SECTION 1

Evaluation of products to control corn rootworm larvae (*Diabrotica spp.*) in Illinois, 2007

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Location

We established four trials on University of Illinois research and education centers near DeKalb (DeKalb County), Monmouth (Warren County), Perry (Pike County), and Urbana (Champaign County).

Experimental Design and Methods

The experimental design was a randomized complete block with four replications. The plot size for each treatment was 10 ft (four rows) x 30 ft at Monmouth and Perry and 10 ft (four rows) x 40 ft at DeKalb and Urbana. Five randomly selected root systems were extracted from the first row of each plot on 9 July at Urbana and Perry, and on 12 and 16 July at Monmouth and DeKalb, respectively. The root systems were washed and rated for corn rootworm larval injury using the 0 to 3 node-injury scale developed by Oleson et al. (2005) (Appendix I). Percentage consistency (percentage of roots with a node-injury rating less than 1.0) was determined for each product at each location. Five randomly selected root systems were extracted from a subset of treatments at Urbana, Monmouth, and DeKalb again on 6 and 7 August to assess late-season rootworm injury. The root systems were washed and rated (0 to 3 node-injury scale) for corn rootworm larval injury.

Yields were estimated by harvesting the center two rows of each plot on 1 October, 24 September, 18 September, and 27 September at DeKalb, Monmouth, Perry, and Urbana, respectively. Weights were converted to bushels per acre (bu/A) at 15% moisture.

Planting and Insecticide Application

Trials were planted on 1, 3, 8, and 10 May at Urbana, DeKalb, Perry, and Monmouth, respectively. All trials were planted using a four-row, Almaco constructed planter with John Deere 7300 row units with Precision Planting finger pick-up style metering units. Granular insecticides were applied through modified Noble metering units or through modified SmartBox metering units mounted to each row. Plastic tubes directed the insecticide granules to either a 5-inch, slope-compensating

TABLE 1.1 • Agronomic information for efficacy trials with products to control corn rootworm larvae, University of Illinois, 2007

	DeKalb	Monmouth	Perry	Urbana
Planting date	3 May	10 May	8 May	1 May
Root evaluation dates	16 July 7 August	12 July 6 August	9 July	9 July 7 August
Hybrids1	DKC61-73 DKC61-69 YGVT Pioneer 33T57 Pioneer 33T59 HxXTRA Mycogen 2T780 Mycogen 2T787 HxXTRA	DKC61-73 DKC61-69 YGVT Pioneer 33T57 Pioneer 33T59 HxXTRA Mycogen 2T780 Mycogen 2T787 HxXTRA	DKC61-73 DKC61-69 YGVT Pioneer 33T57 Pioneer 33T59 HxXTRA Mycogen 2T780 Mycogen 2T787 HxXTRA	DKC61-73 DKC61-69 YGVT Pioneer 33T57 Pioneer 33T59 HxXTRA Mycogen 2T780 Mycogen 2T787 HxXTRA
Row spacing	30 inches	30 inches	30 inches	30 inches
Seeding rate	33,000/acre	33,000/acre	33,000/acre	33,000/acre
Previous crop	Trap crop (late-planted corn and pumpkins)	Trap crop (late-planted corn and pumpkins)	Trap crop (late-planted corn and pumpkins)	Trap crop (late-planted corn and pumpkins)
Tillage	Fall—chisel plow Spring—field cultivator	Fall—chisel plow Spring—field cultivator	Fall—chisel plow Spring—field cultivator	Fall—chisel plow Spring—field cultivator

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73 (the non-rootworm trait isoline of DKC61-69 YGVT), unless otherwise listed.

bander or into the seed furrow. Liquid insecticides were applied at a spray volume of 5 gal per acre using a CO_2 system. All insecticides were applied in front of the firming wheels on the planter. Cable-mounted tines were attached behind each of the row units to improve insecticide incorporation.

Active ingredients for all chemical insecticides, except those with experimental numbers, are listed in Appendix II.

Agronomic Information

Agronomic information for all four trials is listed in Table 1.1.

Climatic Conditions

Temperature and precipitation data for all four locations are presented in Appendix III.

Statistical Analysis

Data were analyzed using ARM 7 (Agricultural Research Manager), revision 7.3.6. (Copyright© 1982–2007 Gylling Data Management, Inc., Brookings, SD).

Results and Discussion

DeKalb—Mean node-injury ratings and consistency percentages for rootworm injury evaluations on 25 July and the corresponding yields are presented in Table 1.2. The mean node-injury ratings in the untreated checks (UTCs) were 2.18 (Mycogen 2T780 + Cruiser 0.25), 1.89 (Pioneer 33T57 + Poncho 250) and 2.18 (DKC61-73), indicating that corn rootworm larval feeding was severe (two nodes of roots destroyed) in the trial. The mean node-injury ratings for all of the transgenic Bt rootworm hybrids were significantly lower than the mean node-injury ratings in all three UTCs. The mean node-injury ratings for all plots treated with an insecticide were significantly lower than the mean node-injury ratings of the DKC and Mycogen UTCs. The mean node-injury ratings for the plots treated with experimental seed treatments ('V' and 'NUP' treatments) did not differ significantly from the node-injury ratings for the Pioneer UTC. The mean node-injury ratings for most products was <1.0, except for Counter 15G and all of the insecticidal seed treatments, including Poncho 1250. YGVT + Counter 15G had the lowest mean node-injury rating of 0.07, although not significantly lower than the mean node-injury ratings for YGVT, HxXTRA (Mycogen and Pioneer hybrids), Defcon 2.1G (band and furrow), and Aztec 2.1G + EXP 4A.

The seed treatments (Poncho 1250 and the experimental treatments) offered the least consistent root protection with consistency percentages at 25% or less. The most consistent protection against rootworm injury (100% consistency) was provided by Force 2.25CS, YGVT + Counter 15G, YGVT, and HxXTRA (Mycogen and Pioneer hybrids).

Late-season rootworm injury in seven treatments was assessed on 7 August (Table 1.3). Overall, the mean node-injury ratings on 7 August were not noticeably different from the mean node-injury ratings on 16 July. The mean node-injury ratings for all treatments were significantly lower than the mean node-injury ratings for the DKC and Mycogen UTCs. The mean node-injury rating in the Poncho 1250 treated plots was not significantly lower than the mean node-injury rating for the Pioneer UTC. Mycogen's HxXTRA and the YGVT + Counter 15G treatments both provided 100% consistency on 7 August.

TABLE 1.2 • Evaluation of products to control corn rootworm larvae, DeKalb, University of Illinois, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6,7] 16 July	% consistency[8]	Mean yield (bu/A)[6,9] 1 Oct
Aztec 2.1G + Poncho 250	6.7 0.25	Band Seed	0.81 e-h	60	225.03 abc
Aztec 2.1G[10] + Poncho 250	8 0.25	Band Seed	0.51 g-k	90	224.62 abc
Aztec 2.1G + EXP 4A	6.7 N/A	Band Seed	0.41 h-l	90	231.93 ab
Aztec 4.67G[11]	3	Furrow	0.66 f-i	70	203.25 c

Table 1.2 continued on page 6

TABLE 1.2 • continued

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6,7] 16 July	% consistency[8]	Mean yield (bu/A)[6,9] 1 Oct
Counter 15G[11]	8	Band	1.00 def	40	236.88 a
Defcon 2.1G	6.7	Band	0.40 h-l	90	219.88 abc
Defcon 2.1G	6.7	Furrow	0.32 i-l	95	220.92 abc
Force 3G	4	Band	0.74 e-h	74	224.24 abc
Fortress 2.5G	8	Furrow	0.96 ef	45	210.48 bc
Lorsban 15G	8	Band	0.90 efg	45	216.50 abc
Saurus 15G	8	Band	0.87 efg	47	213.83 bc
Saurus 15G	8	Furrow	0.78 e-h	65	222.41 abc
Lorsban 4E	2.4	Band	0.55 f-j	90	215.22 abc
Force 2.25CS	0.46	Band	0.45 g-k	100	210.24 bc
Poncho 1250	1.25	Seed	1.18 cde	15	217.81 abc
EXP 4C	N/A	Seed	1.18 cde	25	213.42 bc
NUP 05071	1.34	Seed	1.51 bc	5	210.82 bc
NUP 07066	1.34	Seed	1.41 bcd	10	224.03 abc
V-10170 5SC	1.25	Seed	1.43 bcd	5	221.98 abc
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	0.16 kl	100	228.12 ab
UTC[12] (Mycogen 2T780)[13] + Cruiser	— 0.25	— Seed	2.18 a	0	172.04 d
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.08 l	100	216.18 abc
Pioneer 33T57[14] + Force 3G + Poncho 250	— 4 0.25	— Band Seed	0.60 f-i	85	214.35 bc
UTC[12] (Pioneer 33T57)[14] + Poncho 250	— 0.25	— Seed	1.89 ab	5	177.09 d
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.20 jkl	100	225.53 ab
YGVT (DKC61-69) + Counter 15G[11] + Poncho 250	— 6 0.25	— Band Seed	0.07 l	100	228.79 ab
UTC[12] (DKC61-73)	—	—	2.18 a	0	162.51 d

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Data were transformed (square root transformation) for analysis; the actual means are shown.
[7] Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[8] Percentage of roots with a node-injury rating <1.0.
[9] Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.
[10] Aztec 2.1G was applied at 8 oz as experimental use only. *Aztec 2.1G is not labeled at this rate of application.* We do not condone the use of rates of application not indicated on the product label.
[11] Applied with modified SmartBox metering units.
[12] UTC = untreated check.
[13] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[14] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

TABLE 1.3 • Evaluation of products for late-season control of corn rootworm larvae, DeKalb, University of Illinois, 7 August, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6]	% consistency[7]
Aztec 4.67G[8]	3	Furrow	0.68 cd	75
Poncho 1250	1.25	Seed	1.21 bc	27
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	0.15 de	100
UTC[9] (Mycogen 2T780)[10] + Cruiser	— 0.25	— Seed	2.16 a	5
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.49 de	75
UTC[9] (Pioneer 33T57)[11] + Poncho 250	— 0.25	— Seed	1.79 ab	10
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.27 de	95
YGVT (DKC61-69) + Counter 15G[9] + Poncho 250	— 6 0.25	— Band Seed	0.04 e	100
UTC[9] (DKC61-73)	—	—	2.49 a	0

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Data were transformed (square root transformation) for analysis; the actual means are shown. Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[7] Percentage of roots with a node-injury rating <1.0.
[8] Applied with modified SmartBox metering units.
[9] UTC = untreated check.
[10] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[11] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

Yields (Table 1.2) ranged from 162.51 to 236.88 bushels per acre, with no significant differences among any of the plots with rootworm control products. The yields for all rootworm control products were significantly higher than yields of the UTCs.

Monmouth—Mean node-injury ratings and consistency percentages for rootworm injury evaluations on 12 July and the corresponding yields are presented in Table 1.4. The mean node-injury ratings in the untreated checks (UTCs) were 1.58 (Mycogen 2T780 + Cruiser 0.25), 0.84 (Pioneer 33T57 + Poncho 250) and 1.14 (DKC61-73), indicating that corn rootworm larval feeding was moderate (one node of roots destroyed) in the trial. The mean node-injury ratings for all of the transgenic Bt rootworm hybrids were significantly lower than the mean node-injury ratings in the UTCs. The mean node-injury ratings for all plots treated with a soil insecticide were significantly lower than the mean node-injury ratings of the DKC and Mycogen UTCs. The mean node-injury ratings for the plots treated with seed treatments, including Poncho 1250, did not differ significantly from the node-injury ratings for the Pioneer and DKC UTCs. The mean node-injury ratings for all products was <1.0. With the exception of the seed treatments (Poncho 1250 and the experimental treatments), all products provided 90% or greater consistency.

Late-season rootworm injury in seven treatments was assessed on 7 August (Table 1.5). For the most part, the mean node-injury ratings on 7 August were not noticeably different from the mean node-injury ratings on 12 July, although the mean node-injury ratings increased over time in the Mycogen and Pioneer UTCs. The mean node-injury ratings for all rootworm control products were <1.0. The node-injury ratings for all treatments except Poncho 1250 were significantly lower than the node-injury rating for the DKC UTC. With the exception

TABLE 1.4 • Evaluation of products to control corn rootworm larvae, Monmouth, University of Illinois, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6,7] 12 July	% consistency[8]	Mean yield (bu/A)[7,9,10] 24 Sep
Aztec 2.1G + Poncho 250	6.7 0.25	Band Seed	0.34 cde	90	232.82 a-d
Aztec 2.1G[11] + Poncho 250	8 0.25	Band Seed	0.15 de	100	232.95 a-d
Aztec 2.1G + EXP 4A	6.7 N/A	Band Seed	0.12 de	100	220.69 b-f
Aztec 4.67G[12]	3	Furrow	0.12 de	100	237.20 abc
Counter 15G[12]	8	Band	0.08 de	100	227.28 a-f
Force 3G	4	Band	0.22 de	100	229.26 a-f
Fortress 2.5G	8	Furrow	0.10 de	100	244.81 ab
Lorsban 15G	8	Band	0.20 de	100	231.13 a-e
Lorsban 4E	2.4	Band	0.25 de	100	229.31 a-f
Force 2.25CS	0.46	Band	0.23 de	100	236.81 abc
Poncho 1250	1.25	Seed	0.90 bc	55	227.89 a-f
EXP 4C	N/A	Seed	0.52 bcd	80	228.20 a-f
NUP 05071	1.34	Seed	0.88 bc	60	244.13 ab
NUP 07066	1.34	Seed	0.92 b	45	227.14 a-f
V-10170 5SC	1.25	Seed	0.93 b	70	236.90 abc
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	0.12 de	100	219.03 c-f
UTC[13] (Mycogen 2T780)[14] + Cruiser	— 0.25	— Seed	1.58 a	35	206.37 f
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.05 de	100	206.80 ef
Pioneer 33T57[15] + Force 3G + Poncho 250	— 4 0.25	— Band Seed	0.32 cde	90	230.76 a-e
UTC[13] (Pioneer 33T57)[15] + Poncho 250	— 0.25	— Seed	0.84 bc	55	210.79 def
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.03 de	100	237.47 abc
YGVT (DKC61-69) + Counter 15G[12] + Poncho 250	— 6 0.25	— Band Seed	0.01 e	100	249.76 a
UTC[14] (DKC61-73)	—	—	1.14 ab	45	210.04 def

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Data were transformed (square root transformation) for analysis; the actual means are shown.
[7] Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[8] Percentage of roots with a node-injury rating <1.0.
[9] Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.
[10] Outliers have been removed due to unexplainable extremes in the data.
[11] Aztec 2.1G was applied at 8 oz as experimental use only. *Aztec 2.1G is not labeled at this rate of application.* We do not condone the use of rates of application not indicated on the product label.
[12] Applied with modified SmartBox metering units.
[13] UTC = untreated check.
[14] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[15] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

TABLE 1.5 • Evaluation of products for late-season control of corn rootworm larvae, Monmouth, University of Illinois, 7 August, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6]	% consistency[7]
Aztec 4.67G[8]	3	Furrow	0.32 c	95
Poncho 1250	1.25	Seed	0.55 bc	70
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	0.21 c	95
UTC[9] (Mycogen 2T780)[10] + Cruiser	— 0.25	— Seed	1.92 a	25
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.15 c	100
UTC[9] (Pioneer 33T57)[11] + Poncho 250	— 0.25	— Seed	1.59 a	30
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.02 c	100
YGVT (DKC61-69) + Counter 15G[8] + Poncho 250	— 6 0.25	— Band Seed	0.06 c	100
UTC[9] (DKC61-73)	—	—	1.20 ab	50

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Data were transformed (square root transformation) for analysis; the actual means are shown. Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[7] Percentage of roots with a node-injury rating <1.0.
[8] Applied with modified SmartBox metering units.
[9] UTC = untreated check.
[10] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[11] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

of Poncho 1250, all treatments had consistency ratings of 95% or greater.

Overall yields were high, with averages ranging from 206.37 to 249.76 bushels per acre. The plots with Aztec 4.67G, Force 2.25CS, Fortress 2.5G, NUP 05071, V-10170, YGVT + Counter 15G, and YGVT alone all had significantly higher yields than the yields of the UTCs. Additionally, the plots with Fortress 2.5G, NUP 05071, and YGVT + Counter 15G had significantly higher yields than the plots with HxXTRA (Pioneer and Mycogen hybrids).

Perry—Mean node-injury ratings and consistency percentages for rootworm injury evaluations on 9 July and the corresponding yields are presented in Table 1.6. The mean node-injury ratings in the untreated checks (UTCs) were 0.15 (Mycogen 2T780 + Cruiser 0.25), 0.25 (Pioneer 33T57 + Poncho 250), and 0.84 and 1.09 (DKC61-73), indicating that rootworm larval densities were low. However, the mean node-injury ratings for the DKC UTCs were significantly higher than the mean node-injury ratings for all other treatments, including the Mycogen and Pioneer UTCs. The low level of corn rootworm injury did not allow for an adequate appraisal of product performance; there were no significant differences in node-injury ratings among any of the rootworm control products. Percentage consistencies for all rootworm control products were all 95% or greater. Because of the low level of rootworm injury on 9 July, we did not dig roots in this trial a second time.

Yields ranged from 89.29 to 176.15 bushels per acre. The yield of YGVT was significantly higher than the yields from plots treated with Aztec 2.1G + EXP 4A, Lorsban 4E, Force 2.25CS, and Poncho 1250, and from the yields of the Mycogen and Pioneer UTCs. Based upon the low level of rootworm

TABLE 1.6 • Evaluation of products to control corn rootworm larvae, Perry, University of Illinois, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6] 9 July	% consistency[7]	Mean yield (bu/A)[6,8] 18 Sep
Aztec 2.1G + Poncho 250	6.7 0.25	Band Seed	0.04 b	100	140.11 ab
Aztec 2.1G[9] + Poncho 250	8 0.25	Band Seed	0.03 b	100	151.31 ab
Aztec 2.1G + EXP 4A	6.7 N/A	Band Seed	0.05 b	100	137.68 b
Force 3G	4	Band	0.10 b	100	149.76 ab
Lorsban 15G	8	Band	0.10 b	100	152.91 ab
Lorsban 4E	2.4	Band	0.08 b	100	137.66 b
Force 2.25CS	0.46	Band	0.12 b	100	138.59 b
Poncho 1250	1.25	Seed	0.15 b	100	135.33 b
EXP 4C	N/A	Seed	0.04 b	100	159.02 ab
NUP 05071	1.34	Seed	0.11 b	100	147.48 ab
NUP 07066	1.34	Seed	0.22 b	95	140.17 ab
V-10170 5SC	1.25	Seed	0.17 b	95	143.73 ab
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	0.06 b	100	157.31 ab
UTC[10] (Mycogen 2T780)[11] + Cruiser	— 0.25	— Seed	0.15 b	95	137.31 b
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.06 b	100	155.94 ab
Pioneer 33T57[12] + Force 3G + Poncho 250	— 4 0.25	— Band Seed	0.09 b	100	149.63 ab
UTC[10] (Pioneer 33T57)[12] + Poncho 250	— 0.25	— Seed	0.25 b	90	132.78 b
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.01 b	100	176.15 a
UTC[10] (DKC61-73)	—	—	1.09 a	60	100.98 c
UTC[10] (DKC61-73)	—	—	0.84 a	60	89.29 c

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[7] Percentage of roots with a node-injury rating <1.0.
[8] Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.
[9] Aztec 2.1G was applied at 8 oz as experimental use only. *Aztec 2.1G is not labeled at this rate of application.* We do not condone the use of rates of application not indicated on the product label.
[10] UTC = untreated check.
[11] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[12] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

TABLE 1.7 • Evaluation of products to control corn rootworm larvae, Urbana, University of Illinois, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6] 9 July	% consistency[7]	Mean yield (bu/A)[8,9] 27 Sep
Aztec 2.1G + Poncho 250	6.7 0.25	Band Seed	0.31 gh	100	175.17 a-e
Aztec 2.1G[10] + Poncho 250	8 0.25	Band Seed	0.34 gh	95	187.23 a-d
Aztec 2.1G + EXP 4A	6.7 N/A	Band Seed	0.25 gh	100	192.21 abc
Aztec 4.67G[11]	3	Furrow	0.21 gh	100	161.50 b-e
Counter 15G[11]	8	Band	0.13 gh	100	168.95 b-e
Defcon 2.1G	6.7	Band	0.31 gh	100	179.65 a-e
Defcon 2.1G	6.7	Furrow	0.23 gh	100	188.12 a-d
Force 3G	4	Band	0.41 gh	95	176.40 a-e
Fortress 2.5G	8	Furrow	0.15 gh	100	187.60 a-d
Lorsban 15G	8	Band	0.40 gh	100	179.02 a-e
Saurus 15G	8	Band	0.26 gh	95	156.88 cde
Saurus 15G	8	Furrow	0.31 gh	100	171.01 b-e
Lorsban 4E	2.4	Band	0.34 gh	100	176.65 a-e
Force 2.25CS	0.46	Band	0.36 gh	95	168.64 b-e
Poncho 1250	1.25	Seed	1.49 de	20	177.64 a-e
EXP 4C	N/A	Seed	1.66 cd	15	170.38 b-e
NUP 05071	1.34	Seed	1.29 def	35	159.69 cde
NUP 07066	1.34	Seed	1.99 bc	10	145.58 e
V-10170 5SC	1.25	Seed	1.39 de	40	151.75 de
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	1.04 ef	45	154.72 cde
UTC[12] (Mycogen 2T780)[13] + Cruiser	— 0.25	— Seed	2.86 a	0	107.36 f
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.49 g	89	153.79 de
Pioneer 33T57[14] + Force 3G + Poncho 250	— 4 0.25	— Band Seed	0.21 gh	100	155.73 cde
UTC[12] (Pioneer 33T57)[14] + Poncho 250	— 0.25	— Seed	2.36 ab	5	85.70 f
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.84 f	50	205.17 ab
YGVT (DKC61-69) + Counter 15G[11] + Poncho 250	— 6 0.25	— Band Seed	0.07 h	100	219.92 a
UTC[12] (DKC61-73)	—	—	2.74 a	0	56.56 g

Footnotes on next page

Table 1.7 Footnotes

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Data were transformed (square root transformation) for analysis; the actual means are shown. Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[7] Percentage of roots with a node-injury rating <1.0.
[8] Corn was harvested from the center two rows of each plot and converted to bushels per acre (bu/A) at 15% moisture.
[9] Data were transformed (log transformation) for analysis; the actual means are shown. Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[10] Aztec 2.1G was applied at 8 oz as experimental use only. *Aztec 2.1G is not labeled at this rate of application.* We do not condone the use of rates of application not indicated on the product label.
[11] Applied with modified SmartBox metering units.
[12] UTC = untreated check.
[13] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[14] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

TABLE 1.8 • Evaluation of products for late-season control of corn rootworm larvae, Urbana, University of Illinois, 7 August, 2007

Product[1]	Rate[2,3]	Placement[2,3]	Mean node-injury rating[4,5,6]	% consistency[7]
Aztec 4.67G[8]	3	Furrow	0.18 c	100
Poncho 1250	1.25	Seed	1.21 b	45
HxXTRA (Mycogen 2T787) + Cruiser	— 0.25	— Seed	0.82 b	68
UTC[9] (Mycogen 2T780)[10] + Cruiser	— 0.25	— Seed	2.65 a	5
HxXTRA (Pioneer 33T59) + Poncho 250	— 0.25	— Seed	0.28 c	90
UTC[9] (Pioneer 33T57)[11] + Poncho 250	— 0.25	— Seed	2.06 a	15
YGVT (DKC61-69) + Poncho 250	— 0.25	— Seed	0.97 b	40
YGVT (DKC61-69) + Counter 15G[8] + Poncho 250	— 6 0.25	— Band Seed	0.06 c	100
UTC[9] (DKC61-73)	—	—	2.66 a	10

[1] All seed-applied insecticides and soil insecticides were applied to DKC61-73, the near-isoline of DKC61-69 YGVT, unless otherwise indicated.
[2] Rates of application for band and furrow placements are ounces (oz) of product per 1,000 ft of row.
[3] Rates of application for seed treatments are milligrams (mg) of active ingredient (a.i.) per seed.
[4] Mean node-injury ratings are based on the 0 to 3 node-injury scale (Oleson et al. 2005, Appendix I).
[5] Mean node-injury ratings were derived from five root systems per treatment in each of four replications.
[6] Data were transformed (log transformation) for analysis; the actual means are shown. Means followed by the same letter do not differ significantly (P = 0.05, Duncan's New Multiple Range Test).
[7] Percentage of roots with a node-injury rating <1.0.
[8] Applied with modified SmartBox metering units.
[9] UTC = untreated check.
[10] Mycogen 2T780 is the near-isoline of Mycogen 2T787 HxXTRA.
[11] Pioneer 33T57 is the near-isoline of Pioneer 33T59 HxXTRA.

larval injury in most of the treatments, these differences in yield cannot be ascribed to differences in rootworm larval injury. Yields from all of the treated plots and the Pioneer and Mycogen UTCs were significantly higher than yields from the DKC UTCs.

Urbana—Mean node-injury ratings and consistency percentages for rootworm injury evaluations on 9 July and the corresponding yields are presented in Table 1.7. The mean node-injury ratings in the untreated checks (UTCs) were 2.86 (Mycogen 2T780 + Cruiser 0.25), 2.36 (Pioneer 33T57 + Poncho 250) and 2.74 (DKC61-73), indicating that corn rootworm larval feeding was severe (two nodes of roots destroyed) in the trial. The mean node-injury ratings for all plots treated with an insecticide were significantly lower than the mean node-injury ratings of the DKC and Mycogen UTCs. All plots treated with a granular or liquid insecticide had significantly less rootworm larval damage than plots with insecticidal seed treatments. However, there were no significant differences in mean node-injury ratings among any of the plots treated with granular or liquid insecticides (both in combination with other products and with or without insecticidal seed treatments). All of the plots treated with granular or liquid insecticides had significantly lower node-injury ratings than the YGVT and Mycogen HxXTRA plots. The mean node-injury ratings for all of the transgenic Bt rootworm hybrids were significantly lower than the mean node-injury ratings in the UTCs. The mean node-injury rating for Pioneer's HxXRTA was significantly lower than the mean node-injury ratings for Mycogen's HxXTRA and YGVT.

The liquid and granular insecticide treatments offered the most consistent protection against rootworm larval injury (95% or greater consistency). All insecticidal seed treatments had consistency ratings less than 50%, indicating that more than one half of the roots evaluated had node-injury ratings greater than or equal to 1.0. At least 50% or more of the Mycogen HxXTRA and YGVT roots had node-injury ratings greater than or equal to 1.0. The percentage consistency of the combination of YGVT + Counter 15G (100%) was double the percentage consistency of YGVT alone (50%) in this trial with extensive rootworm injury.

Late-season rootworm injury in seven treatments was assessed on 7 August (Table 1.8). Overall, the mean node-injury ratings on 7 August were not noticeably different from the mean node-injury ratings on 9 July. The mean node-injury ratings for all treatments were significantly lower than the mean node-injury ratings in the UTCs. The mean node-injury ratings for Aztec 4.67G, Pioneer's HxXTRA, and YGVT + Counter 15G were significantly lower than the mean node-injury ratings for Poncho 1250, Mycogen's HxXTRA, and YGVT. The granular insecticides and Pioneer's HxXTRA provided the most consistent protection (90% or greater) against late-season rootworm larval injury.

Yields (Table 1.7) ranged from 56.56 to 219.92 bushels per acre. All of the plots with rootworm control products had significantly higher yields than the UTCs. The yields from the YGVT, YGVT +Counter 15G, and Aztec 2.1G + EXP 4A plots were significantly higher than the yields from the NUP 07066, V10170, Pioneer HxXTRA, and UTC plots.

Summary of 2007 Results

Rootworm larval injury was moderate to heavy at three (DeKalb, Monmouth, and Urbana) of the four locations in 2007. At these three sites, most of the liquid and granular soil insecticides and the transgenic Bt rootworm hybrids provided adequate to excellent protection against injury caused by corn rootworm larvae. Insecticidal seed treatments did not provide adequate protection against injury caused by rootworm larvae, consistent with data we have generated in the past. The combination of YGVT + Counter 15G provided significantly better protection than YGVT by itself in Urbana where rootworm larval feeding injury was severe.