

Red bell pepper insecticide trial, Ohio, 2016:

Preliminary report, 12/30/2016

Celeste Welty, Ohio State Univ.

Target: European corn borer (ECB), 2nd generation

Other pests active: corn earworm (CEW), fall armyworm (FAW)

Location: OSU's North Central Agricultural Research Station, Fremont, Ohio.

Single row plots with one untreated guard row between adjacent plots.

25 plants per plot.

'Aristotle' peppers transplanted 5/31/2016.

Spray dates (8 sprays at 7-day interval): 8/5, 8/12, 8/19, 8/26, 9/2, 9/9, 9/16, 9/22.

Application in 43.2 gal water per acre with TwinJet nozzles

Evaluation: fruit from center 20 plants per plot harvested when >90% red color.

All fruit graded, weighed, and cut open.

4 harvests: 8/29, 9/12, 9/22, 10/6.

An additional preliminary harvest was done on 8/8 to remove a large number of sunscalded fruit; results not included here.

Treatments:

- 1) Intrepid Edge (methoxyfenozide + spinetoram), 8 fl oz/A.
- 2) Radiant 1SC (spinetoram), 6 fl oz/A + NIS 0.25%.
- 3) Harvanta (ISK-3106; cyclaniliprole), 16.4 fl oz/A.
- 4) Standard: Coragen SC 5 fl oz/A in sprays 1, 3, 5; Orthene 97SP, 1 lb/A in sprays 2 & 4; Mustang Maxx, 4 fl oz/A in sprays 6-8.
- 5) Untreated.

Results:

Yield data are shown below, for cumulative harvest (Table 1) and individual harvests (Tables 2-5).

There was a higher amount of culled fruit than normal, primarily due to sunscald and blossom end rot.

Effects of European corn borer are expected in two ways: lower yield due to fruit infested by ECB that are too rotten to pick, and in fruit that are harvested but culled due to presence of a larva or damage, seen either before the fruit is cut open or only after the fruit is cut open.

There was a much lower amount of damage from European corn borer and other caterpillars than usual in all harvests.

Seasonal trends in the pest populations as detected in traps are shown in Table 6.

Stink bugs were not a target pest in this trial but their damage was detected at harvest thus included here.

Table 1A. Yield of marketable and unmarketable red bell pepper fruit in four cumulative harvests in insecticide field trial at Fremont, Ohio, 2016; means per 20 plants per plot.

Treatment	Total yield		Marketable yield		Culls, total		Yield infested or damaged by worms		Yield damaged by stink bugs		Yield infested or damaged by all insects	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
Coragen/Orthene/Mustang	90.8	22.385	50.8	13.645	40.0	8.740	0.0	0.000	0	0	0.0	0.000
untreated	86.0	20.628	43.2	11.368	42.8	9.260	1.2	0.345	1.8	0.475	3.0	0.820
Harvanta	85.5	19.615	37.2	9.930	48.2	9.685	0.2	0.030	0	0	0.2	0.030
IntrepidEdge	82.5	18.510	33.5	8.880	49.0	9.630	0.2	0.040	0	0	0.2	0.040
Radiant	81.0	18.525	30.8	8.130	50.2	10.395	0.2	0.065	0	0	0.2	0.065
<i>P value for treatment effect</i>	0.90	0.77	0.41	0.45	0.42	0.81	0.16	0.07	0.27	0.30	0.19	0.17

Table 1B. Percentage of red bell pepper fruit damaged by insect pests in four cumulative harvests in insecticide field trial at Fremont, Ohio, 2016.

Treatment	% of fruit with worm or worm damage		% of fruit with stink bug damage		% of fruit with any insect damage	
	Number	Weight (kg)	Number	Weight (kg)	Number ^a	Weight (kg) ^a
untreated	1.29%	0.36%	1.89%	0.50%	3.17% A	0.86% A
Coragen/Orthene/Mustang	0.00%	0.00%	0%	0%	0.00% B	0.00% B
Radiant	0.32%	0.08%	0%	0%	0.32% B	0.08% B
IntrepidEdge	0.32%	0.05%	0%	0%	0.32% B	0.05% B
Harvanta	0.35%	0.04%	0%	0%	0.35% B	0.04% B
<i>P value for treatment effect</i>	0.20	0.09	0.10	0.11	0.0348	0.0152

^aWithin a column, means followed by the same letter are not significantly different ($P > 0.05$).

Table 2A. Yield of marketable and unmarketable red bell pepper fruit in first harvest on 8/29/2016, in insecticide field trial at Fremont, Ohio, 2016; means per 20 plants per plot.

Treatment	Total yield		Marketable yield		Culls, total		Yield infested or damaged by worms		Yield damaged by stink bugs		Yield infested or damaged by all insects	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
untreated	23.5	6.028	13.0	3.898	10.5	2.130	0.5	0.120	0.2	0.075	0.8	0.195
Coragen/Orthene/Mustang	20.2	5.435	9.8	3.035	10.5	2.400	0.0	0	0	0	0.0	0
Radiant	20.0	4.095	8.2	2.410	11.8	1.685	0.2	0.065	0	0	0.2	0.065
IntrepidEdge	23.8	5.085	7.5	2.180	16.2	2.905	0.0	0	0	0	0.0	0
Harvanta	16.8	4.325	5.8	1.890	11.0	2.435	0.0	0	0	0	0.0	0
<i>P value for treatment effect</i>	0.65	0.62	0.42	0.40	0.39	0.54	0.26	0.35	0.44	0.44	0.23	0.18

Table 2B. Percentage of red bell pepper fruit damaged by insect pests in first harvest on 8/29/2016, in insecticide field trial at Fremont, Ohio, 2016.

Treatment	% of fruit with worm or worm damage		% of fruit with stink bug damage		% of fruit with any insect damage	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
untreated	1.97%	2.13%	0.66%	0.73%	2.63%	2.87%
Coragen/Orthene/Mustang	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Radiant	1.04%	1.66%	0.00%	0.00%	1.04%	1.66%
IntrepidEdge	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Harvanta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>P value for treatment effect</i>	0.29	0.39	0.44	0.44	0.23	0.29

Table 3A. Yield of marketable and unmarketable red bell pepper fruit in second harvest on 9/12/2016, in insecticide field trial at Fremont, Ohio, 2016; means per 20 plants per plot.

Treatment	Total yield		Marketable yield		Culls, total		Yield infested or damaged by worms		Yield damaged by stink bugs		Yield infested or damaged by all insects	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
Coragen/Orthene/Mustang	31.8	7.540	18.0	4.850	13.8	2.690	0.0	0	0	0	0.0	0
untreated	20.5	4.680	7.8	2.105	12.8	2.575	0.2	0.065	1.5	0.400	1.8	0.465
Harvanta	21.2	4.060	6.8	1.635	14.5	2.425	0.2	0.030	0	0	0.2	0.030
Radiant	17.5	3.820	5.8	1.550	11.8	2.270	0.0	0	0	0	0.0	0
IntrepidEdge	15.8	3.200	6.2	1.550	9.5	1.650	0.0	0	0	0	0.0	0
<i>P</i> value for treatment effect	0.35	0.33	0.25	0.26	0.72	0.70	0.61	0.57	0.24	0.27	0.14	0.14

Table 3B. Percentage of red bell pepper fruit damaged by insect pests in second harvest on 9/12/2016, in insecticide field trial at Fremont, Ohio, 2016.

Treatment	% of fruit with worm or worm damage		% of fruit with stink bug damage		% of fruit with any insect damage	
	Number	Weight (kg)	Number	Weight (kg)	Number ^a	Weight (kg) ^a
untreated	1.00%	1.33%	7.78%	7.78%	8.78% A	9.11% A
Coragen/Orthene/Mustang	0.00%	0.00%	0.00%	0.00%	0.00% B	0.00% B
Radiant	0.00%	0.00%	0.00%	0.00%	0.00% B	0.00% B
IntrepidEdge	0.00%	0.00%	0.00%	0.00%	0.00% B	0.00% B
Harvanta	1.67%	1.25%	0.00%	0.00%	1.67% B	1.25% B
<i>P</i> value for treatment effect	0.61	0.61	0.07	0.07	0.0407	0.0240

^aWithin a column, means followed by the same letter are not significantly different ($P > 0.05$).

Table 4A. Yield of marketable and unmarketable red bell pepper fruit in third harvest on 9/22/2016, in insecticide field trial at Fremont, Ohio, 2016; means per 20 plants per plot.

Treatment	Total yield		Marketable yield		Culls, total		Yield infested or damaged by worms		Yield damaged by stink bugs		Yield infested or damaged by all insects	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
Harvanta	29.2	6.925	15.2	3.930	14.0	2.995	0	0	0	0	0	0
Coragen/Orthene/Mustang	23.5	5.695	13.2	3.325	10.2	2.370	0	0	0	0	0	0
IntrepidEdge	23.2	5.145	9.5	2.410	13.8	2.735	0.2	0.040	0	0	0.2	0.040
untreated	20.2	4.920	9.5	2.410	10.8	2.510	0	0	0	0	0	0
Radiant	26.5	6.255	9.0	2.135	17.5	4.120	0	0	0	0	0	0
<i>P</i> value for treatment effect	0.49	0.58	0.46	0.39	0.52	0.35	0.44	0.44	-	-	0.44	0.44

Table 4B. Percentage of red bell pepper fruit damaged by insect pests in third harvest on 9/22/2016, in insecticide field trial at Fremont, Ohio, 2016.

Treatment	% of fruit with worm or worm damage		% of fruit with stink bug damage		% of fruit with any insect damage	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
untreated	0.00%	0.00%	0%	0%	0.00%	0.00%
Coragen/Orthene/Mustang	0.00%	0.00%	0%	0%	0.00%	0.00%
Radiant	0.00%	0.00%	0%	0%	0.00%	0.00%
IntrepidEdge	1.14%	0.78%	0%	0%	1.14%	0.78%
Harvanta	0.00%	0.00%	0%	0%	0.00%	0.00%
<i>P</i> value for treatment effect	0.44	0.44	-	-	0.44	0.44

Table 5A. Yield of marketable and unmarketable red bell pepper fruit in fourth harvest on 10/6/2016, in insecticide field trial at Fremont, Ohio, 2016; means per 20 plants per plot.

Treatment	Total yield		Marketable yield		Culls, total		Yield infested or damaged by worms		Yield damaged by stink bugs		Yield infested or damaged by all insects	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
untreated	21.8	5.000	13.0	2.955	8.8	2.045	0.5	0.160	0	0	0.5	0.160
IntrepidEdge	19.8	5.080	10.2	2.740	9.5	2.340	0	0	0	0	0	0
Harvanta	18.2	4.305	9.5	2.475	8.8	1.830	0	0	0	0	0	0
Coragen/Orthene/Mustang	15.2	3.715	9.8	2.435	5.5	1.280	0	0	0	0	0	0
Radiant	17.0	4.355	7.8	2.035	9.2	2.320	0	0	0	0	0	0
<i>P value for treatment effect</i>	0.22	0.33	0.08	0.37	0.62	0.50	0.44	0.44	-	-	0.44	0.44

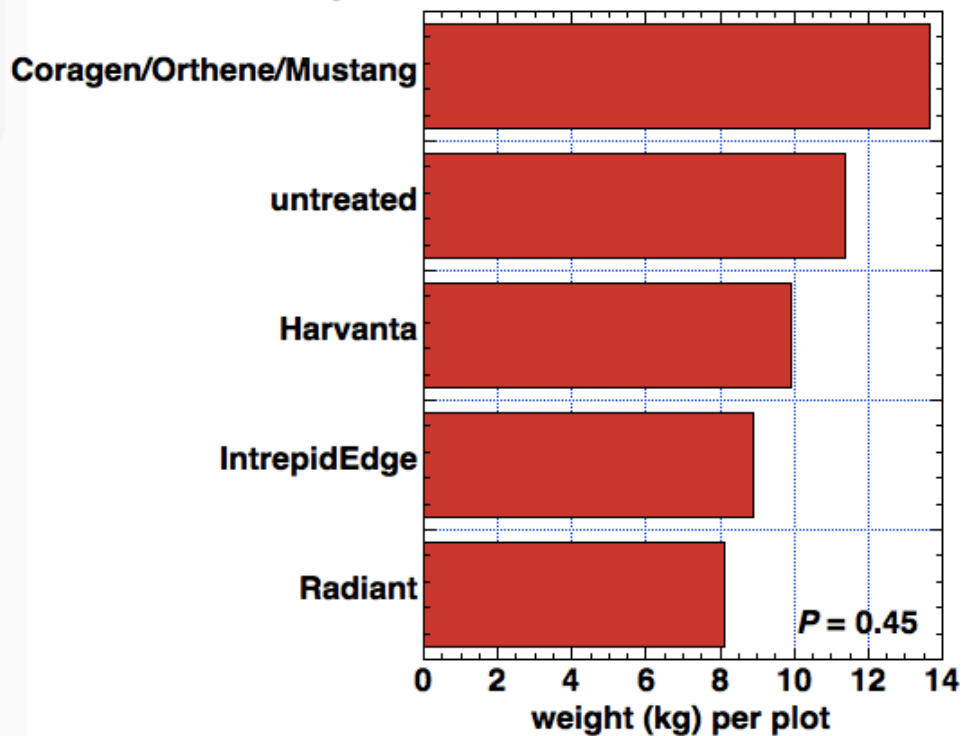
Table 5B. Percentage of red bell pepper fruit damaged by insect pests in fourth harvest on 10/6/2016, in insecticide field trial at Fremont, Ohio, 2016.

Treatment	% of fruit with worm or worm damage		% of fruit with stink bug damage		% of fruit with any insect damage	
	Number	Weight (kg)	Number	Weight (kg)	Number	Weight (kg)
untreated	2.08%	2.68%	0%	0%	2.08%	2.68%
Coragen/Orthene/Mustang	0.00%	0.00%	0%	0%	0.00%	0.00%
Radiant	0.00%	0.00%	0%	0%	0.00%	0.00%
IntrepidEdge	0.00%	0.00%	0%	0%	0.00%	0.00%
Harvanta	0.00%	0.00%	0%	0%	0.00%	0.00%
<i>P value for treatment effect</i>	0.44	0.44	-	-	0.44	0.44

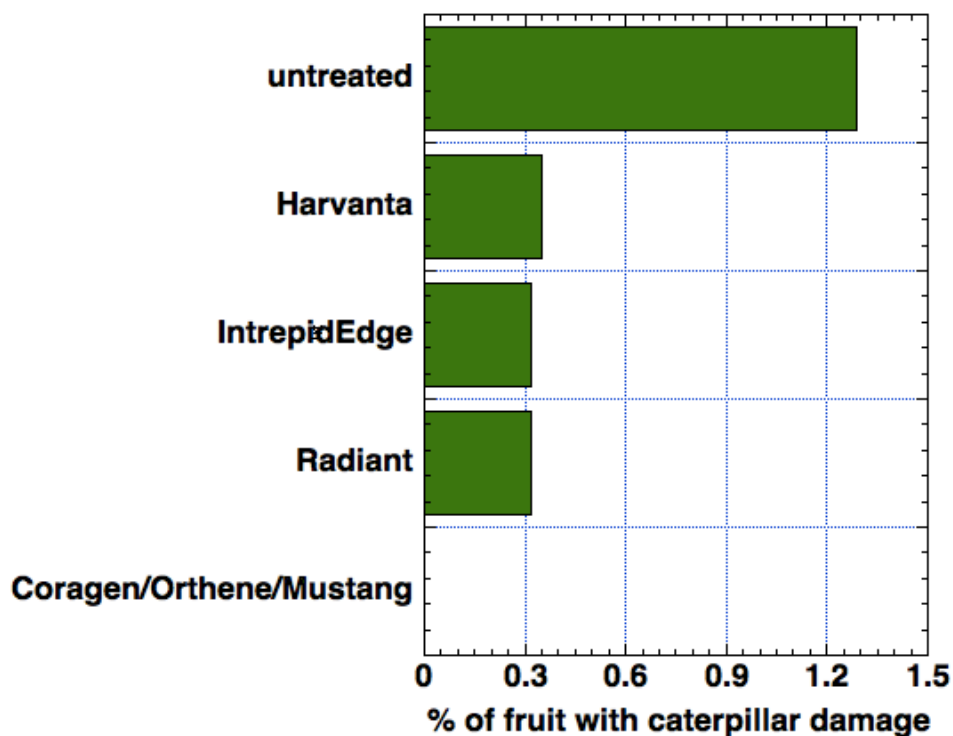
Table 6. Population trends of European corn borer and corn earworm as detected in traps, Fremont, Ohio, 2016.

week	European corn borer					Corn earworm: number of adults in pheromone trap
	Number of adults in pheromone trap (males only)	Number of adults in blacklight trap			Generation (estimate)	
		Females	Males	Total		
May 7-13	-	0	0	0	-	-
May 14-20	-	0	0	0	-	-
May 21-27	-	0	0	0	-	-
May 28 - June 3	-	8	3	11	1	-
June 4-10	4	2	1	3	1	0
June 11-17	0	2	6	8	1	0
June 18-24	3	4	0	4	1	0
June 25 - July 1	21	7	3	10	1	0
July 2-8	21	4	5	9	1	0
July 9-15	10	7	2	9	1	0
July 16-22	1	2	0	2	1	0
July 23-29	5	3	3	6	2	0
July 30 - Aug. 5	0	13	16	29	2	1
August 6-12	1	5	6	11	2	0
August 13-19	0	2	2	4	2	40
August 20-26	1	5	1	6	2	73
Aug 27 - Sep 2	2	8	7	15	3	31
September 3-9	0	7	6	13	3	6
September 10-16	2	2	0	2	3	35
September 17-23	3	0	0	0	3	46
Sep 26-30	0	0	0	0	3	3
October 1-7	1	0	0	0	3	2
October 8-14	-	0	0	0	-	-

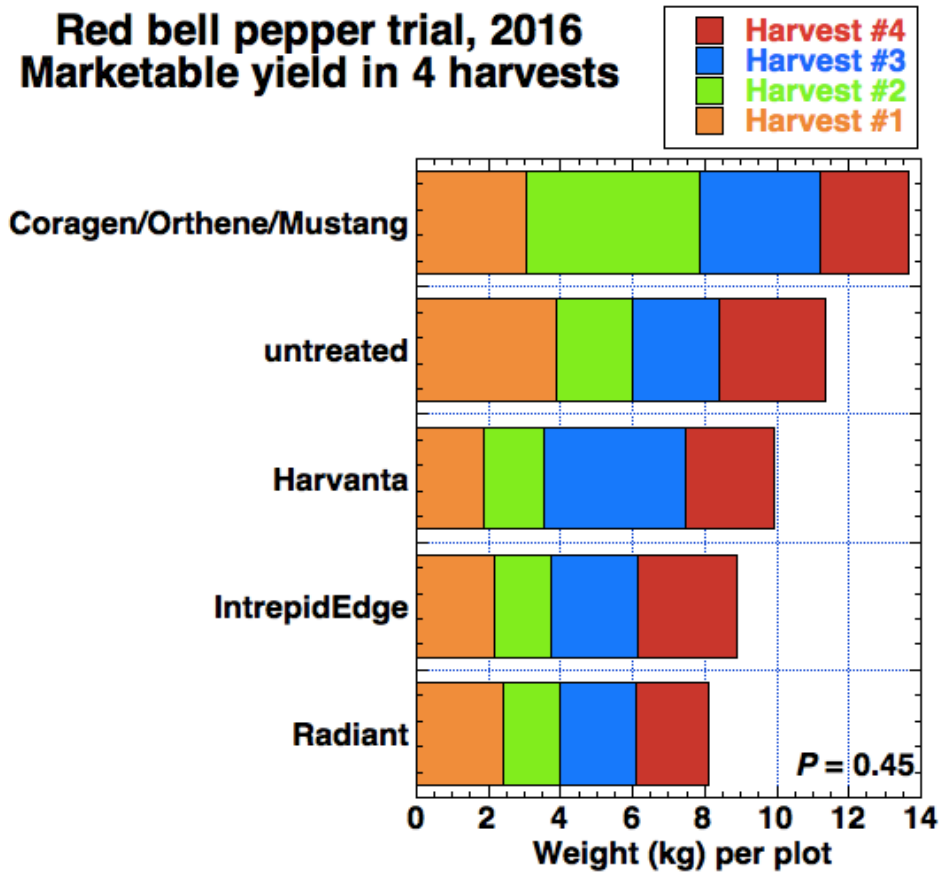
Red bell pepper trial, 2016 Marketable yield in 4 cumulative harvests



Red bell pepper trial, 2016 % of total fruit damaged by caterpillars



Red bell pepper trial, 2016 Marketable yield in 4 harvests



Red bell pepper trial, 2016 % of total fruit infested

