

Purdue University, Department of Entomology
Corn Rootworm Management Products Standard Efficacy Trial
Final Report
12 December 2012

TEST 1 of 2

Title: Corn Rootworm Management Products Standard Efficacy Trial;
Small Plot Assays

Location: Throckmorton-Purdue Agricultural Center, 8342 US231
South, Lafayette, IN 47909.

GPS coordinates: 40.300822, -86.902431

Cooperator: Christian Krupke, Department of Entomology, Purdue
University

Planting date: 16 May 2012

Base Hybrid; Pioneer P34R65

Row width: 30"

Planter Population: 32,000 kernels per acre

Soil Types: Replicates 1,2, and 3 = Throckmorton silt loam;
Replicate 4 = Toronto Millbrook complex silt loams

Soil Properties:

Organic matter; 2.7%	pH; 5.9
CEC: 17.3	Ca Sat'n 52%
Lime index 66	p lbs/ac 49
k lbs/ac 228	Ca lbs/ac 3582
Mg lbs/ac 789	Mg Sat'n 19%
Ca/Mg 2.7	K Sat'n 2%
Mg/K 11.3	Base Sat'n 72%

Texture: 9.2% sand, 68.4% silt, 22.4% clay

Tillage: 19 November 2011, Moldboard plow
12 April 2012. Field cultivator

Conditions at planting air temp; 73F
2" soil temp; 86F
wind dir and spd; SW 5-10 mph

Previous crop: corn (trap crop)

Previous year insecticide: none

Herbicides:

12 April, Harness Extra 2.5qt/a

12 June, Capreno 3 oz, Bucril 6 oz, Choice WM 3pt/100 gal, COC
1 gal/100 gal

Fertilizers:

12 April, 28-0-0 UAN solution 165 units/a

16 May, starter 12-12-12 113 lbs/a

Weather data: see Appendix I.

Methods:

Randomized complete block design, 4 replicates, single row plots x 100 ft, John Deere® Max-emerge® 7000 planter. Liquids were applied at 5 gpa using a single TeeJet® nozzle positioned 4-5 inches above, and oriented parallel over, an open furrow just ahead of the closing wheels. Pressure was 11 psi. Modified Noble® meters were used to apply granular insecticides. All applications were made at 3 mph. Plant population estimates were plants in 40 ft and converted to plants per acre. Seedling height estimates were the lengths of the longest extended leaf of a plant from the soil surface to the leaf tip (+/- 0.5 cm) for 10 consecutive plants/plot. Root injury was evaluated by digging, pressure washing, and rating (0-3 node injury scale) 5 random plants per plot. Plants were considered root-lodged when stalks at ground level were $\geq 45^\circ$ from vertical. Yields were not estimated.

Notes:

Planting was timely relative to the calendar although the planting season began unusually early. This location was severely drought stressed, however, one isolated timely storm in late June reduced plant stress and may have prevented premature plant death. Recurrent rains returned in August. Western corn rootworm, *Diabrotica virgifera*, was the predominant species at this site and likely emerged from egg diapause abnormally early due to atypically early warm conditions. The absence/scarcity of corn roots when rootworm diapause ended, which began prior to the installation of the trial, likely resulted in high larval mortality. The regionally increased use of rootworm resistant hybrids is also likely associated with a reduction in the rootworm equilibrium level at the research site.

Results: There were no treatment effects for plants per acre ($Pr > F = 0.1141$) or plant heights ($Pr > F = 0.0791$); see Tables 1 to 4. Root injury was lowest for the CRW resistant hybrids, seed coatings and the granular products. The products applied as liquid formulations were the most damaged ($Pr > F = 0.0165$), see Tables 5 and 6. Only a few root injury ratings (0.007%) exceeded the conventional economic injury level (0.25), therefore, consistency of performance was not calculated. Root-lodging (goose-necked characteristic) was not present, likely due to the low injury level and low frequency of strong storms during early season.

Table 1. Stand counts; Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Agricultural Center, Lafayette, IN.¹

Treatment	Oz ai /1000 ft ²	Plants per Acre	
		Mean ³	SEM
01. Aztec 2.1G	0.14 TB	31145.4 a	377.24
02. Aztec 2.1G	0.14 IF	30709.8 a	1,186.29
03. Force 3G	0.12 TB	30383.1 a	108.90
04. Force 3G	0.12 IF	30709.8 a	377.24
05. Lorsban 15G	1.20 TB	30492.0 a	435.60
06. Lorsban 15G	1.20 IF	30383.1 a	544.50
07. Counter 20G	1.20 IF	31145.4 a	417.06
08. SmartChoice 5G	0.25 IF	30383.1 a	449.01
09. 62-61/P250	0.25mg ST	30274.2 a	281.18
10. 62-61/P1250	1.25mg ST	30818.7 a	674.24
11. CORAGEN 1.67SC	0.0038 IF	28858.5 a	782.77
12. CORAGEN 1.67SC	0.0052 IF	29729.7 a	544.50
13. HGW86 200 G/L SC	0.0051 IF	27878.4 a	1,487.86
14. HGW86 200 G/L SC	0.0100 IF	29620.8 a	990.13
15. HGW86 200 G/L SC	0.1526 IF	29729.7 a	371.96
16. Check P34R65/C250		30492.0 a	308.02
17. 2K594 SS/RR	PIP	30274.2 a	377.24
18. 2K591 RR		30274.2 a	722.36
19. 2K592 HXX/RR	PIP	30709.8 a	548.12

¹Planted, 16 May 2012; Sampled, 11 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

³ANOVA PR>F=(0.1141).

Table 2. Stand counts by replicate; Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Agricultural Center, Lafayette, IN.¹

Treatment	Oz ai /1000 ft ²		Plants per Acre			
			R1	R2	R3	R4
01. Aztec 2.1G	0.14	TB	31363.2	31363.2	30056.4	31798.8
02. Aztec 2.1G	0.14	IF	33105.6	31363.2	30927.6	27442.8
03. Force 3G	0.12	TB	30492.0	30492.0	30056.4	30492.0
04. Force 3G	0.12	IF	30056.4	31363.2	30056.4	31363.2
05. Lorsban 15G	1.20	TB	29185.2	30927.6	30927.6	30927.6
06. Lorsban 15G	1.20	IF	29185.2	30056.4	30492.0	31798.8
07. Counter 20G	1.20	IF	32234.4	31363.2	30492.0	30492.0
08. SmartChoice 5G	0.25	IF	29185.2	30492.0	30492.0	31363.2
09. 62-61/P250	0.25mg	ST	30927.6	29620.8	30056.4	30492.0
10. 62-61/P1250	1.25mg	ST	32670.0	30056.4	29620.8	30927.6
11. CORAGEN 1.67SC	0.0038	IF	30056.4	29620.8	29185.2	26571.6
12. CORAGEN 1.67SC	0.0052	IF	31363.2	29185.2	29185.2	29185.2
13. HGW86 200 G/L SC	0.0051	IF	31798.8	24829.2	28314.0	26571.6
14. HGW86 200 G/L SC	0.0100	IF	31363.2	27007.2	29185.2	30927.6
15. HGW86 200 G/L SC	0.1526	IF	30056.4	29620.8	28749.6	30492.0
16. Check P34R65/C250	0.25mg		31363.2	30492.0	30056.4	30056.4
17. 2K594 SS/RR		PIP	30927.6	29620.8	30927.6	29620.8
18. 2K591 RR			31363.2	31363.2	30056.4	28314.0
19. 2K592 HXX/RR		PIP	30927.6	31798.8	30927.6	29185.2

¹Planted, 16 May 2012; Sampled, 11 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 3. Plant Height by replication; Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Agricultural Center, Lafayette, IN.¹

Treatment	Oz ai /1000 ft ²	Extended Leaf Height	
		Mean ³	SEM
01. Aztec 2.1G	0.14 TB	56.72 a	2.773
02. Aztec 2.1G	0.14 IF	56.20 a	1.016
03. Force 3G	0.12 TB	53.65 a	2.815
04. Force 3G	0.12 IF	57.12 a	2.400
05. Lorsban 15G	1.20 TB	56.15 a	2.387
06. Lorsban 15G	1.20 IF	60.58 a	0.758
07. Counter 20G	1.20 IF	55.42 a	0.986
08. SmartChoice 5G	0.25 IF	54.08 a	4.751
09. 62-61/P250	0.25mg ST	59.52 a	2.347
10. 62-61/P1250	1.25mg ST	53.08 a	2.158
11. CORAGEN 1.67SC	0.0038 IF	58.35 a	1.687
12. CORAGEN 1.67SC	0.0052 IF	52.50 a	2.593
13. HGW86 200 G/L SC	0.0051 IF	54.80 a	0.610
14. HGW86 200 G/L SC	0.0100 IF	56.12 a	0.886
15. HGW86 200 G/L SC	0.1526 IF	54.18 a	1.721
16. Check P34R65/C250	0.25mg	54.25 a	2.001
17. 2K594 SS/RR	PIP	56.75 a	2.894
18. 2K591 RR		55.50 a	2.528
19. 2K592 HXX/RR	PIP	50.58 a	2.063

¹Planted, 16 May 2012; Sampled, 11 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

³ANOVA PR>F=(0.0791).

Table 4. Plant Height by replication; Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Agricultural Center, Lafayette, IN.¹

Treatment	Oz ai /1000 ft ²	Extended Leaf Height (cm)			
		R1	R2	R3	R4
01. Aztec 2.1G	0.14 TB	57.8	48.6	60.6	59.9
02. Aztec 2.1G	0.14 IF	54.0	55.0	57.5	58.3
03. Force 3G	0.12 TB	49.6	54.9	49.0	61.1
04. Force 3G	0.12 IF	54.9	57.1	52.7	63.8
05. Lorsban 15G	1.20 TB	50.5	55.3	56.7	62.1
06. Lorsban 15G	1.20 IF	61.8	58.5	61.6	60.4
07. Counter 20G	1.20 IF	53.6	56.1	57.9	54.1
08. SmartChoice 5G	0.25 IF	50.9	59.8	42.2	63.4
09. 62-61/P250	0.25mg ST	54.3	61.1	57.5	65.2
10. 62-61/P1250	1.25mg ST	49.5	57.2	49.2	56.4
11. CORAGEN 1.67SC	0.0038 IF	57.6	56.6	55.9	63.3
12. CORAGEN 1.67SC	0.0052 IF	48.9	50.5	50.4	60.2
13. HGW86 200 G/L SC	0.0051 IF	55.7	53.0	55.2	55.3
14. HGW86 200 G/L SC	0.0100 IF	58.0	53.8	56.8	55.9
15. HGW86 200 G/L SC	0.1526 IF	49.6	53.8	55.6	57.7
16. Check P34R65/C250	0.25mg	59.7	52.6	50.3	54.4
17. 2K594 SS/RR	PIP	50.9	62.8	52.8	60.5
18. 2K591 RR		48.8	58.6	54.5	60.1
19. 2K592 HXX/RR	PIP	46.6	51.4	48.3	56.0

¹Planted, 16 May 2012; Sampled, 11 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 5. Node injury ratings; Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Ag Center, Lafayette, IN.¹

Treatment	Oz ai /1000 ft ²	Node Injury (0-3 Scale)		
		Mean ³		SEM
12. CORAGEN 1.67SC	0.0052 IF	0.158	a	0.0250
15. HGW86 200 G/L SC	0.1526 IF	0.155	ab	0.0352
14. HGW86 200 G/L SC	0.0100 IF	0.142	abc	0.0225
16. Check P34R65/C250	0.25mg	0.142	abc	0.0144
04. Force 3G	0.12 IF	0.138	abcd	0.0189
18. 2K591 RR		0.135	abcd	0.0144
11. CORAGEN 1.67SC	0.0038 IF	0.132	abcd	0.0175
13. HGW86 200 G/L SC	0.0051 IF	0.130	abcd	0.0200
08. SmartChoice 5G	0.25 IF	0.125	abcd	0.0087
05. Lorsban 15G	1.20 TB	0.122	abcd	0.0063
07. Counter 20G	1.20 IF	0.112	abcd	0.0063
10. 62-61/P1250	1.25mg ST	0.105	bcde	0.0150
03. Force 3G	0.12 TB	0.102	cde	0.0193
01. Aztec 2.1G	0.14 TB	0.100	cde	0.0122
02. Aztec 2.1G	0.14 IF	0.095	cde	0.0250
06. Lorsban 15G	1.20 IF	0.090	de	0.0147
09. 62-61/P250	0.25mg ST	0.088	de	0.0193
19. 2K592 HXX/RR	PIP	0.088	de	0.0132
17. 2K594 SS/RR	PIP	0.060	e	0.0091

¹Planted, 16 May 2012; Sampled, 12 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

³ANOVA PR>F=(0.0165).

Table 6. Node injury ratings by replication. Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Ag Center, Lafayette, IN. ¹

Treatment	Oz ai /1000 ft ²	Node Injury (0-3 Scale)			
		R1	R2	R3	R4
12. CORAGEN 1.67SC	0.0052 IF	0.12	0.13	0.23	0.15
15. HGW86 200 G/L SC	0.1526 IF	0.26	0.12	0.13	0.11
14. HGW86 200 G/L SC	0.0100 IF	0.18	0.17	0.08	0.14
16. Check P34R65/C250	0.25mg	0.12	0.12	0.15	0.18
04. Force 3G	0.12 IF	0.13	0.19	0.10	0.13
18. 2K591 RR		0.13	0.10	0.14	0.17
11. CORAGEN 1.67SC	0.0038 IF	0.09	0.12	0.15	0.17
13. HGW86 200 G/L SC	0.0051 IF	0.11	0.11	0.11	0.19
08. SmartChoice 5G	0.25 IF	0.15	0.11	0.12	0.12
05. Lorsban 15G	1.20 TB	0.12	0.12	0.11	0.14
07. Counter 20G	1.20 IF	0.10	0.11	0.11	0.13
10. 62-61/P1250	1.25mg ST	0.09	0.13	0.07	0.13
03. Force 3G	0.12 TB	0.12	0.05	0.10	0.14
01. Aztec 2.1G	0.14 TB	0.12	0.09	0.12	0.07
02. Aztec 2.1G	0.14 IF	0.16	0.04	0.10	0.08
06. Lorsban 15G	1.20 IF	0.05	0.12	0.10	0.09
09. 62-61/P250	0.25mg ST	0.11	0.06	0.05	0.13
19. 2K592 HXX/RR	PIP	0.05	0.10	0.09	0.11
17. 2K594 SS/RR	PIP	0.08	0.05	0.07	0.04

¹Planted, 16 May 2012; Sampled, 12 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 7. Individual root ratings. Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Agricultural Center, Lafayette, IN¹.

Rep 1 Node injury ratings by root.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.10	.10	.10	.15	.15
02.	Aztec 2.1G	0.14 IF	.20	.15	.15	.25	.05
03.	Force 3G	0.12 TB	.20	.10	.10	.10	.10
04.	Force 3G	0.12 IF	.25	.15	.10	.05	.10
05.	Lorsban 15G	1.20 TB	.10	.15	.10	.15	.10
06.	Lorsban 15G	1.20 IF	.05	.05	.05	.10	.00
07.	Counter 20G	1.20 IF	.10	.10	.05	.15	.10
08.	SmartChoice 5G	0.25 IF	.15	.15	.15	.20	.10
09.	62-61/P250	0.25mg ST	.15	.10	.05	.15	.10
10.	62-61/P1250	1.25mg ST	.10	.10	.10	.05	.10
11.	CORAGEN 1.67SC	0.0038 IF	.10	.05	.10	.00	.20
12.	CORAGEN 1.67SC	0.0052 IF	.05	.10	.15	.20	.10
13.	HGW86 200 G/L SC	0.0051 IF	.10	.10	.05	.15	.15
14.	HGW86 200 G/L SC	0.0100 IF	.15	.20	.25	.15	.15
15.	HGW86 200 G/L SC	0.1526 IF	.25	.10	.50	.20	.25
16.	Check P34R65/C250	0.25mg	.15	.10	.20	.10	.05
17.	2K594 SS/RR	PIP	.00	.10	.10	.10	.10
18.	2K591 RR		.20	.15	.10	.10	.10
19.	2K592 HXX/RR	PIP	.05	.00	.05	.10	.05

Rep 2. Node injury ratings by root, continued.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.10	.05	.05	.15	.10
02.	Aztec 2.1G	0.14 IF	.00	.05	.05	.05	.05
03.	Force 3G	0.12 TB	.05	.10	.05	.05	.00
04.	Force 3G	0.12 IF	.10	.10	.50	.15	.10
05.	Lorsban 15G	1.20 TB	.15	.10	.15	.10	.10
06.	Lorsban 15G	1.20 IF	.15	.10	.10	.10	.15
07.	Counter 20G	1.20 IF	.05	.10	.10	.10	.20
08.	SmartChoice 5G	0.25 IF	.15	.10	.15	.10	.05
09.	62-61/P250	0.25mg ST	.00	.10	.05	.05	.10
10.	62-61/P1250	1.25mg ST	.10	.20	.10	.10	.15
11.	CORAGEN 1.67SC	0.0038 IF	.10	.20	.10	.10	.10
12.	CORAGEN 1.67SC	0.0052 IF	.15	.10	.10	.15	.15
13.	HGW86 200 G/L SC	0.0051 IF	.10	.10	.10	.10	.15
14.	HGW86 200 G/L SC	0.0100 IF	.25	.20	.10	.10	.20
15.	HGW86 200 G/L SC	0.1526 IF	.10	.10	.20	.10	.10
16.	Check P34R65/C250	0.25mg	.15	.10	.10	.15	.10
17.	2K594 SS/RR	PIP	.10	.00	.05	.00	.10
18.	2K591 RR		.05	.10	.10	.15	.10
19.	2K592 HXX/RR	PIP	.10	.00	.25	.10	.05

Rep 3. Node injury ratings by root, continued.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.05	.10	.10	.15	.20
02.	Aztec 2.1G	0.14 IF	.10	.10	.10	.15	.05
03.	Force 3G	0.12 TB	.15	.10	.10	.05	.10
04.	Force 3G	0.12 IF	.10	.15	.10	.10	.05
05.	Lorsban 15G	1.20 TB	.05	.10	.15	.15	.10
06.	Lorsban 15G	1.20 IF	.10	.15	.10	.10	.05
07.	Counter 20G	1.20 IF	.10	.15	.05	.10	.15
08.	SmartChoice 5G	0.25 IF	.10	.15	.15	.10	.10
09.	62-61/P250	0.25mg ST	.00	.05	.05	.10	.05
10.	62-61/P1250	1.25mg ST	.05	.10	.10	.05	.05
11.	CORAGEN 1.67SC	0.0038 IF	.15	.10	.15	.15	.20
12.	CORAGEN 1.67SC	0.0052 IF	.50	.20	.15	.15	.15
13.	HGW86 200 G/L SC	0.0051 IF	.15	.10	.15	.05	.10
14.	HGW86 200 G/L SC	0.0100 IF	.00	.05	.05	.15	.15
15.	HGW86 200 G/L SC	0.1526 IF	.10	.10	.10	.15	.20
16.	Check P34R65/C250	0.25mg	.05	.15	.20	.25	.10
17.	2K594 SS/RR	PIP	.10	.05	.05	.05	.10
18.	2K591 RR		.15	.15	.15	.10	.15
19.	2K592 HXX/RR	PIP	.15	.10	.05	.05	.10

Rep 4 Node injury ratings by root, continued.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.05	.00	.10	.05	.15
02.	Aztec 2.1G	0.14 IF	.05	.15	.10	.05	.05
03.	Force 3G	0.12 TB	.15	.10	.20	.15	.10
04.	Force 3G	0.12 IF	.10	.20	.10	.10	.15
05.	Lorsban 15G	1.20 TB	.10	.15	.15	.20	.10
06.	Lorsban 15G	1.20 IF	.10	.05	.15	.10	.05
07.	Counter 20G	1.20 IF	.15	.10	.10	.15	.15
08.	SmartChoice 5G	0.25 IF	.10	.15	.20	.05	.10
09.	62-61/P250	0.25mg ST	.15	.10	.10	.15	.15
10.	62-61/P1250	1.25mg ST	.10	.15	.15	.15	.10
11.	CORAGEN 1.67SC	0.0038 IF	.20	.25	.10	.10	.20
12.	CORAGEN 1.67SC	0.0052 IF	.20	.15	.20	.10	.10
13.	HGW86 200 G/L SC	0.0051 IF	.25	.15	.20	.15	.20
14.	HGW86 200 G/L SC	0.0100 IF	.10	.15	.10	.15	.20
15.	HGW86 200 G/L SC	0.1526 IF	.10	.10	.15	.10	.10
16.	Check P34R65/C250	0.25mg	.15	.20	.20	.15	.20
17.	2K594 SS/RR	PIP	.05	.05	.05	.00	.05
18.	2K591 RR		.10	.20	.20	.15	.20
19.	2K592 HXX/RR	PIP	.10	.10	.15	.10	.10

Table 8. Root-lodged (goose-necked) plants per 17.4 ft. Rootworm Management Product Efficacy Assay. Throckmorton-Purdue Ag Center, Lafayette, IN. ¹

Treatment, Place ²	Oz ai /1000 ft	Root-Lodged Plants			
		R1	R2	R3	R4
01. Aztec 2.1G	0.14 TB	0	0	0	0
02. Aztec 2.1G	0.14 IF	0	0	0	0
03. Force 3G	0.12 TB	0	0	0	0
04. Force 3G	0.12 IF	0	0	0	0
05. Lorsban 15G	1.20 TB	0	0	0	0
06. Lorsban 15G	1.20 IF	0	0	0	0
07. Counter 20G	1.20 IF	0	0	0	0
08. SmartChoice 5G	0.25 IF	0	0	0	0
09. 62-61/P250	0.25mg ST	0	0	0	0
10. 62-61/P1250	1.25mg ST	0	0	0	0
11. CORAGEN 1.67SC	0.0038 IF	0	0	0	0
12. CORAGEN 1.67SC	0.0052 IF	0	0	0	0
13. HGW86 200 G/L SC	0.0051 IF	0	0	0	0
14. HGW86 200 G/L SC	0.0100 IF	0	0	0	0
15. HGW86 200 G/L SC	0.1526 IF	0	0	0	0
16. Check P34R65/C250	0.25mg	0	0	0	0
17. 2K594 SS/RR	PIP	0	0	0	0
18. 2K591 RR		0	0	0	0
19. 2K592 HXX/RR	PIP	0	0	0	0

¹Planted, 16 May 2012; Sampled, 12 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

TEST 2 of 2

Title: Corn Rootworm Management Products Standard Efficacy Trial;
Small Plot Assays

Location: Pinney-Purdue Agricultural Center, 11402 South County
Line Road, Wanatah, IN 46390

GPS coordinates: 40.41.446279, -086.941900

Cooperator: Christian Krupke, Department of Entomology, Purdue
University

Planting date: 18 May 2012

Base Hybrid; Pioneer P34R65

Row width: 30"

Planter Population: 32,000 kernels per acre

Soil Type: Sebewa loam

Soil Properties:

Organic matter; 2.9%	pH; 6.3
CEC: 13.1	Ca Sat'n 53%
Lime index 68	p lbs/ac 88
k lbs/ac 335	Ca lbs/ac 2776
Mg lbs/ac 800	Mg Sat'n 25%
Ca/Mg 2.1	K Sat'n 3%
Mg/K 7.8	Base Sat'n 81%

Texture: 49.2% sand, 38.4% silt, 12.4% clay

Tillage: Chisel plow, 16 November 2011; disc + rolling harrow, 11
April 2012; field cultivator + rolling harrow, 14 May
2012;

Conditions at planting: air temp; 77°F
2" soil temp; 78°F
wind dir and spd; NE 7-12 mph

Previous crop: corn (trap crop)

Previous year insecticide: none

Herbicides:

14 May 2012, Balance Flexx, 3.0 oz/a; Harness Extra, 2.0 qt/a

Fertilizers:

18 May 2012, 12-12-12 113 lbs/a starter

24 June 2012, 28-0-0 UAN solution, 150 units/a, side dress.

Weather data: see Appendix II.

Methods:

Randomized complete block design, 4 replicates, single row plots x 100 ft, John Deere® Max-merge® 7000 planter. Liquids were applied at 5 gpa using a single TeeJet® nozzle positioned 4-5 inches above, and oriented parallel over, an open furrow just ahead of the closing wheels. Pressure was 11 psi. Modified Noble® meters were used to apply granular insecticides. All applications were made at 3 mph. Plant population estimates were plants in 40 ft and converted to plants per acre. Seedling height estimates were the lengths of the longest extended leaf of a plant from the soil surface to the leaf tip (+/- 0.5 cm) for 10 consecutive plants/plot. Root injury was evaluated by digging, pressure washing, and rating (0-3 node injury scale) 5 plants per plot. Plants were considered root-lodged when stalks at ground level were $\geq 45^\circ$ from vertical. Yields were not estimated.

Notes:

Planting was timely relative to the calendar although the planting season began unusually early. This northwest Indiana location received timely rains in contrast to most of central and southern counties. Western corn rootworm, *Diabrotica virgifera* was the predominant species at this site and likely emerged from egg diapause abnormally early due to atypically early warm conditions. The absence/scarcity of corn roots when rootworm diapause ended, which began prior to the installation of the trial, likely resulted in high larval mortality. The regionally increased use of rootworm resistant hybrids is also likely associated with a reduction in the rootworm equilibrium level at the research site.

Results: There were no treatment effects for plants per acre ($Pr>F=0.7223$) or plant heights ($Pr>F=0.3500$); see Tables 9 to 12. Although there were no treatment effects for root injury ($Pr>F=0.0612$), the CRW-resistant hybrids and the products applied as seed coatings or granules were associated with the lowest damage. The products applied as liquid formulations tended to be most damaged (Tables 13-15). Likewise, the evaluation of the ability of products to protect individual plants below the conventional economic injury threshold (0.25 node) referred to as percentage consistency showed the same relationships ($Pr>F=0.0498$, Tables 15,16). Root-lodging was not present during the root injury evaluations.

Table 9. Plants per acre; Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²	Plants per Acre	
		Mean ³	SEM
01. Aztec 2.1G	0.14 TB	31,145.4 a	743.93
02. Aztec 2.1G	0.14 IF	31,145.4 a	653.40
03. Force 3G	0.12 TB	31,472.1 a	1,087.18
04. Force 3G	0.12 IF	30,492.0 a	470.50
05. Lorsban 15G	1.20 TB	30,818.7 a	371.96
06. Lorsban 15G	1.20 IF	30,492.0 a	1,036.94
07. Counter 20G	1.20 IF	30,600.9 a	572.80
08. Smart Choice 5G	0.25 IF	30,709.8 a	628.73
09. 62-61/P250	0.25mg ST	29,076.3 a	544.50
10. 62-61/P1250	1.25mg ST	29,947.5 a	544.50
11. CORAGEN 1.67SC	0.0038 IF	31,254.3 a	859.78
12. CORAGEN 1.67SC	0.0052 IF	30,492.0 a	775.16
13. HGW86 200 G/L SC	0.0051 IF	30,709.8 a	1,044.53
14. HGW86 200 G/L SC	0.0100 IF	31,036.5 a	371.96
15. HGW86 200 G/L SC	0.1526 IF	30,927.6 a	470.50
16. Check P34R65/C250	0.25mg	30,274.2 a	576.24
17. 2K594 SS/RR	PIP	29,620.8 a	177.83
18. 2K591 RR		30,274.2 a	653.40
19. 2K592 HXX/RR	PIP	30,709.8 a	518.47

¹Planted, 18 May 2012; Sampled, 20 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP= aplant incorporated protectant.

³ANOVA PR>F=(0.7223).

Table 10. Stand counts by replicate; Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²		Plants per Acre			
			R1	R2	R3	R4
01. Aztec 2.1G	0.14	TB	33105.6	29620.8	30492.0	31363.2
02. Aztec 2.1G	0.14	IF	30056.4	31798.8	30056.4	32670.0
03. Force 3G	0.12	TB	31798.8	34412.4	30056.4	29620.8
04. Force 3G	0.12	IF	30492.0	30927.6	31363.2	29185.2
05. Lorsban 15G	1.20	TB	31798.8	30492.0	30927.6	30056.4
06. Lorsban 15G	1.20	IF	31798.8	32670.0	28314.0	29185.2
07. Counter 20G	1.20	IF	32234.4	29620.8	30492.0	30056.4
08. SmartChoice 5G	0.25	IF	29185.2	30927.6	32234.4	30492.0
09. 62-61/P250	0.25mg	ST	30492.0	28749.6	29185.2	27878.4
10. 62-61/P1250	1.25mg	ST	31363.2	28749.6	29620.8	30056.4
11. CORAGEN 1.67SC	0.0038	IF	30492.0	32670.0	29185.2	32670.0
12. CORAGEN 1.67SC	0.0052	IF	29620.8	30492.0	32670.0	29185.2
13. HGW86 200 G/L SC	0.0051	IF	32670.0	31798.8	27878.4	30492.0
14. HGW86 200 G/L SC	0.0100	IF	31798.8	31363.2	30056.4	30927.6
15. HGW86 200 G/L SC	0.1526	IF	30927.6	30056.4	32234.4	30492.0
16. Check P34R65/C250	0.25mg		29185.2	29620.8	30492.0	31798.8
17. 2K594 SS/RR		PIP	29620.8	30056.4	29185.2	29620.8
18. 2K591 RR			31798.8	30927.6	29185.2	29185.2
19. 2K592 HXX/RR		PIP	31363.2	30927.6	29185.2	31363.2

¹Planted, 18 May 2012; Sampled, 20 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 11. Plant Height by replication; Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²	Extended Leaf Height cm	
		Mean ³	SEM
01. Aztec 2.1G	0.14 TB	78.90 a	3.763
02. Aztec 2.1G	0.14 IF	78.50 a	2.117
03. Force 3G	0.12 TB	70.48 a	3.189
04. Force 3G	0.12 IF	77.62 a	1.938
05. Lorsban 15G	1.20 TB	74.12 a	6.447
06. Lorsban 15G	1.20 IF	77.72 a	5.979
07. Counter 20G	1.20 IF	77.42 a	3.814
08. SmartChoice 5G	0.25 IF	76.72 a	2.027
09. 62-61/P250	0.25mg ST	70.45 a	3.097
10. 62-61/P1250	1.25mg ST	78.48 a	1.344
11. CORAGEN 1.67SC	0.0038 IF	71.12 a	4.244
12. CORAGEN 1.67SC	0.0052 IF	78.80 a	3.158
13. HGW86 200 G/L SC	0.0051 IF	76.20 a	1.836
14. HGW86 200 G/L SC	0.0100 IF	79.15 a	3.617
15. HGW86 200 G/L SC	0.1526 IF	80.32 a	1.109
16. Check P34R65/C250	0.25mg	77.65 a	5.148
17. 2K594 SS/RR	PIP	77.05 a	4.549
18. 2K591 RR		76.28 a	1.260
19. 2K592 HXX/RR	PIP	82.05 a	3.397

¹Planted, 18 May 2012; Sampled, 20 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

³ANOVA PR>F=(0.3500).

Table 12. Plant Height by replication. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²	Extended Leaf Height			
		R1	R2	R3	R4
01. Aztec 2.1G	0.14 TB	71.2	80.6	75.2	88.6
02. Aztec 2.1G	0.14 IF	77.3	74.8	84.6	77.3
03. Force 3G	0.12 TB	64.3	67.7	79.2	70.7
04. Force 3G	0.12 IF	73.6	82.6	75.8	78.5
05. Lorsban 15G	1.20 TB	62.9	83.9	86.6	63.1
06. Lorsban 15G	1.20 IF	60.7	79.0	83.0	88.2
07. Counter 20G	1.20 IF	69.0	77.2	87.5	76.0
08. SmartChoice 5G	0.25 IF	72.1	75.3	81.7	77.8
09. 62-61/P250	0.25mg ST	66.7	75.3	63.7	76.1
10. 62-61/P1250	1.25mg ST	79.6	77.8	81.4	75.1
11. CORAGEN 1.67SC	0.0038 IF	64.6	64.0	74.1	81.8
12. CORAGEN 1.67SC	0.0052 IF	76.7	70.9	85.0	82.6
13. HGW86 200 G/L SC	0.0051 IF	81.1	72.2	75.9	75.6
14. HGW86 200 G/L SC	0.0100 IF	69.0	79.7	85.9	82.0
15. HGW86 200 G/L SC	0.1526 IF	77.7	82.7	81.5	79.4
16. Check P34R65/C250	0.25mg	63.8	81.2	77.3	88.3
17. 2K594 SS/RR	PIP	67.2	82.4	86.8	71.8
18. 2K591 RR		73.4	79.5	75.7	76.5
19. 2K592 HXX/RR	PIP	72.1	86.6	83.3	86.2

¹Planted, 18 May 2012; Sampled, 20 June 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 13. Node injury ratings. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²	Node Injury (0-3 Scale)	
		Mean ³	SEM
01. Aztec 2.1G	0.14 TB	0.210 a	0.0543
02. Aztec 2.1G	0.14 IF	0.208 a	0.0175
03. Force 3G	0.12 TB	0.248 a	0.0293
04. Force 3G	0.12 IF	0.178 a	0.0210
05. Lorsban 15G	1.20 TB	0.198 a	0.0217
06. Lorsban 15G	1.20 IF	0.180 a	0.0268
07. Counter 20G	1.20 IF	0.182 a	0.0335
08. SmartChoice 5G	0.25 IF	0.175 a	0.0119
09. 62-61/P250	0.25mg ST	0.175 a	0.0126
10. 62-61/P1250	1.25mg ST	0.172 a	0.0197
11. CORAGEN 1.67SC	0.0038 IF	0.178 a	0.0278
12. CORAGEN 1.67SC	0.0052 IF	0.235 a	0.0473
13. HGW86 200 G/L SC	0.0051 IF	0.252 a	0.0629
14. HGW86 200 G/L SC	0.0100 IF	0.215 a	0.0384
15. HGW86 200 G/L SC	0.1526 IF	0.315 a	0.0613
16. Check P34R65/C250	0.25mg	0.255 a	0.0524
17. 2K594 SS/RR	PIP	0.138 a	0.0131
18. 2K591 RR		0.175 a	0.0166
19. 2K592 HXX/RR	PIP	0.180 a	0.0402

¹Planted, 18 May 2012; Sampled, 27 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

³ANOVA PR>F=(0.0612).

Table 14. Node injury ratings by replication. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN. ¹

Treatment	Oz ai /1000 ft ²	Node Injury (0-3 Scale)			
		R1	R2	R3	R4
01. Aztec 2.1G	0.14 TB	0.18	0.13	0.16	0.37
02. Aztec 2.1G	0.14 IF	0.19	0.17	0.22	0.25
03. Force 3G	0.12 TB	0.32	0.20	0.20	0.27
04. Force 3G	0.12 IF	0.15	0.16	0.16	0.24
05. Lorsban 15G	1.20 TB	0.16	0.26	0.18	0.19
06. Lorsban 15G	1.20 IF	0.11	0.19	0.18	0.24
07. Counter 20G	1.20 IF	0.13	0.17	0.17	0.28
08. SmartChoice 5G	0.25 IF	0.16	0.16	0.21	0.18
09. 62-61/P250	0.25mg ST	0.15	0.17	0.17	0.21
10. 62-61/P1250	1.25mg ST	0.14	0.16	0.16	0.23
11. CORAGEN 1.67SC	0.0038 IF	0.14	0.15	0.16	0.26
12. CORAGEN 1.67SC	0.0052 IF	0.15	0.22	0.21	0.37
13. HGW86 200 G/L SC	0.0051 IF	0.18	0.21	0.18	0.44
14. HGW86 200 G/L SC	0.0100 IF	0.17	0.33	0.18	0.18
15. HGW86 200 G/L SC	0.1526 IF	0.16	0.38	0.28	0.44
16. Check P34R65/C250	0.25mg	0.15	0.20	0.39	0.28
17. 2K594 SS/RR	PIP	0.15	0.10	0.16	0.14
18. 2K591 RR		0.13	0.10	0.20	0.17
19. 2K592 HXX/RR	PIP	0.30	0.15	0.13	0.14

¹Planted, 18 May 2012; Sampled, 27 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 15. Percentage consistency of performance, node injury ratings. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²	% Consistency (rating ≤ 0.25)	
		Mean ³	SEM
02. Aztec 2.1G	0.14 IF	100 a	0.0
04. Force 3G	0.12 IF	100 a	0.0
09. 62-61/P250	0.25mg ST	100 a	0.0
17. 2K594 SS/RR	PIP	100 a	0.0
18. 2K591 RR		100 a	0.0
05. Lorsban 15G	1.20 TB	95 ab	5.0
06. Lorsban 15G	1.20 IF	95 ab	5.0
07. Counter 20G	1.20 IF	95 ab	5.0
08. SmartChoice 5G	0.25 IF	95 ab	5.0
10. 62-61/P1250	1.25mg ST	95 ab	5.0
11. CORAGEN 1.67SC	0.0038 IF	95 ab	5.0
14. HGW86 200 G/L SC	0.0100 IF	95 ab	5.0
19. 2K592 HXX/RR	PIP	95 ab	5.0
01. Aztec 2.1G	0.14 TB	90 ab	10.0
03. Force 3G	0.12 TB	90 ab	5.8
12. CORAGEN 1.67SC	0.0052 IF	90 ab	10.0
13. HGW86 200 G/L SC	0.0051 IF	85 ab	15.0
16. Check P34R65/C250	0.25mg	85 ab	9.6
15. HGW86 200 G/L SC	0.1526 IF	60 b	18.3

¹Planted, 18 May 2012; Sampled, 27 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

³ANOVA PR>F=(0.0498). Raw percentage, non-transformed.

Table 16. Percentage consistency of performance, node injury ratings by replication. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN.¹

Treatment	Oz ai /1000 ft ²	% Consistency (rating ≤ 0.25)			
		R1	R2	R3	R4
02. Aztec 2.1G	0.14 IF	100	100	100	100
04. Force 3G	0.12 IF	100	100	100	100
09. 62-61/P250	0.25mg ST	100	100	100	100
17. 2K594 SS/RR	PIP	100	100	100	100
18. 2K591 RR		100	100	100	100
05. Lorsban 15G	1.20 TB	100	80	100	100
06. Lorsban 15G	1.20 IF	100	100	100	80
07. Counter 20G	1.20 IF	100	100	100	80
08. SmartChoice 5G	0.25 IF	100	100	80	100
10. 62-61/P1250	1.25mg ST	100	100	100	80
11. CORAGEN 1.67SC	0.0038 IF	100	100	100	80
14. HGW86 200 G/L SC	0.0100 IF	100	80	100	100
19. 2K592 HXX/RR	PIP	80	100	100	100
01. Aztec 2.1G	0.14 TB	100	100	100	60
03. Force 3G	0.12 TB	80	100	100	80
12. CORAGEN 1.67SC	0.0052 IF	100	100	100	60
13. HGW86 200 G/L SC	0.0051 IF	100	100	100	40
16. Check P34R65/C250	0.25mg	100	100	60	80
15. HGW86 200 G/L SC	0.1526 IF	100	40	80	20

¹Planted, 18 May 2012; Sampled, 27 July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Table 17. Individual root ratings. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Lafayette, IN¹.

Rep 1. Node injury ratings by root.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.15	.15	.25	.20	.15
02.	Aztec 2.1G	0.14 IF	.15	.25	.20	.20	.15
03.	Force 3G	0.12 TB	.15	.15	.10	.10	.20
04.	Force 3G	0.12 IF	.15	.15	.15	.15	.15
05.	Lorsban 15G	1.20 TB	.10	.25	.15	.10	.20
06.	Lorsban 15G	1.20 IF	.10	.10	.10	.10	.15
07.	Counter 20G	1.20 IF	.10	.15	.10	.15	.15
08.	SmartChoice 5G	0.25 IF	.10	.20	.20	.15	.15
09.	62-61/P250	0.25mg ST	.15	.10	.15	.15	.20
10.	62-61/P1250	1.25mg ST	.20	.20	.10	.10	.10
11.	CORAGEN 1.67SC	0.0038 IF	.20	.10	.20	.15	.05
12.	CORAGEN 1.67SC	0.0052 IF	.15	.20	.15	.10	.15
13.	HGW86 200 G/L SC	0.0051 IF	.20	.20	.20	.20	.10
14.	HGW86 200 G/L SC	0.0100 IF	.10	.10	.20	.20	.25
15.	HGW86 200 G/L SC	0.1526 IF	.25	.15	.15	.10	.15
16.	Check P34R65/C250	0.25mg	.15	.10	.15	.20	.15
17.	2K594 SS/RR	PIP	.15	.15	.20	.10	nd
18.	2K591 RR		.10	.10	.15	.20	.10
19.	2K592 HXX/RR	PIP	.10	1.00	.10	.20	.10

nd=no data.

Rep 2. Node injury ratings by root, continued.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.10	.10	.15	.15	.15
02.	Aztec 2.1G	0.14 IF	.25	.10	.15	.15	.20
03.	Force 3G	0.12 TB	.20	.25	.20	.15	.20
04.	Force 3G	0.12 IF	.15	.15	.15	.15	.20
05.	Lorsban 15G	1.20 TB	.15	.20	.20	.50	.25
06.	Lorsban 15G	1.20 IF	.25	.15	.25	.15	.15
07.	Counter 20G	1.20 IF	.20	.15	.15	.20	.15
08.	SmartChoice 5G	0.25 IF	.15	.10	.15	.20	.20
09.	62-61/P250	0.25mg ST	.15	.10	.25	.25	.10
10.	62-61/P1250	1.25mg ST	.20	.20	.10	.15	.15
11.	CORAGEN 1.67SC	0.0038 IF	.25	.20	.10	.05	.15
12.	CORAGEN 1.67SC	0.0052 IF	.25	.15	.25	.20	.25
13.	HGW86 200 G/L SC	0.0051 IF	.20	.20	.25	.20	.20
14.	HGW86 200 G/L SC	0.0100 IF	.75	.25	.20	.20	.25
15.	HGW86 200 G/L SC	0.1526 IF	.15	.50	.25	.50	.50
16.	Check P34R65/C250	0.25mg	.15	.25	.25	.15	.20
17.	2K594 SS/RR	PIP	.10	.10	.10	.10	.10
18.	2K591 RR		.25	.15	.25	.25	.10
19.	2K592 HXX/RR	PIP	.10	.20	.15	.10	.20

Rep3. Node injury ratings by root, continued.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.15	.20	.15	.20	.10
02.	Aztec 2.1G	0.14 IF	.25	.10	.25	.25	.25
03.	Force 3G	0.12 TB	.25	.15	.20	.15	.25
04.	Force 3G	0.12 IF	.10	.15	.20	.20	.15
05.	Lorsban 15G	1.20 TB	.15	.15	.25	.15	.20
06.	Lorsban 15G	1.20 IF	.15	.10	.20	.20	.25
07.	Counter 20G	1.20 IF	.10	.20	.15	.15	.15
08.	SmartChoice 5G	0.25 IF	.10	.10	.20	.15	.50
09.	62-61/P250	0.25mg ST	.15	.15	.20	.20	.15
10.	62-61/P1250	1.25mg ST	.10	.15	.20	.10	.25
11.	CORAGEN 1.67SC	0.0038 IF	.10	.20	.20	.20	.10
12.	CORAGEN 1.67SC	0.0052 IF	.25	.15	.20	.20	.25
13.	HGW86 200 G/L SC	0.0051 IF	.20	.20	.25	.15	.10
14.	HGW86 200 G/L SC	0.0100 IF	.25	.15	.25	.10	.15
15.	HGW86 200 G/L SC	0.1526 IF	.25	.50	.20	.25	.20
16.	Check P34R65/C250	0.25mg	.75	.25	.25	.50	.20
17.	2K594 SS/RR	PIP	.25	.10	.15	.20	.10
18.	2K591 RR		.25	.15	.10	.25	.25
19.	2K592 HXX/RR	PIP	.15	.10	.15	.10	.15

Rep 4. Node injury ratings by root, continued.

No.	Treatment	Oz ai /1000 ft	Root Injury				
			N1	N2	N3	N4	N5
01.	Aztec 2.1G	0.14 TB	.20	.75	.15	.25	.50
02.	Aztec 2.1G	0.14 IF	.25	.25	.25	.25	.25
03.	Force 3G	0.12 TB	.20	.20	.50	.20	.25
04.	Force 3G	0.12 IF	.20	.25	.25	.25	.25
05.	Lorsban 15G	1.20 TB	.20	.20	.15	.25	.15
06.	Lorsban 15G	1.20 IF	.20	.10	.50	.20	.20
07.	Counter 20G	1.20 IF	.25	.25	.20	.50	.20
08.	SmartChoice 5G	0.25 IF	.20	.20	.15	.20	.10
09.	62-61/P250	0.25mg ST	.15	.25	.20	.20	.25
10.	62-61/P1250	1.25mg ST	.20	.10	.50	.25	.10
11.	CORAGEN 1.67SC	0.0038 IF	.20	.20	.50	.25	.15
12.	CORAGEN 1.67SC	0.0052 IF	.20	.50	.75	.20	.20
13.	HGW86 200 G/L SC	0.0051 IF	.50	.50	.75	.20	.25
14.	HGW86 200 G/L SC	0.0100 IF	.20	.20	.20	.20	.10
15.	HGW86 200 G/L SC	0.1526 IF	.50	.50	.50	.20	.50
16.	Check P34R65/C250	0.25mg	.25	.50	.20	.25	.20
17.	2K594 SS/RR	PIP	.20	.10	.20	.10	.10
18.	2K591 RR		.25	.10	.10	.15	.25
19.	2K592 HXX/RR	PIP	.10	.10	.15	.10	.25

Table 18. Root-lodged (goose-necked) plants per 17.4 ft. Rootworm Management Product Efficacy Assay. Pinney-Purdue Agricultural Center, Wanatah, IN. ¹

Treatment	/1000 ft ²	Root-Lodged Plants/17.4 ft			
		R1	R2	R3	R4
01. Aztec 2.1G	0.14 TB	0	0	0	0
02. Aztec 2.1G	0.14 IF	0	0	0	0
03. Force 3G	0.12 TB	0	0	0	0
04. Force 3G	0.12 IF	0	0	0	0
05. Lorsban 15G	1.20 TB	0	0	0	0
06. Lorsban 15G	1.20 IF	0	0	0	0
07. Counter 20G	1.20 IF	0	0	0	0
08. SmartChoice 5G	0.25 IF	0	0	0	0
09. 62-61/P250	0.25mg ST	0	0	0	0
10. 62-61/P1250	1.25mg ST	0	0	0	0
11. CORAGEN 1.67SC	0.0038 IF	0	0	0	0
12. CORAGEN 1.67SC	0.0052 IF	0	0	0	0
13. HGW86 200 G/L SC	0.0051 IF	0	0	0	0
14. HGW86 200 G/L SC	0.0100 IF	0	0	0	0
15. HGW86 200 G/L SC	0.1526 IF	0	0	0	0
16. Check P34R65/C250	0.25mg	0	0	0	0
17. 2K594 SS/RR	PIP	0	0	0	0
18. 2K591 RR		0	0	0	0
19. 2K592 HXX/RR	PIP	0	0	0	0

¹Planted, 18 May 2012; Sampled, x July 2012.

²TB=T-band, IF=in-furrow, ST=seed treatment, PIP=plant incorporated protectant.

Appendix I. Weather Observations 2012

Table A1. Throckmorton-Purdue Agricultural Center, Lafayette, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

May 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
05/01	0.40	64	78	56	60	55
05/02	0.55	62	71	56	62	58
05/03	0.00	73	82	61	68	61
05/04	0.00	76	86	66	72	64
05/05	0.00	72	82	63	72	65
05/06	0.00	68	80	56	73	66
05/07	0.90	71	86	58	73	67
05/08	0.55	65	76	57	69	66
05/09	0.00	62	71	55	67	66
05/10	0.08	56	65	46	62	64
05/11	0.00	56	68	40	62	61
05/12	0.00	62	77	43	67	61
05/13	0.00	66	78	56	69	63
05/14	0.00	65	80	51	72	64
05/15	0.00	67	80	53	74	64
05/16	0.00	68	83	49	73	64
05/17	0.00	65	74	52	73	64
05/18	0.00	62	75	46	71	62
05/19	0.00	69	85	50	74	63
05/20	0.00	77	91	61	78	65
05/21	T	79	92	65	81	67
05/22	0.00	63	67	53	74	66
05/23	0.00	61	75	46	73	64
05/24	0.00	68	83	47	76	65
05/25	0.00	76	89	61	79	67
05/26	0.00	81	91	74	83	70
05/27	0.00	82	95	69	85	72
05/28	0.00	84	96	74	86	73
05/29	0.03	83	93	72	84	73
05/30	0.00	75	84	64	81	73
05/31	0.00	67	76	56	77	70

T=TRACE

Appendix I. Weather Observations 2012

Table A2. Throckmorton-Purdue Agricultural Center, Lafayette, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

June 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
06/01	0.33	58	71	49	68	67
06/02	0.00	54	62	49	61	64
06/03	0.00	59	71	48	62	63
06/04	T	67	80	52	70	65
06/05	T	68	82	59	73	67
06/06	0.00	64	75	51	72	67
06/07	0.00	65	78	49	73	67
06/08	0.00	70	85	53	76	69
06/09	0.00	71	87	51	78	70
06/10	0.00	75	88	58	81	71
06/11	0.00	79	91	64	83	72
06/12	0.00	76	85	70	82	74
06/13	0.00	72	82	61	81	74
06/14	0.00	67	80	54	79	73
06/15	0.00	72	87	55	81	73
06/16	0.00	76	92	56	83	74
06/17	0.14	77	93	67	81	75
06/18	0.00	75	86	67	80	75
06/19	0.00	81	94	70	84	75
06/20	0.00	82	94	70	86	76
06/21	0.00	82	94	70	87	77
06/22	1.27	76	92	65	82	77
06/23	0.00	72	83	62	76	76
06/24	0.00	73	86	58	77	75
06/25	0.00	78	89	68	83	76
06/26	0.00	74	83	62	84	76
06/27	0.00	68	81	54	80	75
06/28	0.00	75	90	59	81	74
06/29	0.00	85	99	70	86	76
06/30	0.60	81	97	69	85	78

T=TRACE

Appendix I. Weather Observations 2012

Table A3. Throckmorton-Purdue Agricultural Center, Lafayette, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

July 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
07/01	0.10					
07/02	0.00	78	90	70	79	78
07/03	0.00	81	94	67	83	79
07/04	0.00	80	93	67	86	80
07/05	0.00	85	98	72	91	82
07/06	0.00	87	100	73	92	83
07/07	0.00	87	100	73	94	84
07/08	0.00	88	102	74	94	85
07/09	0.03	76	84	69	85	82
07/10	0.00	78	91	64	87	80
07/11	0.00	79	90	68	88	81
07/12	0.00	78	90	64	88	81
07/13	0.00	80	93	67	89	81
07/14	0.00	80	91	68	90	82
07/15	0.00	78	87	70	89	82
07/16	0.00	79	91	69	88	82
07/17	0.00	83	96	70	91	83
07/18	0.00	83	99	72	90	84
07/19	T	84	99	73	91	84
07/20	0.15	80	94	73	87	83
07/21	0.00	73	83	67	83	80
07/22	0.00	74	90	58	85	80
07/23	0.00	81	94	68	88	81
07/24	T	85	99	75	88	82
07/25	0.00	82	91	75	88	82
07/26	0.00	84	100	69	90	83
07/27	0.00	83	89	73	89	83
07/28	0.02	77	90	63	85	81
07/29	0.00	74	86	60	85	81
07/30	0.00	73	88	55	85	80
07/31	0.00	79	92	65	88	81

T=TRACE

Appendix I. Weather Observations 2012

Table A4. Throckmorton-Purdue Agricultural Center, Lafayette, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

August 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
08/01	0.01	77	93	67	85	81
08/02	0.00	76	91	60	86	81
08/03	0.00	78	96	55	87	81
08/04	0.00	80	93	65	89	82
08/05	1.30	81	97	71	88	83
08/06	0.00	76	86	69	80	81
08/07	0.00	73	87	60	79	80
08/08	0.00	77	91	60	82	79
08/09	0.30	79	94	67	84	80
08/10	0.50	72	84	66	78	78
08/11	0.02	66	76	60	72	76
08/12	0.00	67	80	54	73	74
08/13	0.03	67	80	54	73	73
08/14	0.34	68	78	62	73	73
08/15	0.00	69	80	62	74	74
08/16	0.00	73	85	60	76	75
08/17	1.31	67	76	65	69	72
08/18	0.00	67	76	57	71	72
08/19	0.00	64	77	50	70	72
08/20	0.00	65	79	54	72	72
08/21	0.50	64	79	51	71	71
08/22	0.00	65	80	51	71	72
08/23	0.00	69	84	53	72	72
08/24	0.00	74	88	60	75	73
08/25	0.00	76	89	64	78	75
08/26	0.00	78	91	63	79	75
08/27	0.65	75	84	65	78	75
08/28	0.00	75	85	63	78	76
08/29	0.00	72	85	58	75	75
08/30	0.00	72	86	61	76	75
08/31	0.00	73	87	59	76	74

Appendix I. Weather Observations 2012

Table A5. Throckmorton-Purdue Agricultural Center, Lafayette, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

September 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
09/01	0.72	76	84	63	75	74
09/02	1.32	76	82	73	76	75
09/03	0.00	74	76	71	74	75
09/04	0.00	76	87	70	76	75
09/05	0.00	77	89	67	78	76
09/06	0.02	72	79	67	74	75
09/07	0.00	75	87	64	75	75
09/08	2.06	68	75	64	71	72
09/09	0.00	63	71	54	68	70
09/10	0.00	62	74	53	67	69
09/11	0.00	63	78	48	67	69
09/12	0.00	67	80	56	68	69
09/13	0.00	71	83	57	70	69
09/14	0.35	71	82	63	72	70
09/15	0.01	62	72	53	69	69
09/16	0.00	62	80	49	67	67
09/17	0.00	64	78	49	66	67
09/18	0.02	65	76	54	66	67
09/19	0.00	56	65	43	64	66
09/20	0.00	55	70	38	61	62
09/21	0.00	63	75	49	64	64
09/22	0.00	55	69	46	60	62
09/23	0.62	50	58	39	58	60
09/24	0.00	49	63	35	55	58
09/25	0.00	53	69	38	55	57
09/26	0.07	62	72	53	59	59
09/27	0.23	65	69	59	63	62
09/28	0.00	61	77	52	64	63
09/29	0.00	58	70	49	63	63
09/30	0.00	60	76	47	62	62

Appendix II. Weather Observations 2012

Table A6. Pinney-Purdue Agricultural Center, Wanatah, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

May 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
05/01	0.23	54	63	44	54	54
05/02	0.21	58	63	52	57	57
05/03	0.00	68	79	57	63	61
05/04	0.17	75	84	66	68	66
05/05	0.00	63	80	47	68	68
05/06	0.00	64	77	48	64	65
05/07	1.44	67	79	56	64	65
05/08	0.04	55	63	50	60	62
05/09	0.00	60	69	51	62	64
05/10	0.00	52	58	40	59	62
05/11	0.00	51	62	38	60	61
05/12	0.00	60	76	38	63	62
05/13	0.00	58	64	51	65	64
05/14	0.00	58	70	49	64	63
05/15	0.00	63	75	44	67	64
05/16	0.00	68	83	48	70	66
05/17	0.00	58	68	47	69	66
05/18	0.00	60	74	41	67	65
05/19	0.00	69	83	51	71	67
05/20	0.00	75	90	56	75	69
05/21	0.35	76	91	63	78	71
05/22	0.00	57	65	52	66	68
05/23	0.00	57	65	46	65	66
05/24	0.00	66	82	45	70	67
05/25	0.00	75	88	61	75	70
05/26	0.00	72	79	65	79	73
05/27	0.00	75	90	64	78	73
05/28	0.00	82	96	67	82	76
05/29	0.00	82	92	70	82	76
05/30	0.00	75	85	58	82	77
05/31	0.00	60	70	50	74	73

Appendix II. Weather Observations 2012

Table A7. Pinney-Purdue Agricultural Center, Wanatah, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

June 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
06/01	0.86	52	63	49	64	67
06/02	0.02	51	57	46	58	61
06/03	0.10	60	71	44	61	63
06/04	0.00	66	78	53	66	67
06/05	0.00	64	74	54	70	70
06/06	0.00	61	70	51	70	69
06/07	0.00	62	74	48	72	70
06/08	0.00	65	79	49	74	72
06/09	0.00	71	86	50	77	73
06/10	0.00	75	88	59	80	75
06/11	0.00	78	90	64	81	77
06/12	0.00	76	87	67	81	77
06/13	0.00	67	74	55	79	77
06/14	0.00	61	74	46	75	74
06/15	0.00	70	85	52	77	75
06/16	0.00	76	91	56	80	77
06/17	1.53	75	90	63	79	77
06/18	0.00	72	82	64	75	76
06/19	0.00	78	89	66	76	77
06/20	0.00	80	89	71	80	79
06/21	0.00	80	89	69	82	80
06/22	0.28	73	83	65	78	78
06/23	0.00	70	80	59	76	77
06/24	0.00	72	84	57	78	77
06/25	0.00	77	90	66	83	80
06/26	0.00	67	74	56	81	79
06/27	0.00	67	82	49	80	78
06/28	0.00	73	87	53	82	78
06/29	0.04	82	97	71	87	82
06/30	0.66	75	86	63	81	80

Appendix II. Weather Observations 2012

Table A8. Pinney-Purdue Agricultural Center, Wanatah, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

July 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
07/01	0.00	76	86	66	79	80
07/02	0.14	74	90	66	78	80
07/03	0.00	79	91	65	82	81
07/04	0.00	81	92	70	86	83
07/05	0.00	85	96	73	90	85
07/06	0.00	84	98	70	91	86
07/07	0.00	87	98	75	94	88
07/08	0.07	82	98	71	93	88
07/09	0.03	74	82	64	84	84
07/10	0.00	74	89	58	86	82
07/11	0.00	73	86	62	86	83
07/12	0.00	73	89	58	85	82
07/13	0.00	76	92	59	86	83
07/14	0.00	79	94	65	89	85
07/15	0.78	76	91	68	87	85
07/16	0.28	76	89	67	82	82
07/17	0.00	81	92	68	83	84
07/18	0.00	83	96	72	87	86
07/19	3.12	82	96	69	87	86
07/20	0.02	74	82	69	79	78
07/21	0.00	71	80	63	78	80
07/22	0.00	73	85	60	79	80
07/23	0.03	77	87	66	80	80
07/24	0.04	82	91	73	84	82
07/25	0.21	75	82	68	81	81
07/26	0.33	79	93	67	81	81
07/27	0.48	76	82	68	79	80
07/28	0.10	72	82	64	77	78
07/29	0.00	69	77	60	76	78
07/30	0.01	70	84	54	78	78
07/31	0.47	77	89	66	82	80

Appendix II. Weather Observations 2012

Table A9. Pinney-Purdue Agricultural Center, Wanatah, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

August 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
08/01	0.00	72	81	62	79	80
08/02	0.00	72	83	59	78	79
08/03	0.00	74	91	60	80	80
08/04	0.00	78	91	64	84	82
08/05	0.80	76	92	65	83	82
08/06	0.00	72	80	58	79	81
08/07	0.00	69	83	54	77	79
08/08	0.00	73	88	55	79	79
08/09	0.03	72	84	63	80	80
08/10	0.24	67	75	60	74	77
08/11	0.29	62	71	58	70	73
08/12	0.00	64	72	54	70	72
08/13	0.17	64	75	51	69	72
08/14	0.70	63	66	60	68	71
08/15	0.00	69	81	60	73	73
08/16	0.05	70	84	58	74	75
08/17	0.42	67	73	61	69	73
08/18	0.00	63	72	52	69	72
08/19	0.00	60	75	44	69	72
08/20	0.00	62	77	52	71	72
08/21	0.00	63	76	51	72	73
08/22	0.00	62	78	48	72	73
08/23	0.00	65	82	45	73	73
08/24	0.00	71	87	54	76	74
08/25	0.00	75	89	58	79	76
08/26	0.00	75	91	58	80	77
08/27	0.77	72	85	61	78	77
08/28	0.02	72	82	59	77	77
08/29	0.00	69	82	55	74	76
08/30	0.00	68	83	55	74	76
08/31	0.00	70	86	51	74	75

Appendix II. Weather Observations 2012

Table A10. Pinney-Purdue Agricultural Center, Wanatah, IN.
 Precipitation observed at 8:00 am.
 Temperatures observed at 11:59 pm.

September 2012

Date	Precip (inch)	Avg Air (°F)	Max Air (°F)	Min Air (°F)	Soil Bare°F	Soil GrassF°
09/01	0.00	74	90	58	77	76
09/02	0.55	73	76	69	75	76
09/03	0.01	75	82	71	75	76
09/04	0.00	75	88	67	77	78
09/05	0.17	75	86	65	77	78
09/06	0.09	71	81	64	74	76
09/07	0.00	72	83	59	75	76
09/08	0.46	65	80	56	70	74
09/09	0.14	62	71	54	68	72
09/10	0.08	60	70	49	66	70
09/11	0.00	61	77	43	66	69
09/12	0.00	65	81	47	67	69
09/13	0.00	69	84	51	69	70
09/14	0.22	67	81	59	71	71
09/15	0.00	60	73	49	68	70
09/16	0.00	59	77	43	67	68
09/17	0.00	59	78	41	66	67
09/18	0.02	62	76	47	67	67
09/19	0.00	55	62	42	65	67
09/20	0.00	55	71	35	62	64
09/21	0.00	60	72	45	65	65
09/22	0.05	52	68	41	60	63
09/23	0.00	49	58	40	58	61
09/24	0.00	47	60	33	57	59
09/25	0.00	52	70	31	57	59
09/26	0.00	60	74	48	61	61
09/27	0.00	62	70	54	64	64
09/28	0.00	57	71	45	64	64
09/29	0.00	54	70	41	62	63
09/30	0.00	54	73	38	61	62