Clothianidin 0.25 mg ai/seed; Lorsban: 0.9 oz ai/1000 row-ft, TB | 0.37 a | 0.75 a |
| 33D12, Herculex I + Poncho 1250 | ST = Clothianidin 1.25 mg ai/seed | 0.39 a | 0.25 a |
| 33D12, Herculex I + Poncho 250 | ST = Clothianidin 0.25 mg ai/seed | 0.85 b | 1.50 a |

Within columns, mean values followed by the same letter are not significantly different from each other (Fisher's protected LSD test @ 0.05 significance level).

^a TB = T-band, 7-inch band placed over the open seed furrow; IF = placed in the open seed furrow; ST = seed treatment

^b Root rating scale used: 0 - 3 scale (Oleson et al. 2005);

^c Lodged plants = plants leaning >45° from vertical; lodged plants per treatment was recorded from two center rows of each plot on 27 August 2007. No plant lodging was observed in any treatment on 31 July 2007.

Possible explanation for the low but significantly different percentage of lodged plants in the Pioneer Hybrid 33D14 treatment on 27 August 07: Low-moderate rootworm injury led to extensive root regrowth on Pioneer Hybrid 33D12 treatments; the Pioneer 33D14 treatment had little rootworm injury or root regrowth; saturated soils during much of August coupled with severe wind events may have caused more lodging in the Pioneer Hybrid 33D14 treatment because less root mass was available to anchor the plants (unknown if ear weight varied among treatments or contributed to lodging).