

Yield and Efficacy Responses of Bt Transgenic CRW Corn Hybrids and Lorsban 15G At Planting To Nitrogen Fertilizer Application Rates

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Background information pertaining to corn rootworm experiments conducted at Clay Center, NE during 2008.

Agronomic

Hybrids (Traits):	Mycogen® 2T780 (LibertyLink®), 2T785 (YieldGard® Plus/RoundUp Ready® 2) and 2T787 (Herculex® XTRA, LibertyLink®)
Row Spacing:	30 inches
Row Orientation:	North-South
Planting Date:	30 April 2008
Planter:	No-till slot-planted into established ridge with 4-row 7300 JD Maximerge vacuum planter
Planting Depth:	2 inches
Application Equipment:	<u>Granular Insecticides:</u> Standard insecticide boxes were used to apply Lorsban® 15G in a t-band application at 8 oz product/1000 row ft.
Previous Crop:	Late planted corn
Soil Information:	Butler and Crete silt loam
Herbicides Applied:	Broadcasted: Keystone® @ 2.65 Qt/acre, Roundup WeatherMax® @ 26 fl oz/acre and AMS @ 17 lbs/100 gal solution on 06 May 2008.
Fertilizer Applied:	160 lbs, 80 lbs or 0 lbs of nitrogen broadcast as 28% liquid nitrogen on 08 April 2008. 5 GPA of 10-34-0 starter fertilizer was applied in furrow at planting.

Data Collection:

- Plant Population: The total number of plants per plot were recorded on 20 May and converted to plants per acre. Plant growth stage was V1.
- Extended Leaf Height: Extended leaf heights were recorded in inches from ten randomly selected plants per plot on 16 June. Plant growth stage was V6.
- Root Lodged Plants: The total number of root lodged plants per plot were recorded at root dig (09 July) and late season (30 September) and converted to percentage of plants lodged.
- Harvest Evaluation: Plots were machine harvested on 04 November. Percent moisture and lbs of grain were recorded and converted to 56 lbs/bu @ 15% moisture to evaluate yield.

Entomological Data:

- Species present: Predominantly western corn rootworm, *Diabrotica virgifera virgifera* LeConte, and a few northern corn rootworm, *D. barberi* Smith and Lawrence.
- CRW egg hatch: First observed on 02 June.
- Root Evaluation: Iowa 0-3 root damage scale was used to evaluate larval corn rootworm injury in each treatment per replication. Ten randomly selected plants were dug from each plot.
- Root Evaluation Date: 14 July 2008

Experimental Design

- Design: Split-plot
Replicated four times
- Plot Size: 4 rows x 65 feet
- Statistical Analyses: PROC MIXED, with mean separation using the differences of least square means (MIXED; $p|t|>0.05$).

Record of Rainfall: (April 1 - October 27)

<u>Date</u>	<u>Amount (Inches)</u>	<u>Date</u>	<u>Amount (Inches)</u>
April 3	0.41	July 10	1.85
April 8	0.18	July 12	0.25
April 10	1.21	July 15	0.20
April 17	0.80	July 16	2.14
April 18	1.15	July 18	1.15
April 24	0.30	August 6	0.30
April 26	0.30	August 9	1.45
May 6	1.31	August 12	0.45
May 8	0.26	August 14	0.15
May 10	1.13	August 23	0.23
May 21	0.25	September 1	1.02
May 22	1.45	September 8	0.65
May 23	1.01	September 11	0.25
May 26	0.10	September 12	0.25
May 27	0.26	October 6	1.60
May 29	0.10	October 13	1.40
June 4	1.10	October 14	0.95
June 5	0.15	October 21-23	2.80
June 7	0.26		
June 11	0.35		
June 24	1.29		
June 27	0.45		

<u>Month</u>	<u>Total (Inches)</u>
April	4.35
May	5.87
June	3.60
July	5.59
August	2.58
September	1.92
October	<u>6.75</u>
Total	30.66

Seasonal Record of Irrigation:

<u>Date</u>	<u>Amount (Inches)</u>	<u>Month</u>	<u>Total (Inches)</u>
July 31	1.70	July	1.70
August 6	1.71	August	<u>3.29</u>
August 26	<u>1.58</u>	Total	4.99
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**Yield and Efficacy Responses of Bt Transgenic CRW Corn Hybrids and Lorsban 15G At Planting
To Nitrogen Fertilizer Application Rates**

Effect	Lbs of Nitrogen	Hybrid Insect Trait(s) + Insecticide	Yield ² (bu/acre) (04 Nov.)	Avg. Root Ratings ^{2,3} (0-3 Scale) (14 July)	% Root Lodging ^{2,3} (30 Sept.)	% Root Lodging ^{2,3} (09 July)	Avg. Extended Leaf Height ^{2,3} (Inches) (16 June)	Avg. Plant Populations ^{2,3} (20 May)
Main	160	-----	198.9 a	0.62	14.6	0.4	31.8 a	26,744
	80	-----	169.9 b	0.65	25.5	0.9	30.7 a	26,739
	0	-----	138.2 c	0.80	30.2	0.4	28.4 b	26,607
		<i>Treatment Probability</i>	<i>0.0016</i>	<i>0.5177</i>	<i>0.0914</i>	<i>0.4443</i>	<i>0.0025</i>	<i>0.9376</i>
Split	-----	YieldGard [®] Plus	178.3 a	0.32 a	5.3 a	0.1 a	30.5	28,104 a
	-----	Herculex [®] XTRA	171.3 ab	0.22 a	0.1 a	0.0 a	30.8	25,717 c
	-----	Herculex I [®] + Lorsban [®] 15G ¹	165.7 ab	0.80 b	22.6 b	0.1 a	29.8	25,844 c
	-----	Herculex I [®]	160.7 b	1.43 c	65.8 c	2.1 b	30.1	27,123 b
		<i>Treatment Probability</i>	<i>0.0282</i>	<i><.0001</i>	<i><.0001</i>	<i>0.0004</i>	<i>0.1171</i>	<i><.0001</i>

¹Lorsban[®] 15G granular insecticide applied at planting in a t-band application at a rate of 8 oz product/1000 row ft.

²Means in column followed by the same lowercase letter are not statistically different using the differences of least square means (MIXED; p|t|>0.05).

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Main*Split	160	YieldGard [®] Plus	205.4	0.25	2.3 ab	0.0	32.1	28,420	
	160	Herculex I [®] + Lorsban [®] 15G ¹	199.4	0.63	6.7 ab	0.3	31.4	25,765	
	160	Herculex [®] XTRA	198.5	0.19	0.0 a	0.0	32.3	25,817	
	160	Herculex I [®]	192.4	1.41	49.4 d	1.3	31.2	26,975	
	80	YieldGard [®] Plus	182.9	0.26	2.1 a	0.1	30.4	28,194	
	80	Herculex [®] XTRA	173.6	0.21	0.0 a	0.0	30.9	25,944	
	80	Herculex I [®] + Lorsban [®] 15G ¹	171.9	0.70	20.6 bc	0.0	30.7	25,902	
	80	Herculex I [®]	151.1	1.46	79.5 e	3.6	30.9	26,918	
	0	YieldGard [®] Plus	146.7	0.46	11.6 ab	0.3	28.9	27,698	
	0	Herculex [®] XTRA	141.8	0.26	0.3 a	0.0	29.3	25,389	
	0	Herculex I [®]	138.7	1.42	68.6 e	1.4	28.1	27,476	
	0	Herculex I [®] + Lorsban [®] 15G ¹	125.7	1.07	40.5 cd	0.0	27.4	25,867	
	<i>Treatment Probability</i>			<i>0.4456</i>	<i>0.9093</i>	<i>0.0257</i>	<i>0.3459</i>	<i>0.5609</i>	<i>0.8913</i>

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