Delaware Field and Vegetable Crop Insect Pest Management Trials

2024

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The purpose of this book is to disseminate insecticide, miticide, and molluscide product efficacy and field survey results for information only. These data are not meant to be used for marketing purposes. Inclusion or exclusion of a product from a trial is not meant as an endorsement of one or discrimination against another. Please note that not all products evaluated might be labeled for use on the crop in which they were tested on or may have been used outside of label restrictions or approved use patterns. Always consult the label before applying pesticides. If you have questions or concerns, feel free to contact David Owens anytime.

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Vegetables

Field Crops

Miscellaneous

Cabbage 2024 Lepidopteran Pests

Location: Carvel REC, Field 99
Variety: 'Platinum Dynasty'
Transplanting Date: 20-Aug
Experimental Design: RCBD with 11 treatments and 5 replicates
Plot Size: 2 rows x 15' and 2 guard rows
Row Spacing: 30"
Plant Spacing: 12"
Treatment Method: CO_2-pressurized backpack sprayer with a 36" boom fitted with 3, D5 nozzles and #45 cores calibrated to deliver 50.8 GPA at 45 PSI.
Treatment Date: A = 9/6, B = 9/14, C = 9/20, D = 9/30, E = 10/9, F = 10/21
Sample Size: 10 plants per plot, 15 heads at harvest
Harvest Date: 10/29 (Reps 1-3), 10/31 (reps 4-5)
Data Analysis: ANOVA, Tukey-Kramer HSD means separation;

Notes: "Other" worms include Corn Earworm, Beet armyworm, Fall armyworm, Webworm, Salt Marsh Caterpillar, and some unidentified larvae/neonates. Beet armyworm neonates were encountered on 2 sample dates, consisting of 42 and 70 larvae. Larger larvae not recently hatched from an egg mass = 45.7% of "Other", Corn earworm consisted 32.3% of "Other."

TRT	Rate	Application #
1. UTC	---	
2. Proclaim Radiant	4.8 oz 8.0 fl oz	A, C, E B, D, F
3. 'Experimental'+ Javelin	8.0 oz + 2.0 oz	A-F
4. 'Experimental' + Javelin	8.0 oz + 8.0 oz	A-F
5. 'Experimental' + Xentari	8.0 oz + 8.0 oz	A-F
6. 'Experimental' + Javelin Radiant Spear Lep + Javelin Proclaim	8.0 oz + 2.0 oz 8.0 fl oz 32 fl oz + 8.0 oz 4.8 oz	A, E B, F C D
7. 'Experimental' + Javelin Radiant Spear Lep + Javelin Proclaim	8.0 oz + 8.0 oz 8.0 fl oz 32 fl oz + 8.0 oz 4.8 oz	A, E B, F C D
8. 'Experimental' + Xentari Xentari Radiant Spear Lep + Xentari Proclaim	8.0 oz + 8.0 oz 8.0 oz 8.0 fl oz 32 fl oz + 8.0 oz 4.8 oz	A E B, F C D
9. Xentari Avaunt eVo Coragen Radiant Besiege	16 oz 3 oz 7.5 fl oz 6.0 fl oz 8.0 fl oz	A B, F C E D
10. Plinazolin	2.1 fl oz	A-F
11. Lamcap II	1.92 fl oz	A-F

All applications received Induce at 0.25% v/v except Sept 14 (app B) which received Dyne-Amic at 0.25% v/v.

5-Sept Worm Counts, 6-Sept Damage Rating

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	3.2 ± 1.5	0.2 ± 0.2	0	0	0.4 ± 0.2	3.8 ± 1.9	1.1 ± 0.1
2	2.0 ± 0.6	0.2 ± 0.2	0	0.4 ± 0.2	0	2.6 ± 0.8	0.9 ± 0.2
3	4.0 ± 1.8	0.4 ± 0.2	0	0	0.2 ± 0.2	4.6 ± 2.0	1.1 ± 0.2
4	2.6 ± 1.3	0.4 ± 0.4	0	0	0	3.0 ± 1.6	1.2 ± 0.2
5	1.8 ± 0.9	0	0	0	0.2 ± 0.2	2.0 ± 1.0	0.8 ± 0.2
6	1.6 ± 0.4	0	0	0	0.2 ± 0.2	1.8 ± 0.5	0.9 ± 0.1
7	2.6 ± 0.9	0	0	0.2 ± 0.2	0.4 ± 0.4	3.2 ± 1.1	1.1 ± 0.1
8	0.6 ± 0.4	0	0	0.4 ± 0.4	0	1.0 ± 0.4	0.8 ± 0.2
9	1.8 ± 0.5	0.4 ± 0.2	0	0.2 ± 0.2	0	2.4 ± 0.5	0.8 ± 0.1
10	3.8 ± 1.6	0.8 ± 0.6	0	0	0	4.6 ± 2.0	1.1 ± 0.2
11	4.4 ± 1.4	0.2 ± 0.2	0	0	0	4.6 ± 1.5	0.9 ± 0.1
ANOVA	*P = 0.424* *F = 1.04;* *df = 10, 44*	*P = 0.516* *F = 0.93;* *df = 10, 44*		*P = 0.469* *F = 0.99;* *df = 10, 44*	*P = 0.587* *F = 0.85;* *df = 10, 44*	*P = 0.590* *F = 0.84;* *df = 10, 44*	*P = 0.620* *F = 0.81;* *df = 10, 44*

9-Sept 3DAT1

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	3.8 ± 1.7 a	0.2 ± 0.2	0	0	0.4 ± 0.2	4.4 ± 2.0 a	2.3 ± 0.3
2	0.4 ± 0.2 b	0	0	0.2 ± 0.2	0	0.6 ± 0.4 b	1.5 ± 0.2
3	1.2 ± 0.6 ab	0	0	0	0	1.2 ± 0.6 ab	1.8 ± 0.2
4	0.4 ± 0.2 b	0	0	0	0	0.4 ± 0.2 b	1.5 ± 0.4
5	0.2 ± 0.2 b	0.2 ± 0.2	0	0	0.2 ± 0.2	0.6 ± 0.2 b	1.3 ± 0.3
6	0.6 ± 0.4 b	0.6 ± 0.2	0	0	0	1.2 ± 0.6 ab	1.8 ± 0.2
7	0.8 ± 0.4 ab	0	0	0	0.2 ± 0.2	1.0 ± 0.3 ab	1.6 ± 0.3
8	1.6 ± 0.7 ab	0.2 ± 0.2	0	0.2 ± 0.2	0	2.0 ± 0.8 ab	1.8 ± 0.3
9	0.2 ± 0.2 b	0	0	0	0.2 ± 0.2	0.4 ± 0.2 b	1.4 ± 0.2
10	0.2 ± 0.2 b	0	0	0	0	0.2 ± 0.2 b	1.4 ± 0.2
11	0.6 ± 0.6 b	0.2 ± 0.2	0	0	0	0.8 ± 0.6 b	1.7 ± 0.3
ANOVA	*P = 0.011 F = 2.70; df = 10, 44*	*P = 0.109 F = 1.71; df = 10, 44*		*P = 0.541 F = 0.90; df = 10, 44*	*P = 0.346 F = 1.16; df = 10, 44*	*P = 0.016 F = 2.55; df = 10, 44*	*P = 0.431 F = 1.04; df = 10, 44*

TRT 7 differed from TRT 6 DBM *P = 0.0352, t = -2.45; df = 4*

13-Sept; 7 DAT1

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	4.2 ± 1.3 a	1.0 ± 0.6	0	0	0.6 ± 0.2	5.8 ± 1.6 a	2.0 ± 0.4
2	0 b	0	0	0	0	0 b	0.9 ± 0.2
3	1.4 ± 0.9 b	0.8 ± 0.6	0	0	0.2 ± 0.2	2.4 ± 1.6 ab	1.3 ± 0.3
4	0.2 ± 0.2 b	0.4 ± 0.2	0	0	0	06 ± 0.2 b	0.9 ± 0.1
5	0.4 ± 0.4 b	0	0	0	0.4 ± 0.4	0.8 ± 0.5 b	1.2 ± 0.2
6	0.2 ± 0.2 b	0.2 ± 0.2	0	0	0	0.4 ± 0.2 b	0.9 ± 0.2
7	0.8 ± 0.4 b	0.8 ± 0.5	0	0	0.2 ± 0.2	1.8 ± 1.0 ab	1.2 ± 0.3
8	0.4 ± 0.4 b	0.4 ± 0.4	0	0	0.2 ± 0.2	1.0 ± 0.8 b	1.4 ± 0.1
9	0 b	0	0	0	0.2 ± 0.2	0.2 ± 0.2 b	0.9 ± 0.2
10	0.2 ± 0.2 b	0.4 ± 0.4	0	0	0	0.6 ± 0.4 b	1.1 ± 0.1
11	0.4 ± 0.2 b	0.8 ± 0.8	0	0	0.2 ± 0.2	1.4 ± 1.2 b	1.0 ± 0.3
ANOVA	*P <0.001 F = 5.33; df = 10, 44*	*P = 0.696 F = 0.73; df = 10, 44*			*P = 0.513 F = 0.93; df = 10, 44*	*P = 0.002 F = 3.47; df = 10, 44*	*P = 0.076 F = 1.87; df = 10, 44*

16-Sept; 2 DAT2

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	3.4 ± 0.9 a	3.0 ± 0.4 a	1.2 ± 1.2	0	0.8 ± 0.5	8.4 ± 2.5 a	2.4 ± 0.3 a
2	0 b	0 b	0	0.2 ± 0.2	0	0.2 ± 0.2 b	1.1 ± 0.2 b
3	1.0 ± 0.3 b	0.6 ± 0.6 b	0	0	0	1.6 ± 0.7 b	1.5 ± 0.3 ab
4	0.2 ± 0.2 b	0.6 ± 0.4 b	0	0	0.4 ± 0.4	1.2 ± 0.7 b	1.3 ± 0.1 b
5	0.6 ± 0.4 b	0.2 ± 0.2 b	0	0	0.2 ± 0.2	1.0 ± 0.5 b	1.2 ± 0.3 b
6	0 b	0 b	0	0	0	0 b	0.9 ± 0.2 b
7	0.2 ± 0.2 b	0 b	0	0	0	0.2 ± 0.2 b	1.1 ± 0.2 b
8	0.2 ± 0.2 b	0 b	0	0	0	0.2 ± 0.2 b	1.2 ± 0.1 b
9	0 b	0 b	0	0	0	0 b	1.0 ± 0.1 b
10	0.4 ± 0.2 b	0.2 ± 0.2 b	0	0	0	0.6 ± 0.4 b	1.2 ± 0.1 b
11	0.4 ± 0.2 b	0.2 ± 0.2 b	0	0	0.2 ± 0.2	0.8 ± 0.6 b	1.1 ± 0.1 b
ANO	*P <0.001 F = 8.41; df = 10, 44*	*P <0.001 F = 10.14; df = 10, 44*	*P = 0.458 F = 1.00; df = 10, 44*	*P = 0.458 F = 1.00; df = 10, 44*	*P = 0.178 F = 1.48; df = 10, 44*	*P <0.001 F = 8.04; df = 10, 44*	*P <0.001 F = 4.47; df = 10, 44*

TRT 3 vs 4 significant difference on 16-Sept ICW (*P 0.0356, t = -2.14, df = 6.76*)

20-Sept; 6 DAT2

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	4.4 ± 1.5 a	1.8 ± 0.7 a	0.4 ± 0.2 a	0	1.8 ± 1.1	8.4 ± 3.1	2.5 ± 0.1
2	0.2 ± 0.2 b	0 b	0 b	0	8.4 ± 8.4	8.6 ± 8.6	0.9 ± 0.1
3	2.6 ± 1.5 ab	0.4 ± 0.2 b	0 b	0	0.8 ± 0.8	3.8 ± 2.2	1.8 ± 0.2
4	0.8 ± 0.4 ab	0 b	0 b	0	0.2 ± 0.2	1.0 ± 0.5	0.8 ± 0.1
5	1.0 ± 0.8 ab	0.2 ± 0.2 b	0 b	0	0.2 ± 0.2	1.4 ± 0.7	1.4 ± 0.1
6	0.6 ± 0.4 ab	0 b	0 b	0	0.2 ± 0.2	0.8 ± 0.6	0.9 ± 0.1
7	0.8 ± 0.8 ab	0 b	0 b	0	0	0.8 ± 0.8	1.0 ± 0.1
8	0 b	0 b	0 b	0		0.2 ± 0.2	1.1 ± 0.2
9	0.4 ± 0.4 b	0 b	0 b	0	0.2 ± 0.2	1.4 ± 1.4	0.9 ± 0.2
10	0.2 ± 0.2 b	0 b	0 b	0	0.2 ± 0.2	0.4 ± 0.2	1.1 ± 0.2
11	1.0 ± 0.8 ab	1.0 ± 0.4 ab	0 b	0	0.4 ± 0.2	2.4 ± 1.2	1.2 ± 0.2
ANOVA	*P = 0.013 F = 2.66; df = 10, 44*	*P <0.001 F = 4.44; df = 10, 44*	*P = 0.012 F = 2.67; df = 10, 44*		*P = 0.552 F = 0.89; df = 10, 44*	*P = 0.388 F = 1.09; df = 10, 44*	*P <0.001 F = 9.19; df = 10, 44*

23-Sept; 3 DAT3

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	11.2 ± 3.4 a	3.2 ± 0.7 a	8.6 ± 8.6	0	1.2 ± 0.5	24.2 ± 11.5 a	2.9 ± 0.2 a
2	0 b	0 b	0	0	0	0 b	0.6 ± 0.1 c
3	2.8 ± 2.0 b	0 b	0.4 ± 0.4	0	1.0 ± 0.5	4.2 ± 2.9 b	1.7 ± 0.4 b
4	0.6 ± 0.4 b	0.2 ± 0.2 b	0	0	0	0.8 ± 0.5 b	0.7 ± 0.2 c
5	1.2 ± 0.8 b	0.8 ± 0.4 b	0	0	0.4 ± 0.4	2.4 ± 1.5 b	1.0 ± 0.2 bc
6	0.6 ± 0.6 b	0 b	0	0	0.2 ± 0.2	0.8 ± 0.8 b	0.7 ± 0.1 c
7	0.4 ± 0.2 b	0 b	0	0	0	0.4 ± 0.2 b	1.2 ± 0.1 bc
8	0 b	0 b	0	0	0.4 ± 0.4	0.4 ± 0.4 b	1.2 ± 0.1 bc
9	0.4 ± 0.2 b	0 b	0	0	0.2 ± 0.2	0.6 ± 0.4 b	0.6 ± 0.1 c
10	1.4 ± 0.6 b	0 b	0	0	0	1.4 ± 0.6 b	1.1 ± 0.2 bc
11	1.0 ± 0.5 b	0.2 ± 0.2 b	0	0	0.2 ± 0.2	1.4 ± 0.7 b	1.3 ± 0.2 bc
ANOVA	*P <0.001 F = 6.71; df = 10, 44*	*P = <0.001 F = 13.32; df = 10, 44*	*P = 0.466 F = 0.99; df = 10, 44*		*P = 0.069 F = 1.91; df = 10, 44*	*P = 0.001 F = 3.76; df = 10, 44*	*P <0.001 F 10.90; df = 10, 44*

27-Sept; 7 DAT3

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	11.8 ± 2.6 a	2.8 ± 1.5 a	0.4 ± 0.4	0	1.8 ± 1.0	16.8 ± 3.6	2.9 ± 0.3 a
2	0.8 ± 0.6 b	0 b	0	0	0	0.8 ± 0.6	0.2 ± 0.04 b
3	3.0 ± 1.1 b	0.2 ± 0.2 b	0.4 ± 0.4	0	0.6 ± 0.6	4.2 ± 1.6	1.2 ± 0.3 b
4	1.6 ± 0.7 b	0.2 ± 0.2 b	0	0	0.6 ± 0.2	2.4 ± 0.7	0.9 ± 0.2 b
5	3.2 ± 1.4 b	0.2 ± 0.2 b	0	0	0	3.4 ± 1.4	0.9 ± 0.2 b
6	2.2 ± 1.0 b	0 b	0	0	0	2.2 ± 1.0	0.4 ± 0.1 b
7	0.4 ± 0.2 b	0.6 ± 0.6 ab	0	0	0.4 ± 0.2	1.4 ± 0.9	0.7 ± 0.2 b
8	0 b	0 b	0	0	0.2 ± 0.2	0.2 ± 0.2	0.6 ± 0.3 b
9	0.4 ± 0.2 b	0 b	0	0	0	0.4 ± 0.2	0.2 ± 0.1 b
10	0.4 ± 0.2 b	0 b	0	0	0.2 ± 0.2	0.6 ± 0.2	0.8 ± 0.1 b
11	1.2 ± 0.7 b	0.2 ± 0.2 b	0	0	14.2 ± 14.0	15.6 ± 14.9	0.7 ± 0.3 b
ANOVA	*P <0.001 F = 9.87; df = 10, 44*	*P = 0.012 F = 2.69; df = 10, 44*	*P = 0.541 F = 0.90; df = 10, 44*		*P = 0.467 F = 0.99; df = 10, 44*	*P = 0.127 F = 1.64; df = 10, 44*	*P <0.001 F = 12.39; df = 10, 44*

TRT 4 significantly differed from TRT 5 for "Other" worms, $P = 0.035$, $t = -2.45$, $df = 4$.

3-Oct; 3 DAT4

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	8.0 ± 1.8 a	1.4 ± 1.0	0.4 ± 0.2 a	0	0.6 ± 0.6	10.4 ± 1.1	3.2 ± 0.2 a
2	0.2 ± 0.2 b	0	0 b	0	0	0.2 ± 0.2	0.6 ± 0.2 cd
3	1.4 ± 0.9 b	0	0 b	0	0	1.4 ± 0.9	1.5 ± 0.2 b
4	1.4 ± 1.4 b	0	0 b	0	0.2 ± 0.2	1.6 ± 1.6	1.2 ± 0.1 bcd
5	0.8 ± 0.3 b	1.8 ± 1.2	0 b	0	0	2.5 ± 1.3	1.1 ± 0.1 bcd
6	1.6 ± 1.0 b	0.2 ± 0.2	0 b	0	0	1.8 ± 0.9	0.6 ± 0.2 cd
7	0.8 ± 0.4 b	0.2 ± 0.2	0 b	0	0.2 ± 0.2	1.2 ± 0.6	0.9 ± 0.2 bcd
8	2.6 ± 2.4 ab	0.8 ± 0.8	0 b	0	0	3.4 ± 2.3	0.9 ± 0.3 bcd
9	0.2 ± 0.2 b	0	0 b	0	0	0.2 ± 0.2	0.3 ± 0.1 d
10	1.2 ± 0.6 b	0.4 ± 0.4	0 b	0	0	1.6 ± 0.7	1.1 ± 0.1 bcd
11	2.8 ± 1.2 ab	0	0 b	0	0.6 ± 0.4	3.4 ± 1.4	1.4 ± 0.3 bc
ANOVA	*P = 0.002 F = 3.49; df = 10, 43*	*P = 0.211 F = 1.40; df = 10, 43*	*P = 0.015 F = 2.60; df = 10, 43*		*P = 0.452 F = 1.01; df = 10, 43*	*P <0.001 F = 5.87; df = 10, 43*	*P <0.001 F = 15.00; df = 10, 43*

8-Oct; 8 DAT4

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	9.6 ± 1.4 a	2.0 ± 1.0 a	0.6 ± 0.6	0	0.8 ± 0.6	13.0 ± 1.5 a	3.2 ± 0.3 a
2	0.2 ± 0.2 b	0 b	0	0	0	0.2 ± 0.2 b	0.8 ± 0.2 b
3	0.6 ± 0.4 b	0.4 ± 0.2 ab	0	0	0.2 ± 0.2	1.2 ± 0.7 b	1.2 ± 0.4 b
4	2.0 ± 0.4 b	0 a	0	0	0	2.0 ± 0.4 b	1.0 ± 0.2 b
5	1.4 ± 0.5 b	0.8 ± 0.5 ab	0	0	0.4 ± 0.2	2.6 ± 0.5 b	1.4 ± 0.1 b
6	1.6 ± 1.1 b	0 b	0	0	0.2 ± 0.2	1.8 ± 1.1 b	0.6 ± 0.2 b
7	0.4 ± 0.2 b	0 b	0	0	0.2 ± 0.2	0.6 ± 0.2 b	1.1 ± 0.3 b
8	0.8 ± 0.6 b	0 b	0	0	0.2 ± 0.2	1.0 ± 0.5 b	1.0 ± 0.2 b
9	0.2 ± 0.2 b	0 b	0	0	0	0.2 ± 0.2 b	0.8 ± 0.2 b
10	0.2 ± 0.2 b	0 b	0	0	0.2 ± 0.2	0.4 ± 0.2 b	0.6 ± 0.1 b
11	0.8 ± 0.8 b	0 b	0	0	0.8 ± 0.6	1.6 ± 1.4 b	1.0 ± 0.3 b
ANOVA	*P <0.001 F = 16.57; df = 10, 44*	*P = 0.005 F = 3.04; df = 10, 44*	*P = 0.458 F = 1.00; df = 10, 44*		*P = 0.489 F = 0.96; df = 10, 44*	*P <0.001 F = 21.61; df = 10, 44*	*P < 0.001 F = 9.81; df = 10, 44*

TRT 3 vs 4 significant difference on Oct -8 ICW (*P 0.0241, t = 2.33, df = 7.90*)

13-Oct; 4 DAT5

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	5.4 ± 2.2 a	0.8 ± 0.6	0	0	0.2 ± 0.2 ab	6.4 ± 2.5 a	3.1 ± 0.2 a
2	0.4 ± 0.4 b	0.2 ± 0.2	0	0	0 b	0.6 ± 0.4 b	0.4 ± 0.1 d
3	1.4 ± 0.7 b	0	0	0	0.8 ± 0.4 a	2.2 ± 0.7 ab	1.4 ± 0.2 b
4	1.4 ± 0.7 b	1.0 ± 0.5	0	0	0.2 ± 0.2 ab	2.6 ± 0.7 ab	1.0 ± 0.3 bcd
5	0.6 ± 0.4 b	1.0 ± 1.0	0	0	0 b	1.6 ± 1.4 b	1.1 ± 0.3 bcd
6	0.2 ± 0.2 b	0	0	0	0 b	0.2 ± 0.2 b	0.8 ± 0.2 bcd
7	0 b	0	0	0	0 b	0 b	0.9 ± 0.2 bcd
8	1.0 ± 0.5 b	0.2 ± 0.2	0	0	0 b	1.2 ± 0.5 b	0.9 ± 0.1 bcd
9	0.2 ± 0.2 b	0	0	0	0 b	0.2 ± 0.2 b	0.5 ± 0.2 cd
10	0 b	0	0	0	0 b	0 b	0.7 ± 0.2 bcd
11	1.0 ± 0.4 b	0.2 ± 0.2	0	0	0 b	1.2 ± 0.6 b	1.4 ± 0.1 bc
ANOVA	*P = 0.001 F = 3.64; df = 10, 44*	*P = 0.406 F = 1.07; df = 10, 44*			*P = 0.006 F = 2.95; df = 10, 44*	*P = 0.001 F = 3.83; df = 10, 44*	*P <0.001 F = 14.69; df = 10, 44*

TRT 7 differed from TRT 8 for "Total" *P = 0.035; t = 2.45; df = 4*

23-Oct; 2 DAT6

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	6.2 ± 1.4 a	0.6 ± 0.6	0	0	0.2 ± 0.2	7.0 ± 2.0 a	3.7 ± 0.1 a
2	0 b	0	0	0	0	0 b	0.5 ± 0.2 bc
3	0.4 ± 0.4 b	0.2 ± 0.2	0	0	0.2 ± 0.2	0.8 ± 0.4 b	1.6 ± 0.2 b
4	0.2 ± 0.2 b	0.2 ± 0.2	0	0	0	0.4 ± 0.2 b	1.6 ± 0.2 b
5	0.6 ± 0.2 b	0	0	0.2 ± 0.2	0.4 ± 0.4	1.2 ± 0.7 b	1.5 ± 0.4 b
6	0.6 ± 0.2 b	0	0	0	0	0.6 ± 0.2 b	0.7 ± 0.1 bc
7	0.8 ± 0.4 b	0	0	0	0	0.8 ± 0.4 b	1.0 ± 0.2 bc
8	0.4 ± 0.2 b	0	0	0	0	0.4 ± 0.2 b	1.2 ± 0.3 bc
9	0.4 ± 0.4 b	0	0	0	0	0.4 ± 0.4 b	0.4 ± 0.05 c
10	0 b	0	0	0	0	0 b	0.7 ± 0.1 bc
11	1.0 ± 0.8 b	0.2 ± 0.2	0	0	0	1.2 ± 0.7 b	1.4 ± 0.4 bc
ANOVA	*P <0.001 F = 10.31; df = 10, 44*	*P = 0.629 F = 0.80; df = 10, 44*		*P = 0.458 F = 1.00; df = 10, 44*	*P = 0.600 F = 0.83; df = 10, 44*	*P <0.001 F = 7.29; df = 10, 44*	*P <0.001 F = 14.80; df = 10, 44*

28-Oct; 7 DAT6

TRT	ICW	DBM	CSW	CL	Other	Total Worms	Damage Rating
1	9.2 ± 3.0 a	1.4 ± 1.0	0.2 ± 0.2	0	0.2 ± 0.2	11.0 ± 3.6 a	3.5 ± 0.2 a
2	0 b	0	0	0	0	0 b	1.0 ± 0.1 bc
3	0 b	0.4 ± 0.4	0	0	0	0.4 ± 0.4 b	1.8 ± 0.4 b
4	0.4 ± 0.2 b	1.0 ± 0.6	0	0	0.2 ± 0.2	1.6 ± 0.9 b	1.1 ± 0.4 bc
5	0 b	0.2 ± 0.2	0	0	0.2 ± 0.2	0.4 ± 0.2 b	1.3 ± 0.2 bc
6	0.6 ± 0.2 b	0	0	0	0	0.6 ± 0.2 b	0.7 ± 0.1 bc
7	0.4 ± 0.4 b	0	0	0	0	0.4 ± 0.4 b	0.8 ± 0.2 bc
8	0.2 ± 0.2 b	0	0	0	0	0.2 ± 0.2 b	1.1 ± 0.2 bc
9	0.2 ± 0.2 b	0	0	0	0	0.2 ± 0.2 b	0.5 ± 0.1 c
10	0 b	0	0	0	0	0 b	0.7 ± 0.2 bc
11	0.6 ± 0.4 b	0.4 ± 0.2	0	0	0.2 ± 0.2	1.2 ± 0.6 b	1.2 ± 0.3 bc
ANOVA	*P <0.001 F = 8.55; df = 10, 44*	*P = 0.157 F = 1.54; df = 10, 44*	*P = 0.458 F = 1.00; df = 10, 44*		*P = 0.719 F = 0.70; df = 10, 44*	*P <0.001 F = 7.52; df = 10, 44*	*P <0.001 F = 12.72; df = 10, 44*

TRT	Average Damage Rating	% Marketable Heads
1	3.4 ± 0.3 a	9.3 ± 9.3 c
2	0.3 ± 0.2 c	98.3 ± 1.7 a
3	1.7 ± 0.2 b	68.9 ± 5.9 b
4	1.3 ± 0.1 bc	80.7 ± 4.0 ab
5	1.2 ± 0.3 bc	77.5 ± 7.7 ab
6	0.4 ± 0.1 c	97.3 ± 1.6 a
7	0.7 ± 0.1 bc	92.0 ± 1.3 ab
8	0.5 ± 0.2 c	90.0 ± 4.2 ab
9	0.3 ± 0.2 c	97.3 ± 2.7 a
10	0.2 ± 0.1 c	97.3 ± 1.6 a
11	1.1 ± 0.4 bc	77.4 ± 8.5 ab
ANOV	*P <0.001 F = 15.88; df = 10, 44*	*P <0.001 F = 23.82; df = 10, 44*

0 = clean, 1 = frame leaf damage, 2 = slight wrapper leaf damage, 3 = significant wrapper leaf damage, 3.5 = slight head damage, 4 = significant head damage. Cabbage with a grade of 2 or less was considered marketable

Cantaloupe 2024 Striped Cucumber Beetle

Location: Carvel REC, Field 12D
Variety: 'Aphrodite'
Planting Date: 17-May
Experimental Design: RCBD with 7 treatments and 4 replicates
Plot Size: 3 rows x 22'
Row Spacing: 7'
Plant Spacing: 2'
Treatment Method: CO_2-pressurized backpack sprayer with a 4.5' boom fitted with 4 D4-45 nozzles calibrated to deliver 42.7 GPA at 55 PSI (Foliar TRT 4, 5 on 6-June) or 40.2 GPA at 50 PSI (Foliar treatments on F1 Generation)

Treatment Date: Overwintered Soil Application 5-June
Overwintered Foliar Application 6-June
F1 Generation: 8-July, 15-July, 23-July
Sample Size: Beetles and dead beetles in planting holes and on foliage, fruits, and flowers directly over the plastic beds (space between plastic beds was not examined for live and dead beetle counts) from row 2.
Data Analysis: ANOVA, Tukey-Kramer HSD means separation

Notes: Seed was treated with thiamethoxam, delaying striped cucumber beetle establishment.
Adjuvant Kinetic used at 2.3 pt/100 gallon, trts 4 and 5 on 6-June
Adjuvant Induce used at 0.25% v/v for all July foliar applications
All dead beetles were removed from plastic at time of data collection
July beetles: 98.3% striped cucumber beetle

TRT	Rate	TRT Date
1. UTC	---	
2. Admire Pro 2. ISM-555 SC200	10.5 fl oz/A (drip) 2.1 fl oz/A	5-June 8-July, 15-July, 23-July
3. Platinum 3. ISM-555 SC200	3.67 oz/A (drip) 3.1 fl oz/A	5-June 8-July, 15-July, 23-July
4. Hero 4. Anarchy 30SG	10.3 fl oz/A 5.3 oz/A	6-June 8-July, 15-July, 23-July
5. Brigade 5. Minecto Pro	6.4 fl oz/A 10.0 fl oz/A	6-June 8-July, 15-July, 23-July
6. Harvanta	16.4 fl oz/A	8-July, 15-July, 23-July
7. ISM-555 SC200	4.1 fl oz/A	8-July, 15-July, 23-July

4-June
1d PRE

TRT	Alive StCB/ plant	Alive SpCB/ plant
1. UC	3.3 ± 0.9	0.0
2. Amire Pro	3.6 ± 0.8	0.1 ± 0.0
3. Pltinum	5.1 ± 0.6	0.0 ± 0.0
4. Hro	3.4 ± 1.0	0.0 ± 0.0
5. Bigade	4.0 ± 0.5	0.1 ± 0.0
ANO	*P = 0.526* *F = 0.832; df = 4, 15*	*P = 0.674* *F = 0.59; df = 4, 15*

13-June
7 DAT

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant
1. UC	3.7 ± 0.8	0.1 ± 0.1	0.2 ± 0.1 b	0.0 ± 0.0
2. Amire Pro	3.5 ± 0.8	0.3 ± 0.1	1.1 ± 0.2 ab	0.1 ± 0.0
3. Pltinum	1.6 ± 1.0	0.3 ± 0.2	2.7 ± 0.6 a	0.1 ± 0.1
4. Hro	1.9 ± 0.5	0.1 ± 0.1	1.0 ± 0.6 ab	0.0 ± 0.0
5. Bigade	2.3 ± 0.4	0.0 ± 0.0	0.3 ± 0.1 b	0.0 ± 0.0
ANO	*P = 0.221* *F = 1.62; df = 4, 15*	*P = 0.379* *F = 1.13; df = 4, 15*	*P = 0.004* *F = 6.00; df = 4, 15*	*P = 0.632* *F = 0.66; df = 4, 15*

20-June
14 DAT

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant
1. UC	3.9 ± 0.4	0.1 ± 0.1	0.0 ± 0.0 c	0.0
2. Amire Pro	4.5 ± 0.8	0.3 ± 0.1	0.5 ± 0.2 b	0.0
3. Pltinum	3.4 ± 0.7	0.1 ± 0.1	2.4 ± 0.1 a	0.1 ± 0.1
4. Hro	4.5 ± 1.1	0.1 ± 0.0	0.1 ± 0.0 bc	0.1 ± 0.1
5. Bigade	3.2 ± 0.3	0.0 ± 0.0	0.0 ± 0.0 c	0.0 ± 0.0
ANO	*P = 0.614 F = 0.68; df = 4, 15*	*P = 0.267 F = 1.45; df = 4, 15*	*P <0.001 F = 127.05; df = 4, 15*	*P = 0.183 F = 1.79; df = 4, 15*

F1 Generation
July 8
0d PRE

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant
1. UTC	5.7 ± 1.2	0	0.1 ± 0.1	0
2. ISM-555 L	2.0 ± 0.2	0	0.1 ± 0.1	0
3. ISM-555 M	1.7 ± 0.5	0	1.3 ± 0.2	0
4. Anarchy	3.7 ± 1.3	0	0.0 ± 0.0	0
5. Minecto Pro	3.4 ± 0.6	0	0.0 ± 0.0	0
6. Harvanta	4.7 ± 2.5	0	0.1 ± 0.1	0
7. ISM-555 H	5.7 ± 1.4	0	0.1 ± 0.1	0
ANOVA	*P = 0.198 F – 1.59; df = 6, 21*		*P<0.001 F = 19.95; df = 6, 21*	

July 15
7 DAT1

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant	# flowers exmnd	% damaged flowers	# beetles/ flower
1. UTC	8.8 ± 2.4 a	0.0	0.3 ± 0.3	0	20	63.8 ± 18.8	0.5 ± 0.2
2. ISM-555 L	1.6 ± 0.7 b	0.0 ± 0.0	0.3 ± 0.0	0	20	31.3 ± 5.5	0.3 ± 0.1
3. ISM-555 M	2.0 ± 0.8 b	0.0	0.7 ± 0.3	0	20	26.3 ± 4.3	0.1 ± 0.0
4. Anarchy	1.1 ± 0.3 b	0.0 ± 0.0	0.4 ± 0.2	0	18 ± 2	30.8 ± 2.2	0.2 ± 0.0
5. Minecto Pro	4.6 ± 1.8 ab	0.0 ± 0.0	0.8 ± 0.3	0	16.5 ± 3.5	52.5 ± 22.9	0.4 ± 0.2
6. Harvanta	3.3 ± 1.6 ab	0.0	1.5 ± 0.7	0	20	43.8 ± 12.6	0.5 ± 0.1
7. ISM-555 H	1.3 ± 0.4 b	0.1 ± 0.1	4.7 ± 3.6	0.0 ± 0.0	20	32.5 ± 14.5	0.2 ± 0.1
ANOVA	*P = 0.008 F = 3.99; df = 6, 21*	*P = 0.611 F = 0.76; df = 6, 21*	*P = 0.327 F = 1.24; df = 6, 21*	*P = 0.451 F = 1.00; df = 6, 21*		*P = 0.437 F = 1.02; df = 6, 21*	*P = 0.221 F = 1.52; df = 6, 21*

July 17

2DAT2 (Flower data was collected July 18)

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant	# flowers exmnd	% damaged flowers	# beetles/ flower
1. UTC	7.5 ± 1.9 a	0.0 ± 0.0	0.6 ± 0.4 b	0	20	48.8 ± 6.6 a	0.5 ± 0.0 a
2. ISM-555 L	0.6 ± 0.1 b	0.0 ± 0.0	1.8 ± 0.5 ab	0	20	1.3 ± 1.3 b	0.1 ± 0.0 b
3. ISM-555 M	0.4 ± 0.1 b	0	3.1 ± 1.1 ab	0	20	6.3 ± 6.3 b	0.1 ± 0.0 b
4. Anarchy	0.4 ± 0.1 b	0	7.0 ± 2.3 a	0.1 ± 0.0	17.8 ± 2.3	2.5 ± 2.5 b	0.0 b
5. Minecto Pro	2.9 ± 1.0 b	0.0 ± 0.0	4.1 ± 1.8 ab	0	16.8 ± 3.3	5.0 ± 3.5 b	0.2 ± 0.1 b
6. Harvanta	2.1 ± 0.8 b	0	5.4 ± 1.5 ab	0	20	3.8 ± 2.4 b	0.1 ± 0.0 b
7. ISM-555 H	0.3 ± 0.1 b	0.0 ± 0.0	2.3 ± 0.4 ab	0	20	5.0 ± 3.5 b	0.0 b
ANOVA	*P <0.001 F = 8.97; df = 6, 21*	*P = 0.761 F = 0.56; df = 6, 21*	*P = 0.041 F = 2.72; df = 6, 21*	*P <0.001 F = 25.00; df = 6, 21*		*P <0.001 F = 16.77; df = 6, 21*	*P <0.001 F = 12.75; df = 6, 21*

July 22

7 DAT2

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant
1. UC	3.0 ± 0.9 a	0.1 ± 0.1	0.3 ± 0.1	0.0
2. IS -555 L	0.2 ± 0.0 b	0.0 ± 0.0	0.5 ± 0.2	0.0 ± 0.0
3. IS -555 M	0.2 ± 0.2 b	0.0	0.9 ± 0.0	0.0 ± 0.0
4. Archy	0.3 ± 0.1 b	0.0	4.7 ± 3.5	0.1 ± 0.1
5. Mnecto Pro	1.0 ± 0.3 b	0.0 ± 0.0	2.6 ± 1.4	0.0
6. Hrvanta	1.0 ± 0.5 b	0.0 ± 0.0	3.1 ± 2.6	0.0
7. IS -555 H	0.3 ± 0.1 b	0.1 ± 0.0	0.9 ± 0.4	0.0 ± 0.0
ANO	*P = 0.001 F = 6.43; df = 6, 21*	*P = 0.502 F = 0.92; df = 6, 21*	*P = 0.516 F = 0.90; df = 6, 21*	*P = 0.323 F = 1.25; df = 6, 21*

July 26
3DAT3

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant	# flowers exmnd	% damaged flowers	# beetles/ flower
1. UTC	1.8 ± 0.6 a	0.1 ± 0.1	0.4 ± 0.1	0 b	19.8 ± 0.3	12.8 ± 4.9 a	0.2 ± 0.1
2. ISM-555 L	0.3 ± 0.1 b	0.0 ± 0.0	1.4 ± 0.5	0.1 ± 0.0 ab	20	1.3 ± 1.3 b	0.1 ± 0.0
3. ISM-555 M	0.3 ± 0.1 b	0.0 ± 0.0	0.6 ± 0.3	0.1 ± 0.0 ab	20	2.5 ± 2.5 ab	0.1 ± 0.0
4. Anarchy	0.2 ± 0.1 b	0	1.1 ± 0.3	0.1 ± 0.1 a	20	0.0 b	0.0 ± 0.0
5. Minecto Pro	1.2 ± 0.4 ab	0	0.9 ± 0.5	0 b	16.5 ± 2.4	2.5 ± 2.5 ab	0.2 ± 0.1
6. Harvanta	0.5 ± 0.1 ab	0.1 ± 0.0	1.3 ± 0.4	0.0 ± 0.0 ab	20	1.3 ± 1.3 b	0.0 ± 0.0
7. ISM-555 H	0.2 ± 0.1 b	0	1.1 ± 0.4	0.0 ± 0.0 ab	20	0 b	0.0
ANOVA	*P = 0.003 F = 4.86; df = 6, 21*	*P = 0.349 F = 1.19; df = 6, 21*	*P = 0.467 F = 0.97; df = 6, 21*	*P = 0.036 F = 2.81; df = 6, 21*		*P = 0.015 F = 3.50; df = 6, 21*	

July 30
7 DAT3

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant	Total CB alive	Total CB dead
1. UC	1.8 ± 0.5	0.0 ± 0.0	0.3 ± 0.1	0.0 b	1.8 ± 0.5	0.3 ± 0.1
2. IS -555 L	0.2 ± 0.1	0.0	0.5 ± 0.1	0.0 ± 0.0 b	0.2 ± 0.1	0.6 ± 0.1
3. IS -555 M	0.7 ± 0.4	0.0 ± 0.0	0.5 ± 0.3	0.0 ± 0.0 b	0.7 ± 0.4	0.6 ± 0.3
4. Archy	0.2 ± 0.1	0.1 ± 0.0	2.0 ± 1.1	0.3 ± 0.1 a	0.3 ± 0.1	2.3 ± 1.1
5. Mnecto Pro	1.2 ± 0.6	0.1 ± 0.0	0.8 ± 0.4	0.0 ± 0.0 b	1.3 ± 0.6	0.8 ± 0.5
6. Harnta	0.7 ± 0.5	0.1 ± 0.0	1.8 ± 1.2	0.0 b	0.7 ± 0.5	1.8 ± 1.2
7. IS -555 H	0.2 ± 0.0	0.0 ± 0.0	1.7 ± 1.1	0.0 b	0.3 ± 0.1	1.7 ± 1.1
ANO	*P = 0.108 F = 2.02; df = 6, 21*	*P = 0.791 F = 0.514; df = 6, 21*	*P = 0.542 F = 0.86; df = 6, 21*	*P = 0.006 F = 4.31; df = 6, 21*	*P = 0.050 F = 2.58; df = 6, 21*	*P = 0.454 F = 1.00; df = 6, 21*

August 2
10 DAT3

TRT	Alive StCB/ plant	Alive SpCB/ plant	Dead StCB/ plant	Dead SpCB/ plant	# flowers exmnd	% damaged flowers	# beetles/ flower
1. UTC	1.8 ± 0.6 a	0.1 ± 0.0	0.1 ± 0.1	0.0 b	15.3 ± 3.5	23.1 ± 9.1	0.1 ± 0.1
2. ISM-555 L	0.4 ± 0.1 b	0.1 ± 0.0	0.3 ± 0.1	0.0 ± 0.0 ab	20	18.8 ± 5.5	0.1 ± 0.0
3. ISM-555 M	0.2 ± 0.2 b	0. ± 0.1	0.4 ± 0.3	0.0 ± 0.0 ab	20	6.3 ± 3.8	0.0 ± 0.0
4. Anarchy	0. ± 0.1 b	0.0 ± 0.0	0.5 ± 0.2	0.2 ± 0.1 b	20	6.3 ± 1.3	0.1 ± 0.1
5. Minecto Pro	0.6 ± 0.2 ab	0.0	0.2 ± 0.1	0.1 ± 0.0 ab	20	32.5 ± 9.2	0.3 ± 0.1
6. Harvanta	0.4 ± 0.2 b	0.0	0.2 ± 0.1	0.0 ± 0.0 ab	20	11.3 ± 5.2	0.0 ± 0.0
7. ISM-555 H	0.2 ± 0.1 b	0.0 ± 0.0	0.5 ± 0.1	0.0 ± 0.0 ab	20	8.8 ± 5.5	0.1 ± 0.0
ANOVA	*P = 0.007 F = 4.14; df = 6, 21*	*P = 0.420 F = 1.05; df = 6, 21*	*P = 0.271 F = 1.37; df = 6, 21*	*P = 0.044 F = 2.66; df = 6, 21*		*P = 0.052 F = 2.54; df = 6, 21*	*P = 0.120 F = 1.95; df = 6, 21*

Cantaloupe 2024 Two Spotted Spider Mite

Location: Carvel REC, Field 12D
Variety: ‘Aphrodite’
Planting Date: May 17
Experimental Design: RCBD with 2 treatments and 4 replicates (nested within larger cucumber beetle trial)
Plot Size: 3 rows x 22’
Row Spacing: 7’
Plant Spacing: 2’
Treatment Method: CO_2-pressurized backpack sprayer with a 4.5’ boom fitted with 4 D4-45 nozzles calibrated to deliver 40.2 GPA at 50 PSI.
Treatment Date: 8-July
Sample Size: 10 leaves from rows 1 and 3
Data Analysis: T-test; Tukey-Kramer HSD means separation; Log_{10} + 1 transformation

Notes: ISM-555 had been discussed as having miticidal activity. Spider mites were introduced into guard rows of trts 1 and 7 of the cucumber beetle trial to evaluate. Mites were collected from pokeweed growing along the edge of commercial watermelon fields in Sussex County. No pretreatment data was collected. Only 1 post treatment data point was collected due to the cucumber beetle protocol.

Foliar treatments included the adjuvant Induce at 0.25% v/v

TRT no./ Material	**Material**	**Mites / Leaf 15-July (7 DAT)**
1. UTC	---	35.2 ± 17.4 a
7. ISM-555	4.1 fl oz/A	0.5 ± 0.3 b
T-test		*P = 0.001; t = -5.91; df = 6*

Eggplant 2024 Colorado Potato Beetle

Location: Carvel REC, Field 12D
Variety: 'Classic'
Planting Date: ~ 14 June
Experimental Design: RCBD with 4 treatments and 4 replicates
Plot Size: 1 rows x 15'
Row Spacing: 7'
Plant Spacing: 12"
Treatment Method: Banded application via CO_2-pressurized backpack sprayer with a 23" boom fitted with 3, D4 nozzles and #25 cores calibrated to deliver 45 GPA at 20 PSI. The outer nozzles were oriented towards the row.
Treatment Date: 19-July
Sample Size: 5 plants
Data Analysis: ANOVA, Tukey-Kramer HSD means separation;

TRT	Rate/A
1. UTC	---
2.Sivanto Prime	12.25 fl oz/A
3.ISM-555 SC200	2.05 fl oz/A
4. Agri-Mek SC	2.6 fl oz/A

18-July; 1D PRE

TRT	Small L	Medium L	Large L	Adult	Total
1	30.8 ± 28.5	1.8 ± 1.4	0	0.3 ± 0.3	32.8 ± 30.1
2	18.8 ± 6.1	2.0 ± 2.0	0	1.0 ± 0.4	21.8 ± 6.6
3	26.0 ± 17.3	7.5 ± 7.5	0	2.8 ± 1.3	36.3 ± 23.3
4	38.5 ± 18.4	18.8 ± 11.3	0	1.0 ± 0.4	58.3 ± 27.1
ANOVA	*P = 0.904 F = 0.19; df = 3, 12*	*P = 0.308 F = 1.34; df = 3, 12*		*P = 0.130 F = 2.30; df = 3, 12*	*P = 0.741 F = 0.42; df = 3, 12*

26-July; 7DAT

TRT	Small L	Medium L	Large L	Adult	Total
1	43.3 ± 15.5 a	23.0 ± 9.0 a	18.3 ± 6.2 a	2.3 ± 1.3	86.8 ± 20.7 a
2	17.3 ± 4.8 ab	12.0 ± 4.1 ab	1.8 ± 0.3 b	0.8 ± 0.3	31.8 ± 4.9 b
3	0.5 ± 0.5 b	0.5 ± 0.5 b	0 b	0.3 ± 0.3	1.3 ± 0.5 b
4	22.5 ± 7.7 ab	5.5 ± 1.7 ab	1.3 ± 1.3 b	0.3 ± 0.3	29.5 ± 10.1 b
ANO	*P = 0.039 F = 3.84; df = 3, 12*	*P = 0.042 F = 3.73; df = 3, 12*	*P = 0.004 F = 7.49; df = 3, 12*	*P = 0.189 F = 1.87; df = 3, 12*	*P = 0.002 F = 9.20; df = 3, 12*

1-August; 13 DAT

TRT	**Small L**	**Medium L**	**Large L**	**Adult**	**Total**
1	4.0 ± 1.3 a	6.5 ± 3.0	12.5 ± 6.2	0	23.0 ± 8.6 a
2	0 b	2.8 ± 1.4	4.0 ± 1.8	1.0 ± 0.4	7.8 ± 2.8 ab
3	0 b	0	0.3 ± 0.3	0.5 ± 0.3	0.8 ± 0.5 b
4	0 b	2.3 ± 1.1	3.8 ± 1.0	0.3 ± 0.3	6.3 ± 1.9 ab
ANO	*P = 0.002 F = 9.60; df = 3, 12*	*P = 0.121 F = 2.38; df = 3, 12*	*P = 0.106 F = 2.54; df = 3, 12*	*P = 0.126 F = 2.33; df = 3, 12*	*P = 0.030 F = 4.23; df = 3, 12*

Onion 2024 Seedcorn Maggot

Location: Carvel REC, Field 5
Variety: Pelleted 'Talon'
Planting Date: 8-May
Experimental Design:RCBD with 9 treatments and 7 replicates
Plot Size: 2 rows x 20'
Row Spacing: 30"
Plant Spacing: 9 seeds per foot, 180 seeds per plot row
Treatment Method: Seed treatment applied by The Seedcare Institute
Sample Size: Stand counts from 1 plot row.
Data Analysis: ANOVA, Tukey-Kramer HSD means separation

Notes: Field was tilled and poultry manure spread at a rate of 2 tons per acre on 23-April. Field was irrigated via 5 sprinkler heads on 6' risers on 3-May and 8-May and treated with Dacthal 6F at 10 pints per acre on May 7, Irrigated on May 3 and May 8.

TRT	TRT Code	Rates
1. Crol	A9382 + A9459 + A12050 + A20451	7.5 g A/ 100 kg 2.5 g A/ 100 kg 2.5 g A/ 100 kg 250 g A/ 100 kg
2.	See above (trt 1) + A22156 + A9567	Trt 1 + 0.2 mg A/ seed + 0.1 mg A/ seed
3	See above (trt 1) + A22725	Trt 1 + 0.0303 mg A/ seed
4	See above (trt 1) + A22725	Trt 1 + 0.0606 mg A/ seed
5	See above (trt 1) + A22725	Trt 1 + 0.0909 mg A/ seed
6	See above (trt 1) + A22725 + A9567	Trt 1 + 0.0303 mg A/ seed + 0.1 mg A/ seed
7	See above (trt 1) + A22725 + A9567	Trt 1 + 0.0303 mg A/ seed + 0.2 mg A/ seed
8	See above (trt 1) + A22725 + A9567	Trt 1 + 0.0606 mg A/ seed + 0.1 mg A/ seed
9	See above (trt 1) + A22725 + A9567	Trt 1 + 0.0909 mg A/ seed + 0.1 mg A/ seed

TRT	Stand				Dead		Change			
	21-May	**29-May**	**3-June**	**12-June**	**3-June**	**29-May**	**21-May to 29-May**	**29-May to 3-June**	**3-June to 12-June**	**Experiment**
1	55.4 ± 7.3	55.7 ± 10.5	43.5 ± 11.6	31.7 ± 5.5	1.0 ± 0.7	1.0 ± 0.7	+ 0.3 ± 8.5	-13.3 ± 3.9	-12.5 ± 6.2 ab	-23.7 ± 9.0
2	57.0 ± 9.4	64.0 ± 8.8	35.4 ± 4.2	44.6 ± 9.3	1.0 ± 0.6	0.4 ± 0.3	+ 8.0 ± 5.5	-28.6 ± 7.0	+9.1 ± 9.0 ab	-12.4 ± 6.9
3	63.4 ± 10.7	70.3 ± 12.5	56.0 ± 12.6	31.3 ± 6.8	0.8 ± 0.8	0.1 ± 0.1	+ 6.9 ± 4.1	-20.3 ± 5.3	-21.0 ± 6.7 ab	-32.1 ± 6.2
4	67.3 ± 7.5	72.6 ± 8.4	57.4 ± 6.6	37.0 ± 5.6	1.6 ± 0.8	0.6 ± 0.3	+ 5.3 ± 4.2	-15.1 ± 4.8	-20.4 ± 7.9 b	-17.6 ± 5.5
5	63.3 ± 7.0	65.0 ± 6.7	41.1 ± 3.2	45.7 ± 6.8	1.0 ± 0.6	0.3 ± 0.2	+ 1.7 ± 9.7	-23.9 ± 8.1	+4.6 ± 4.4 ab	-12.6 ± 5.1
6	66.9 ± 10.5	78.3 ± 10.0	44.9 ± 7.3	54.3 ± 8.7	1.1 ± 0.5	0.6 ± 0.3	+ 11.4 ± 6.1	-33.4 ± 7.7	+9.4 ± 4.8 a	-14.3 ± 6.9
7	55.0 ± 7.0	63.7 ± 9.8	38.1 ± 5.0	42.3 ± 7.3	0.7 ± 0.5	0.1 ± 0.1	+ 8.7 ± 6.8	-25.6 ± 6.2	+4.1 ± 3.4 ab	-12.7 ± 5.3
8	66.9 ± 10.5	76.0 ± 11.7	47.0 ± 12.3	52.6 ± 14.0	1.2 ± 0.7	0.4 ± 0.2	+ 9.1 ± 3.3	-26.3 ± 10.2	+0.7 ± 7.2 ab	-14.3 ± 6.9
9	76.6 ± 7.1	76.0 ± 9.4	63.4 ± 7.0	55.1 ± 7.9	0.7 ± 0.5	0.9 ± 0.3	-0.6 ± 4.1	-12.6 ± 8.9	-8.3 ± 7.8 ab	-21.4 ± 4.2
ANOVA	*P = 0.742 F = 0.64; df = 8, 54*	*P = 0.800 F = 0.57; df = 8, 54*	*P = 0.198 F = 1.45; df = 8, 51*	*P = 0.316 F = 1.20; df = 8, 54*	*P = 0.991 F = 0.19; df = 8, 51*	*P = 0.599 F = 0.81; df = 8, 54*	*P = 0.874 F = 0.47; df = 8, 54*	*P = 0.4523 F = 1.04; df = 8, 51*	*P = 0.004 F = 3.30; df = 8, 51*	*P = 0.226 F = 1.38; df = 8, 54*

Potatoes 2024 Wireworms and Colorado Potato Beetle

Location: Carvel REC, Field 26A
Variety: 'Kennebec'
Planting Date: 25 April
Experimental Design: RCD with 3 treatments and 4 replicates
Plot Size: 1 rows x 20'
Row Spacing: 30"
Plant Spacing: 12"
Treatment Method: In-Furrow: (Assuming a 36" band) CO_2-pressurized backpack sprayer equipped with a single nozzle wand fitted with a D4 disc and #25 core delivering 14.4 GPA at 30 PSI.
Foliar: Banded application with a 30" spray swath, CO_2-pressurized backpack sprayer equipped with a single nozzle wand fitted with a D4 disc and #25 core delivering 18.9 GPA at 40 PSI.
Treatment Date: At-Planting; Foliar: 12-June
Sample Size: 10 stems per plot for Colorado Potato Beetle; all potatoes dug in row
Data Analysis: ANOVA, Tukey-Kramer HSD means separation

Notes: By mid-July, untreated plots had been completely defoliated by CPB.

TRT	**Rate**	**% insect damage**	**% wireworm**
1. UTC	---	33.6 ± 12.0	22.9 ± 10.3
2. Belay	3 fl oz	37.2 ± 9.4	18.5 ± 6.6
3. Nurizma	2.3 fl oz	57.0 ± 7.9	25.0 ± 7.5
ANOVA		*P = 0.125* *F = 2.34; df = 3, 12*	*P = 0.955* *F = 0.105; df = 3, 12*

Foliar Colorado Potato Beetle

TRT	**Rate**
1. UTC	---
2. Plinazolin SC 200	2.05 fl oz
3. Minecto Pro	11.0 fl oz

All foliar sprays included Induce at 0.25% v/v

12-June 0d PRE

TRT	**Small larvae**	**Medium**	**Large**	**Adult**	**Total**
1	10.5 ± 7.3	7.3 ± 4.2	3.5 ± 2.2	0.3 ± 0.3	21.5 ± 10.6
2	8.5 ± 6.9	8.3 ± 3.8	3.3 ± 2.6	0.3 ± 0.3	20.3 ± 5.1
3	11.5 ± 7.4	14.3 ± 7.4	6.5 ± 2.9	0	32.3 ± 6.5
ANO	*P = 0.956* *F = 0.05; df = 2, 9*	*P = 0.626* *F = 0.49; df = 2, 9*	*P = 0.629* *F = 0.49; df = 2, 9*	*P = 0.622* *F = 0.50; df = 2, 9*	*P = 0.510* *F = 0.73; df = 2, 9*

14-June, 2DAT

TRT	Small larvae	Medium	Large	Adult	Total
1	4.5 ± 4.5	13.0 ± 11.7	2.8 ± 2.4	0.3 ± 0.3	20.5 ± 10.7
3	1.0 ± 1.0	0	0	0	1.0 ± 1.0
4	3.0 ± 2.1	5.0 ± 2.2	0.3 ± 0.3	0	8.3 ± 3.6
ANO	*P = 0.708 F = 0.36; df = 2, 9*	*P = 0.436 F = 0.91; df = 2, 9*	*P = 0.355 F = 1.16; df = 2, 9*	*P = 0.405 F = 1.00; df = 2, 9*	*P = 0.160 F = 2.26; df = 2, 9*

18-June, 6DAT

TRT	Small larvae	Medium	Large	Adult	Total
1	17.3 ± 12.0	1.3 ± 0.9	8.5 ± 5.7	0.3 ± 0.3	27.3 ± 18.2
2	0	0	0	0	0
3	0.3 ± 0.3	0.5 ± 0.5	0	0	0.8 ± 0.5
ANO	*P = 0.188 F = 2.03; df = 2, 9*	*P = 0.394 F = 1.04; df = 2, 9*	*P = 0.162 F = 2.24; df = 2, 9*	*P = 0.405 F = 1.00; df = 2, 9*	*P = 0.170 F = 2.18; df = 2, 9*

24-June, 12 DAT

TRT	Small larvae	Medium	Large	Adult	Total
1	0	1.5 ± 0.9	4.5 ± 2.3	5.0 ± 4.0	11.0 ± 3.3
2	0	0	0	0.3 ± 0.3	0.3 ± 0.3
3	0	0	0	0	0
ANOVA		*P = 0.100 F = 3.00; df = 2, 9*	*P = 0.066 F = 3.74; df = 2, 9*	*P = 0.281 F = 1.47; df = 2, 9*	*P = 0.004 F = 10.54; df = 2, 9*

1-July, 19 DAT

TRT	Small larvae	Medium	Large	Adult	Total
1	4.3 ± 4.3	4.5 ± 4.5	0	4.5 ± 1.2	13.3 ± 9.3
3	0	0	0	3.8 ± 1.0	3.8 ± 1.0
4	0	0	0	5.0 ± 2.1	5.0 ± 2.1
ANOVA	*P = 0.405 F = 1.00; df = 2, 9*	*P = 0.405 F = 1.00; df = 2, 9*		*P = 0.846 F = 0.17; df = 2, 9*	*P = 0.453 F = 0.87; df = 2, 9*

Snap Beans 2024 Seedcorn Maggot

Location: Carvel REC, Field 5
Variety: 'Huntington'
Planting Date: 6-May
Experimental Design: RCBD with 7 treatments and 6 replicates
Plot Size: 2 rows x 20', 126 seed per plot row
Row Spacing: 30"
Plant Spacing: 2"
Treatment Method: Seed treated by The Seedcare Institute
Sample Size: Stand count: whole plot prior to destructive sample, row 1 whole row after destructive sample
Destructive sample: 10 row feet, 28-May
Data Analysis: ANOVA, Tukey-Kramer HSD means separation

Notes: Field was tilled and poultry manure spread at a rate of 2 tons per acre on 23-April. Field was irrigated on 3-May and 8-May and treated with Dual Magnum at 1.25 pints per acre on May 7, Irrigated on May 3 and May 8.

TRT	Material	Active ingredient	Rate
1	FarMore F300	Mefenoxam (Apron XL) Fludioxinil (Maxim 4FS) Azoxystrobin (Dynasty)	3.75 g a.i./100 kg 5.0 g a.i./100 kg 2.5 g a.i./100 kg
2	FarMore F300 + Cruiser 5FS	See above + Thiamethoxam	See above + 50 g a.i./100 kg
3	FarMore F300 + Isocycloseram	See above + Isocycloseram	See above + 5 g a.i./100 kg
4	FarMore F300 + Isocycloseram	See above + Isocycloseram	See above + 10 g a.i./100 kg
5	FarMore F300 + Cruiser 5FS + Isocycloseram	See above + Thiamethoxam + Isocycloseram	See above + 50 g a.i./ 100 kg + 5 g a.i./ 100 kg
6	FarMore F300 + Fortenza	See above + Cyantraniliprole	See above + 0.2 mg/ seed
7	FarMore F300 + Lumivia	Chlorantraniliprole	See above + 0.2 mg/ seed

20-May (2 rows)

TRT	**Stand**	**% Runts**	**% Dead***	**% "Snake heads"**	**% Affected***
1	204.5 ± 6.9	0.9 ± 0.4	1.7 ± 0.5	4.9 ± 1.2 a	7.5 ± 1.3 a
2	216.7 ± 4.0	0.2 ± 0.2	0.3 ± 0.1	2.1 ± 0.2 b	2.6 ± 0.3 b
3	214.8 ± 2.7	0.5 ± 0.3	0.5 ± 0.1	2.4 ± 0.2 b	3.4 ± 0.5 b
4	215.5 ± 2.7	0.2 ± 0.2	0.8 ± 0.4	2.9 ± 0.4 ab	3.9 ± 0.4 b
5	222.7 ± 3.6	0.4 ± 0.2	0.5 ± 0.2	2.3 ± 0.3 b	3.2 ± 0.3 b
6	210.5 ± 3.7	0.2 ± 0.1	0.6 ± 0.3	1.9 ± 0.2 b	2.6 ± 0.4 b
7	218.2 ± 4.1	0.2 ± 0.1	1.2 ± 0.8	2.5 ± 0.3 b	3.9 ± 0.8 b
ANO	*P = 0.102 F = 1.94; df = 6, 35*	*P = 0.268 F = 1.34; df = 6, 35*	*P = 0.337 F = 1.18; df = 6, 35*	*P = 0.004 F = 4.02; df = 6, 35*	*P <0.001 F = 5.39; df = 6, 35*

*Data was SQRT (x + 0.1) transformed for analysis

28-May (2 rows)

TRT	**Stand**	**% Runts**	**% Dead**	**% "Snake heads"**	**% Affected**
1	196.3 ± 8.7 b	10.5 ± 1.0	0.5 ± 0.2	0.3 ± 0.3	11.4 ± 1.0
2	223.8 ± 1.7 a	8.2 ± 0.8	0.2 ± 0.1	0.1 ± 0.1	8.5 ± 0.7
3	209.8 ± 3.0 ab	9.3 ± 1.2	0.2 ± 0.1	0.6 ± 0.2	10.2 ± 1.2
4	213.0 ± 4.9 ab	8.8 ± 0.7	0	0.2 ± 0.1	9.0 ± 0.7
5	223.0 ± 4.2 a	7.5 ± 0.6	0.3 ± 0.2	0.1 ± 0.1	8.0 ± 0.5
6	213.2 ± 6.7 ab	9.4 ± 1.0	0.3 ± 0.2	0	9.7 ± 1.0
7	219.8 ± 4.6 a	9.9 ± 0.7	0.2 ± 0.1	0.2 ± 0.1	10.3 ± 0.7
ANO	*P = 0.012 F = 3.25; df = 6, 35*	*P = 0.246 F = 1.39; df = 6, 35*	*P = 0.302 F = 1.26; df = 6, 35*	*P = 0.076 F =2.12; df = 6, 35*	*P = 0.103 F = 1.93; df = 6, 35*

4-June (1 row)

TRT	Stand	% Runts	% Dead	% "Snake heads"	% Affected
1	95.0 ± 2.3 b	3.6 ± 0.9	0.2 ± 0.2	0	3.8 ± 1.0
2	112.0 ± 2.2 a	5.9 ± 1.0	0	0	5.9 ± 1.0
3	104.2 ± 3.4 ab	6.9 ± 1.7	0.7 ± 0.3	0	7.5 ± 2.0
4	102.7 ± 2.6 ab	4.6 ± 1.1	0.2 ± 0.2	0	4.8 ± 1.1
5	101.0 ± 3.7 ab	6.1 ± 1.1	0	0	6.1 ± 1.2
6	103.2 ± 4.3 ab	8.8 ± 1.5	0	0	8.8 ± 1.5
7	110.5 ± 2.1 a	5.9 ± 1.1	0	0	5.9 ± 1.1
ANOVA	*P = 0.007 F = 3.59; df = 6, 35*	*P = 0.138 F = 1.75; df = 6, 35*	*P = 0.064 F = 2.22; df = 6, 35*		*P = 0.174 F = 1.61; df = 6, 35*

Destructive Sample
28-May

TRT	**n. plants**	**% Healthy**	**% Injured**	**% Damaged**
1	45.5 ± 1.8	34.2 ± 3.9	46.3 ± 4.6	19.5 ± 2.8
2	52.7 ± 2.3	50.1 ± 4.7	35.8 ± 1.8	14.1 ± 3.4
3	49.8 ± 1.6	33.5 ± 4.2	51.5 ± 4.3	15.0 ± 1.8
4	50.2 ± 2.8	43.6 ± 6.9	42.3 ± 4.5	14.2 ± 3.6
5	54.7 ± 2.4	33.9 ± 3.2	49.5 ± 3.6	16.6 ± 3.5
6	49.0 ± 3.9	47.2 ± 5.1	43.0 ± 3.2	9.8 ± 2.4
7	49.3 ± 2.7	40.6 ± 5.4	45.4 ± 3.6	14.0 ± 3.3
ANO	*P = 0.309* *F = 1.24; df = 6, 35*	*P = 0.104* *F = 1.92; df = 6, 35*	*P = 0.113* *F = 1.87; df = 6, 35*	*P = 0.484* *F = 0.93; df = 6, 35*

Sweet Corn 2024 Corn Earworm I

Location: Carvel REC, Field 25F
Variety: ‘American Dream’
Planting Date: 25-April
Experimental Design: Randomized complete block design with 11 treatments and 4 replicates
Plot Size: 2 rows x 20’ treated and 1 untreated guard row between plots
Row Spacing: 30”
Seeding Rate: 24,000/a
Treatment Method: Directed ear spray; CO_2-pressurized backpack sprayer with single-row boom equipped with 2 D2 tips and and #25 cores delivering 40 GPA at 38 PSI.

Treatment Date: See Table, treatments initiated at 25% first silk
Harvest Date: July 16
Sample Size: 25 ears/plot
Data Analysis: ANOVA; Tukey-Kramer HSD means separation.

Notes: Several plots had treatment stakes destroyed inadvertently before harvest.

TRT	Rate/acre	Application Date
1. UT	---	---
2. Beiege Bahroid XL	10.0 fl oz 2.8 fl oz	A, C, E B, D
3. Elvest Bahroid XL	9.6 fl oz 2.8 fl oz	A, C, E B, D
4. Beiege	6.0 fl oz	A-E
5. Vaacor Raant Heo Bahroid XL	2.5 fl oz 6.0 fl oz 10.3 fl oz 2.8 fl oz	A, B C D E
6. Bahroid XL	2.8 fl oz	A-E
7. Brgade	6.4 fl oz	A-E
8. Wrrior II Lcap II	1.92 fl oz 1.92 fl oz	A, B C, D, E
9. Heo	7.0 fl oz	A-E
10. Rdiant	3.0 fl oz	A-E
11. Rdiant + Baythroid XL	3.0 fl 0z + 2.8 fl oz	A-E

Induce was added to all treatments at a rate of 0.25% v/v
A = June 24, B = June 27, C = July 1, D = July 5, E = July 9

Trt	Worms per 25 ears				
	Small CEW	**Med CEW**	**Large CEW**	**Dead CEW**	**Total**
1	0	1.0 ± 0.7	0 b	1 ± 0.6	2 ± 0.7
2	0.5 ± 0.3	0	0.3± 0.3 ab	0	0.8 ± 0.5
3	0	0.3 ± 0.3	0.3 ± 0.3 ab	0	0.5 ± 0.3
4	0	0	0 ab	0	0
5	0	0	0 ab	0	0
6	0	0.7 ± 0.7	1.0 ± 0.6 ab	0.3 ± 0.3	2.0 ± 0.6
7	0.5 ± 0.5	1.0 ± 1.0	2.8 ± 1.2 ab	0	4.3 ± 1.9
8	0	0	2.0 ± 1.5 ab	0.3 ± 0.3	2.3 ± 1.3
9	0	1.0 ± 0.6	0.3 ± 0.3 ab	0	1.3 ± 0.3
10	0	0.3 ± 0.3	3.7 ± 1.2 a	0	4.0 ± 1.0
11	0	0	0 ab	0.5 ± 0.5	0.5 ± 0.5
ANOVA	*P = 0.4904 F = 0.97; df = 10*	*P = 0.7223 F = 0.69; df = 10*	*P = 0.0103 F = 3.12; df = 10*	*P = 0.1551 F = 1.63; df = 10*	*P = 0.0283 F = 2.55; df = 10*

Trt	**% Clean Ears**	**% Clean + tip ears**	**% Damaged ears**	**# sap beetle damaged kernals**	**# stink bug damaged kernals**
1	39.9 ± 11.5	75.7 ± 10.4	24.3 ± 10.4	12.2 ± 4.4	2.2 ± 1.2
2	56.1 ± 12.6	88.6 ± 7.5	11.4 ± 7.5	16.1 ± 2.6	0.6 ± 0.3
3	70.0 ± 10.6	98.0 ± 2.0	2.0 ± 2.0	18.51 ± 7.3	0
4	71.0 ± 7.5	81.8 ± 2.9	18.2 ± 2.9	14.9 ± 4.0	0.7 ± 0.3
5	76.3 ± 8.4	95.8 ± 2.4	4.2 ± 2.4	14.8 ± 6.0	0.6 ± 0.1
6	60.0 ± 6.9	80.0 ± 4.6	20.0 ± 4.6	17.3 ± 1.7	0.4 ± 0.3
7	50.0 ± 7.7	85.0 ± 8.7	15.0 ± 8.7	6.9 ± 1.9	0.2 ± 0.1
8	37.3 ± 18.7	92.0 ± 4.6	8.0 ± 4.6	13.5 ± 4.6	1.3 ± 0.8
9	66.7 ± 7.1	88.0 ± 10.1	12.0 ± 10.1	10.5 ± 1.5	0.04 ± 0.04
10	68.0 ± 2.3	96.0 ± 2.3	4.0 ± 2.3	17.6 ± 7.3	0.4 ± 0.4
11	81.3 ± 6.3	95.8 ± 4.2	4.2 ± 4.2	11.2 ± 0.1	2.3 ± 2.1
ANO	*P = 0.1224 F = 1.76; df = 10*	*P = 0.3366 F = 1.20; df = 10*	*P = 0.3366 F = 1.20; df = 10*	*P = 0.7853 F = 0.62; df =10*	*P = 0.1913 F = 1.52; df = 10*

Sweet Corn 2024 Corn Earworm II

Location: Carvel REC, Field 5 (Untreated Control Block): 38.635223, -75.462091; ~1.3 acres
Concord DE (Magnet + Conventional Insecticide): 38.637974, -75.521718; ~11.6 acres
Concord DE (Conventional Insecticide): 38.641762, -75.531374; ~11.4 acres

Variety: 'Glacial'

Planting Date: June 21 Untreated Control Block
June 26 Magnet + Conventional Insecticidal Program
June 30 Conventional Insecticide

Row Spacing: 30"

Plant Spacing: 6"

Treatment Method: CO_2-pressurized backpack sprayer with a single nozzle wand fitted with an SJ3-015-VP nozzle (3 stream pattern), calibrated to deliver 5.3 fl oz per 100 row feet at 2.7 mph.

Treatment Dates: Magnet applications began at late tassel push.
Magnet applied with Lannate (rate 2.6 fl oz Lannate + 125.4 fl oz Magnet): 6-Aug, 17-Aug, 20-Aug, and 23-Aug
Magnet applied with Radiant (rate 1.0 fl oz Radiant + 127 fl oz Magnet): 10-Aug, 12-Aug, 14-Aug

Field	TRT	Rate	Application Dates
Maget + Conveional	Magnet + Lannate	125.4 fl oz + 2.6 fl oz (5 fl oz/100 row feet)	8/6, 8/20, 8/23
	Magnet + Radiant	127 fl oz + 1.0 fl oz	8/10, 8/12, 8/14, 8/17
	Nudrin + Sultrus	24 fl oz + 2.8 fl oz	8/8, 8/16, 8/26
	Elevest	9 fl oz	8/11, 8/18
	Intrepid Edge + Suus	6.4 fl oz + 2.8 fl oz	8/14, 8/21
	Besiege	10 fl oz	8/23
Conveional Insectcide Field	Nudrin + Sultrus	24 fl oz + 2.8 fl oz	8/8, 8/16, 8/26, 8/30
	Elevest	9 fl oz	8/11, 8/18, 8/28
	Intrepid Edge + Suus	6.4 fl oz + 2.8 fl oz	8/14, 8/21
	Besiege	10 fl oz	8/23

Sample Size: At each sample date, between 45 and 90 ears were examined for eggs. Between 50-100 ears were examined for earworm infestation.

Notes:
Corn earworm traps biated with Hercon lures were placed adjacent to each treatment block. Lures were replaced two weeks after trap placement.
10% silk in the Magnet + Conventional plot occurred on August 8, 60% silking August 12
10% silk in Field 5 Untreated plot occurred on 11 Aug
Irrigation often ran the day following treatment.
50% silk in the Conventional (no Magnet) on Aug 15

Nightly Trap Capture

Location	8/5	8/7	8/9	Aug 12	13-Aug	14-Aug	15-Aug	16-Aug	19-Aug	20-Aug	21-Aug	23-Aug	26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	3-Sept	4-Sept	6 Sept	12-Sept
Field 5				Start	34	17	45	35	11.7	17		7.7	14.7		4.5	17	3	4	9		
Mag+Conv	start	18	40.5	29.7	49	31	40	54	56.7		79	18		21.3		43.5				1.9	0.4
Conv					Start		21					22.6		58.3	68	136		33.6		5.7	5.9

Location/TRT				# Eggs (# ears)							
	6-Aug	9-Aug	12-Aug	13-Aug	15-Aug	19-Aug	21-Aug	23-Aug	27-Aug	30-Aug	3-Sept
Field 5/ No insecticide		0.02 ± 0.02 (50)	0.58 ± 0.12 (90)		0.83 ± 0.16 (52)	1.32 ± 0.19	3.11 ± 0.40 (45)	1.48 ± 0.23 (60)	1.14 ± 0.20 (50)		
Magnet + Conventional		0.03 ± 0.02 (80)	0.14 ± 0.04 (120)		0.23 ± 0.08 (60)	0.10 ± 0.05 (48)		0.36 ± 0.09 (75)	0.58 ± 0.11 (48)		
Magnet Only				0.33 ± 0.11 (60)	0.17 ± 0.05 (60)	0.38 ± 0.09 (50)			0.15 ± 0.06 (60)		
Conventional (No Magnet)					0.18 ± 0.13 (60)	0.53 ± 0.11 (60)		0.28 ± 0.13 (75)	0.15 ± 0.06 (60)	0.74 ± 0.20 (43)	0.40 ± 0.21 (47)
Calloway Untreated									0.41 ± 0.12 (41)	0.77 ± 0.30 (13)	0.33 ± 0.10 (49)
Calloway Early	0.01 ± 0.01 (90)		0.09 ± 0.05 (90)		0.3 ± 0.13 (50)	0.02 ± 0.02 (49)					

Location/TRT	Early worm sample	Harvest Sample
Calloway Eary	1 CEW/ 100 ears (99% clean ears) (Aug 20)	2 CEW/ 100 ears (98% clean ears) (Aug 30)
Field 5/ No inecticide	303 CEW/ 100 ears (17% clean ears) (August 19)	242 CEW/ 99 ears; (53 small, 65 medium, 96 large, 28 exits or gone) 1.01% clean ears (Aug 30)
Magnet + Cntional	0 CEW / 98 ears (August 19)	6 CEW/ 100 ears (5 small 1 Large); 94% clean ears
Magnet (No Isecticide)	15 CEW/ 100 ears (92% clean ears)	82 CEW/ 109 ears 43.1% clean ears (25 small, 29 medium, 25 Large, 1 FAW, 2 exits) (August 30)
Calloway Noagnet, No Insecticide	26 CEW/ 50 ears (48% clean ears)	59 CEW/ 97 ears (22.7% clean ears) (Sept 4)
Calloway Noagnet, Convention TT	1 CEW/ 75 ears (98.7% clean ears)	5 CEW/ 100 ears (95% clean ears) (Sept 4)

Sweet Corn 2024 Corn Earworm II (Rain Trial)

Location: Carvel REC, Field 5
Variety: 'Glacial'
Planting Date: 21 June
Experimental Design: Randomized Complete Block design with 5 treatments and 4 replicates
Plot Size: 2 rows x 20' treated and 1 untreated guard row between plots
Row Spacing: 30"
Seeding Rate: 24,000/a
Treatment Method: Directed ear spray; CO_2-pressurized backpack sprayer with single-row boom equipped with 2 D2 tips and and #25 cores delivering 40 GPA at 38 PSI.

Overhead irrigation from sprinklers was applied to plots beginning a minimum of 45 minutes following treatment. Rain gauges indicated that plots received 0.15 to 0.3 inches per irrigation run.

Treatment Date: Treatments initiated at 10% first silk
Harvest Date: August 30
Sample Size: 25 ears/plot
Data Analysis: ANOVA; Tukey-Kramer HSD means separation.
Notes:

TRT	Material	Rate
1	UTC	---
2	Besiege + Irrigation	10.0 fl oz
3	Baythroid XL + Irrigation	2.8 fl oz
4	Besiege	10.0 fl oz
5	Baythroid XL	2.8 fl oz

TRT	Small	Medium	Large	Exits/ Missing	% Clean	% Clean + Tip	% Damage
1. UC	13.3 ± 0.3	16.7 ± 3.4	25.0 ± 4.0	7.3 ± 1.8	1.3 ± 1.3	34.4 ± 24.5	65.6 ± 24.5
2. Bege + Irr	0	1.3 ± 0.9	1.0 ± 1.0	1.7 ± 1.2	84.0 ± 9.2	96.0 ± 4.0	4.0 ± 4.0
3. Baytoid + Irr	11.7 ± 5.8	9.3 ± 1.9	9.3 ± 0.9	3.3 ± 1.2	16.0 ± 2.3	38.7 ± 7.4	61.3 ± 7.4
4. Bsiege	0	1.7 ± 1.2	2.7 ± 1.2	2.3 ± 1.3	78.5 ± 7.3	100	0
5. Baytoid	11.7 ± 2.4	8.3 ± 2.7	5.3 ± 3.1	6.7 ± 2.2	14.9 ± 1.5	68.0 ± 21.2	32.0 ± 21.2
2 vs 4	---	*P = 0.418 t = 0.22; df = 3.67*	*P = 0.152 t = 1.25; df = 2.88*	*P = 0.364 t = 0.37; df = 3.96*	*P = 0.333 t = -0.47; df = 3.80*	*P = 0.211 t = 1.0; df = 2*	*P = 0.211 t = -1; df = 2*
3 vs 5	*P = 0.500 t = 0; df = 2.67*	*P = 0.389 t = -0.30; df = 3.52*	*P = 0.069 t = -2.03; df = 2.94*	*P = 0.135 t = 1.34; df = 3.1*	*P = 0.354 t = -0.41; df = 3.37*	*P = 0.149 t = 1.31; df = 2.48*	*P = 0.149 t = -1.31; df = 2.48*

Sweet Corn 2024 Corn Earworm III

Location: Carvel REC, Field 25F
Variety: 'American Dream'
Planting Date: 27-June
Experimental Design: Randomized complete block design with 5 treatments and 4 replicates
Plot Size: 2 rows x 20' treated and 1 untreated guard row between plots
Row Spacing: 30"
Seeding Rate: 24,000/a
Treatment Method: Directed ear spray; CO_2-pressurized backpack sprayer with single-row boom equipped w/ 2 D2 tips, #25 cores delivering 40 GPA at 38 PSI.
Treatment Date: See Table, treatments initiated at 10% first silk
Harvest Date: 4-Sept
Sample Size: 25 ears/plot
Data Analysis: ANOVA; Tukey-Kramer HSD means separation.

Notes: It appears that under moderate pressure, 3 treatments spaced at first silk to full silk and first silk to wilting silk will not provide adequate corn earworm management, unlike as had been suggested by some published work with *H. armigera*. Need to test 4 applications with lower rates to keep under the 31.0 fl oz Besiege maximum application amount. Need to repeat under greater population pressure, %clean ears is unusually high for Georgetown in August sweet corn.

TRT	Rate/acre	Application Date
1. UT	---	---
2. Beiege	10.0 fl oz	A, B, C
3. Beiege	10.0 fl oz	A, B, C, D, E, F
4. Beiege	10.0 fl oz	A, B, C, D, E
5. Beiege	10.0 fl oz	A, C, E

A = Aug 11, B = Aug 14, C = Aug 17, D = Aug 20, E = Aug 23, F = Aug 26
Induce was added to all treatments at a rate of 0.25% v/v

TRT	Worms per 25 ears				% Clean Ears	% Clean + Tip	% Damage
	Small	Medium	Large	Exits + Missing			
1	1.5 ± 0.9	1.0 ± 0.4	0.5 ± 0.5	12.8 ± 1.9	30.7 ± 8.1 b	65.1 ± 6.9 b	34.9 ± 6.9
2	0.8 ± 0.5	1.3 ± 0.5	0	4.0 ± 1.3	75.7 ± 7.4 a	97.9 ± 1.2 a	2.1 ± 1.2
3	0	0	0	0	100 a	100 a	0
4	0	0	0	0	100 a	100 a	0
5	0.8 ± 0.5	0.8 ± 0.5	0.3 ± 0.3	4.0 ± 2.0	76.0 ± 7.9 a	94.7 ± 3.1 a	5.3 ± 3.1
ANO	*P = 0.521 F = 0.85; df = 4, 11*	*P = 0.335 F = 1.28; df = 4, 11*	*P = 0.734 F = 0.50; df = 4, 11*	*P = 0.002 F = 8.48; df = 4, 11*	*P <0.001 F = 12.63; df = 4, 11*	*P <0.001 F = 12.70; df = 4, 11*	*P <0.001 F = 12.70; df = 4, 11*

Missing 2 trt 3 and 2 trt 4 plots.

Sweet Corn 2024 Corn Earworm IV

Location: Carvel REC, Field 25F
Variety: 'Obsession I' and 'Obsession II'
Planting Date: 27-June
Experimental Design: Split Block design with 2 main factors (Obsession I vs Obsession II) and 4 subplot factors (treatment frequency)
Plot Size: 2 rows x 20' treated and 1 untreated guard row between plots
Row Spacing: 30"
Seeding Rate: 24,000/a
Treatment Method: Directed ear spray; CO_2-pressurized backpack sprayer with a 20" boom equipped with 2 8002 nozlles calibrated to deliver 35.1 GPA at 20 PSI; each row was treated twice, once per side. Boom held parrallel to ears.
Treatment Date: See Table, treatments initiated at 10% first silk Obsession II and 20% silking Obsession I. All plots treated with Vantacor at 2.5 fl oz/A
Harvest Date: 4 Sept
Sample Size: 25 ears/plot
Data Analysis: ANOVA; Tukey-Kramer HSD means separation.
Notes: Some treatments exceeded Vantacor's use rate per crop per season restrictions. Obsession I and Obessession II did not begin silking on the same day, thus spray program implementation differed slightly.

Variety	TRT	Timing
Obsessin I	1	UTC
	2	7 day (M); Aug 15, Aug 22, Aug 29
	3	3, 4 day (MF); Aug 15, Aug 18, Aug 22, Aug 25, Aug 29, Sept 2
	4	2, 2, 3 day (MWF); Aug 15, Aug 17, Aug 19, Aug 22, Aug 29, Aug 31, Sept 2
Obsessin II	5	UTC
	6	7 day (M); Aug 13, Aug 20, Aug 27
	7	3, 4 day (MF)Aug 13, Aug 17, Aug 20, Aug 31
	8	2, 2, 3 day (MWF); Aug 13, Aug 15, Aug 17, Aug 20, Aug 22, Aug 24, Aug 29, Aug 31

All treatments included Induce at 0.25% v/v

Four pheromone traps were deployed at the corners of the field.

Date	SW Hartstack	NE Hartstack	NW Sentry	SE Sentry
8/14	75	60	28	1
8/19	130	138	107	108
8/22	12	5	50	18
8/27	33	40	32	70

Trt	Worms per 25 ears			
	Small CEW	**Med CEW**	**Large CEW**	**Total**
1	5.6 ± 2.6 ab	2.2 ± 1.1 ab	1.6 ± 3.5	11.2 ± 2.0 ab
2	0.8 ± 0.4 ab	3.0 ± 1.1 ab	1.2 ± 0.5	5.0 ± 1.1 bc
3	0.6 ± 0.4 b	3.4 ± 1.1 ab	1.0 ± 0.4	5.0 ± 1.5 bc
4	0.2 ± 0.2 b	0.8 ± 0.5 ab	1.0 ± 0.8	2.0 ± 0.7 c
5	6.8 ± 2.2 a	4.8 ± 1.5 a	3.6 ± 1.8	15.2 ± 3.6 a
6	2.8 ± 1.0 ab	1.6 ± 0.5 ab	0.2 ± 0.2	4.6 ± 1.2 bc
7	0.8 ± 0.5 ab	2.3 ± 0.9 ab	1.0 ± 1.0	4.0 ± 1.6 bc
8	0.8 ± 0.3 ab	0 b	0.3 ± 0.3	1 ± 0.4 c
ANOVA	*P = 0.0056* *F = 3.67; df = 7*	*P = 0.0478* *F = 2.36; df = 7*	*P = 0.1544* *F = 1.67; df = 7*	*P = 0.001* *F = 6.78; df = 7*

Trt	% Clean Ears	% Clean + Tip Ears	% Damaged Ears	Tip Damage Extent (cm^2/ear)	Damage Extent (cm^2/ear)
1	11.6 ± 4.0 d	56.0 ± 8.7 a	44.0 ± 8.7 a	3.2 ± 1.7	5.6 ± 1.1 a
2	48.0 ± 7.9 bc	88.0 ± 4.9 b	12.0 ± 4.9 b	1.5 ± 0.5	0.8 ± 0.4 b
3	62.9 ± 2.8 abc	96.0 ± 2.5 b	4.0 ± 2.5 b	1.3 ± 0.4	0.4 ± 0.2 b
4	76.0 ± 5.7 ab	95.2 ± 3.9 b	4.8 ± 3.9 b	0.8 ± 0.3	0.3 ± 0.2 b
5	35.4 ± 10.3 cd	96.0 ± 2.2 b	4.0 ± 2.2 b	1.8 ± 0.5	0.2 ± 0.2 b
6	75.2 ± 4.6 ab	98.4 ± 1.6 b	1.6 ± 1.6 b	0.4 ± 0.2	0.1 ± 0.1 b
7	84.0 ± 7.1 a	100 b	0 b	0.2 ± 0.1	0 b
8	89.1 ± 4.9 a	100 b	0 b	0.2 ± 0.1	0 b
ANO	*P = 0.0001* *F = 17.36; df = 7*	*P = 0.0001* *F = 12.40; df = 7*	*P = 0.0001* *F = 12.40; df = 7*	*P = 0.0802* *F = 2.06; df = 7*	*P = 0.0001* *F = 17.08; df = 7*

Sweet Corn 2024 Corn Earworm V

Location: Carvel REC, Field 25F
Variety: 'American Dream'
Planting Date: July 10
Experimental Design: Randomized Complete Block design with 14 treatments and 4 replicates
Plot Size: 2 rows x 20' treated and 1 untreated guard row between plots
Row Spacing: 30"
Seeding Rate: 24,000/a
Treatment Method: Directed ear spray; CO_2-pressurized backpack sprayer with single-row boom equipped with 2 D2 tips and and #25 cores delivering 40 GPA at 38 PSI.
Treatment Date: See Table; Treatments initiated at 5-10% first silk
Harvest Date: 17-Sept
Sample Size: 25 ears/plot
Data Analysis: ANOVA; Tukey-Kramer HSD means separation.
Notes: TRT 13 was originally intended to test a 2 vs 3 day spray schedule, but temperatures cooled in early September.

TRT	Rate	Timing
1. UC	---	---
2. Vtacor	1.7 fl oz	A
Lnate	24.0 fl oz	B
'Eperimental'	4.5 fl oz	C
Vtacor	1.7 fl oz	D
Heo	10.0 fl oz	E
Elest	9.6 fl oz	F
Bythroid XL	2.8 fl oz	G
3. Lnnate	24.0 fl oz	A
Vtacor	1.7 fl oz	B, D, F
Bythroid XL	2.8 fl oz	C, G
Heo	10.0 fl oz	E
4. Lnnate	24.0 fl oz	A
Vtacor + Mustg	1.7 fl oz +4.0 fl oz	B, D
Bythroid XL	2.8 fl oz	C, G
Heo	10.0 fl oz	E
Vtacor	1.7 fl oz	F
5. Lnnate	24.0 fl oz	A
Elest	9.6 fl oz	B, D
Bythroid XL	2.8 fl oz	C, G
'Eperimental'	4.5 fl oz	E
Vtacor	1.7 fl oz	F

TRT	Rate	Timing
6. Lnnate Bege Bythroid XL 'Eperimental' Vtacor	24.0 fl oz 10.0 fl oz 2.8 fl oz 4.5 fl oz 1.7 fl oz	A B, D C, G E F
7. Lnnate Vtacor 'Eperimental' Heo Bythroid XL	24.0 fl oz 1.7 fl oz 4.5 fl oz 10.0 fl oz 2.8 fl oz	A B, D, F C E G
8. Lnnate Vtacor Heo 'Eperimental' Bythroid	24.0 fl oz 1.7 fl oz 10.0 fl oz 4.5 fl oz 2.8 fl oz	A B, D, F C E G
9. Lnnate Vtacor Bythroid XL Heo 'Eperimental'	24.0 fl oz 1.7 fl oz 2.8 fl oz 10.0 fl oz 4.5 fl oz	A B, D, F C E G
10. Lmcap II	1.92 fl oz	A-G
11. Bythroid XL	2.8 fl oz	A-G
12. Bigade	6.4 fl oz	A-G
13. Irepid Edge + Baytoid XL	6.0 fl oz + 2.8 fl oz 2 day spray timing	
14. Irepid Edge + Baytoid XL	6.0 fl oz + 2.8 fl oz	A-G

A = Aug 25, B = Aug 28, C = Aug 31, D = Sept 3, E = Sept 6, F = Sept 9, G = Sept 12

TRT 13: Aug 25, Aug 27, Aug 29, Aug 31, Sept 5, Sept 11

All treatments included Dyne-Amic at 0.25% v/v

Trt	Worms per 25 ears				
	Small CEW	**Med CEW**	**Large CEW**	**Dead CEW**	**Total**
1	1.3 ± 0.8 ab	5.0 ± 1.2 a	5.3 ± 1.3 a	23.3 ± 1.7 a	1.3 ± 0.8 ab
2	1.0 ± 0.4 b	2.0 ± 0.9 ab	2.3 ± 1.0 ab	12.8 ± 1.1 bcd	1.0 ± 0.4 b
3	0.3 ± 0.3 b	0.5 ± 0.3 bc	0.8 ± 0.8 ab	2.0 ± 0.7 e	0.3 ± 0.3 b
4	0 b	0.7 ± 0.7 bc	0.3 ± 0.3 b	2.0 ± 0.6 e	0 b
5	0.5 ± 0.5 b	1.5 ± 1.0 abc	0.3 ± 0.3 b	4.8 ± 0.9 e	0.5 ± 0.5 b
6	1.0 ab	0 bc	1.0 ± 1.0 ab	7.0 ± 1.0 cde	1.0 ab
7	0.5 ± 0.5 b	3.8 ± 0.8 ab	4.3 ± 0.3 ab	14.5 ± 1.5 bc	0.5 ± 0.5 b
8	0.3 ± 0.3 b	0.0 c	0.5 ± 0.5 b	2.8 ± 0.8 e	0.3 ± 0.3 b
9	1.0 ab	0.7 ± 0.7 bc	0.3 ± 0.3 b	6.3 ± 0.7 de	1.0 ab
10	3.3 ± 0.8 a	1.8 ± 0.6 abc	3.8 ± 1.3 ab	18.5 ± 0.5 ab	3.3 ± 0.8 a
11	0.5 ± 0.5 b	0.5 ± 0.5 bc	0.5 ± 0.5 ab	9.5 ± 8.5 cde	0.5 ± 0.5 b
12	0.8 ± 0.3 b	1.8 ± 0.9 abc	2.0 ± 0.4 ab	7.8 ± 1.3 cde	0.8 ± 0.3 b
13	0 b	0.5 ± 0.5 bc	0 ab	1.5 ± 0.5 e	0 b
14	0 b	0 c	0.3 ± 0.3 b	1.5 ± 0.3 e	0 b
ANOVA	*P* = 0.001 *F = 3.69*; *df* = 13 34	*P* = 0.001 *F* = 4.02; *df* = 13 , 34	*P < 0.0001* *F = 5.29*; *df* = 13 34	*P <0.0001* *F = 21.96*; *df* = 13, 34	*P* = 0.001 *F = 3.69*; *df* = 13, 34

Trt	% Clean Ears	% Clean + tip ears	% Damaged ears	# sap beetle damaged kernels	# stink bug damaged kernels
1	16.9 ± 5.9 e	78.0 ± 7.7 bc	22.0 ± 7.7 ab	24.3 ± 12.7	1.8 ± 1.8
2	51.6 ± 4.1 bcd	88.9 ± 1.9 ab	11.1 ± 1.9 bc	12.0 ± 4.1	18.0 ± 8.4
3	91.6 ± a	98.0 ± 2.0 a	2.0 ± 2.0 c	10.3 ± 4.2	0
4	93.3 ± 3.5 a	97.3 ± 2.7 a	2.7 ± 2.7 c	44.0 ± 19.5	0
5	82.0 ± 2.6 ab	98.0 ± 1.2 a	2.0 ± 1.2 c	49.0 ± 37.6	0.3 ± 0.3
6	69.8 ± 6.2 abcd	95.5 ± 4.5 ab	4.5 ± 4.5 bc	6.5 ± 6.5	41.5 ± 38.5
7	39.5 ± 8.4 cde	83.8 ± 1.6 abc	16.2 ± 1.6 abc	20.8 ± 12.1	0
8	87.8 ± 3.5 a	98.0 ± 1.1 a	2.0 ± 1.1 c	20.5 ± 12.9	0
9	74.3 ± 2.9 abc	90.6 ± 3.5 ab	9.4 ± 3.5 bc	7.7 ± 6.7	37.0 ± 36.5
10	34.3 ± 1.0 de	71.6 ± 3.2 c	28.4 ± 3.2 a	16.8 ± 6.0	8.5 ± 8.5
11	54.5 ± 41.5 abcde	89.1 ± 10.9 abc	10.9 ± 10.9 abc	13.5 ± 9.5	0
12	69.5 ± 7.3 abc	91.8 ± 3.4 ab	8.2 ± 3.4 bc	4.0 ± 4.0	0
13	93.8 ± 2.2 a	98.0 ± 2.0 ab	2.0 ± 2.0 bc	22.5 ± 20.5	1.5 ± 1.5
14	93.9 ± 1.1 a	96.9 ± 1.0 a	3.1 ± 1.0 c	3.0 ± 3.0	10 ± 1.0
ANO	*P <0.0001* *F = 13.00; df = 13, 34*	*P = 0.0046* *F = 2.99; df = 13, 34*	*P <0.0001* *F = 5.71; df = 13, 34*	*P = 0.619* *F = 0.84; df = 13, 34*	*P = 0.185* *F = 1.46; df = 13, 34*

Sweet Corn 2024 Fall Armyworm

Location: Carvel REC, Field 5
Variety: 'Glacial'
Planting Date: June 21
Experimental Design: Unreplicated strip trial
Plot Size: 2 rows x 200'
Row Spacing: 30"
Plant Spacing: 24,000 per acre
Treatment Method: CO_2-pressurized backpack sprayer with a 4.5' spray boom fitted with 4 D4 discs and #45 cores spaced 18" apart and calibrated to deliver 40.2 GPA at 50 PSI.
Treatment Date: 23 July
Sample Date: 26 July
Sample Size: 25 previously infested whorls
Notes: This is an unreplicated strip trial. It is assumed that the proportion of Gone and Dead in the untreated strip would have been the same in all other strips had insecticides not been applied, but this cannot be confirmed.

Material	Rate	Small	Medium	Large	Total Live	Gone	Dead
UTC	---	19	8	5	32	6	0
Besiege	10 fl oz	3	8	4	15	13	0
Intrepid Edge	12 fl oz	2	5	0	7	5	13
Avaunt eo	3.5 oz	1	1	3	5	11	9
Warrior Lannate	1.92 fl oz + 16 fl oz	1	5	6	12	8	5

The adjuvant Induce was added to all treatments at a rate of 0.25% v/v.

Sweet Corn 2024 Sentinel Plot CEW Bt Susceptibility

Location: Carvel REC, Field 25F
Variety: See Table
Planting Date: 10 July
Experimental Design: Randomized complete block design with 6 varieties, 4 replicates
Plot size: 4 rows x 25'; minimum 5' alley between plots. Two large alleys separated Sh2 from Se/SH2 corn.
Row Spacing: 30"
Seeding Rate: 24,000 seeds/A
Harvest Date: 23 September
Sample Size: 25 ears/plot from rows 2 and 3
Data Analysis: ANOVA; Tukey-Kramer HSD means separation

No European corn borer were present.

Variety	**Type**	**Protein**	**% Clean Ears**	**% Clean + Tip**	**% Damage**	**Sap Beetle damaged kernels**	**Area damaged (cm^2)**
Obsession	Sh2	---	8 ± 4.3 b	69 ± 7.7 b	31 ± 7.7 a	2.5 ± 2.5	147.7 ± 15
Obsession II	Sh2	Cry1A.105 + Cry2Ab2	26 ± 2.6 b	78 ± 4.8 ab	21 ± 4.4 ab	9.75 ± 9.75	62.4 ± 7.4
Providence	SE, Sh2	---	24 ± 5.7 b	64 ± 8.5 b	35 ± 8.7 a	21 ± 15.8	90.6 ± 10.8
BC0805 Attribute	SE, Sh2	Cry1Ab	20 ± 9.4 b	62 ± 7.7 b	37 ± 8.1 a	7.5 ± 7.5	122.3 ± 25.9
Remedy	SE, Sh2	Cry1Ab + Vip3A	100 ± 0 a	100 ± 0 a	0 b	3.8 ± 3.8	0
ANOVA			*P <0.001; F= 46.27; df= 4, 15*	*P= 0.006; F= 5.59 df= 4, 15*	*P= 0.008; F= 5.23; df= 4,15*	*P= 0.642; F= 0.64; df= 4, 15*	*P < 0.00; F= 15.33; df= 4, 15*

Variety	**No. worms (instar) / ear**								
	2nd	**3rd**	**4th**	**5th**	**6th**	**Ex**	**Ming**	**Dea**	**Total**
Obsession	0.03	0.07	0.09	0.23	0.07	0.16	0.34	0.05	1.04
Obsession II	0.27	0.19	0.11	0.15	0.02	0.08	0.1	0.01	0.93
Providenc	0.1	0.07	0.11	0.28	0	0.1	0.13	0.08	0.87
BC0805 Attribute	0.13	0.15	0.16	0.37	0.2	0.05	0.05	0.05	1.16
Remedy Attribute II	0	0	0	0	0	0	0	0	0

Tomato 2024 Soybean Looper

Location: Carvel REC, Field 12D
Variety: 'Plum Regal'
Transplanting Date: 11-July
Experimental Design: RCBD with 6 treatments and 4 replicates
Plot Size: 1 rows x 15'
Row Spacing: 7'
Plant Spacing: 18"
Treatment Method: CO_2-pressurized backpack sprayer with a 23" boom fitted with 3, D4 nozzles and #45 cores calibrated to deliver 55.6 GPA at 50 PSI. Boom was held perpendicular to the tomato canopy and each row was treated on both sides. Outer nozzles articulated to direct spray down into the canopy (top) and up into the canopy (bottom nozzle).
Treatment Date: 23-Aug, 31-Aug, 6-Sept, 14-Sept, 20-Sept, 26-Sept, 3-Oct
Sample Size: all vine-ripe tomatoes per plot
Harvest Date: 11-Sept, 26-Sept, 2-Oct, 9-Oct, 17-Oct, 24-Oct
Data Analysis: ANOVA, Tukey-Kramer HSD means separation;

Notes: Please note that treatments exceeded label restrictions on application frequency, always read and follow label directions and rotate among effective products.
Abundant soybean looper populations are unusual in tomato; our most common worm species is generally corn earworm, product efficacy differs among the two species. In this trial, very few corn earworm were encountered, the vast majority of worms feeding on the tomatoes were loopers.
10 loopers were collected from plots, 8 were conclusively determined to be soybean looper by examining mandible tooth pattern.
Plinazolin is not labeled.

TRT	**Rate/A**
1. UTC	---
2. Baythroid XL	2.8 fl oz
3. Plinazolin	2.05 fl oz
4. Proclaim	3.6 oz
5. Intrepid	14.0 fl oz
6. Exirel	10.fl oz0

All treatments tank-mixed with Induce at a rate of 0.25% v/v

Season Total

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UC	543.5 ± 32.4 ab	54.8 ± 5.7 bc	40.8 ± 6.2 ab	1.2 ± 0.4	3.0 ± 0.8
2. Bythroid XL	508.8 ± 37.5 ab	45.1 ± 2.4 c	49.2 ± 2.6 a	1.2 ± 0.3	4.1 ± 0.9
3. Pazolin	605.3 ± 41.2 ab	61.7 ± 4.5 abc	29.2 ± 5.4 bc	2.2 ± 0.4	6.4 ± 2.0
4. Prlaim	394.5 ± 52.7 b	77.7 ± 4.0 a	10.2 ± 2.3 d	4.7 ± 1.3	6.3 ± 0.7
5. Inpid	428.8 ± 26.4 b	68.6 ± 2.2 ab	17.3 ± 4.9 cd	5.2 ± 1.6	7.7 ± 1.9
6. Erel	613.3 ± 38.8 a	55.0 ± 2.8 bc	34.9 ± 3.7 abc	3.1 ± 0.4	5.9 ± 2.2
ANOV	*P = 0.004 F = 5.33; df = 5, 18*	*P <0.001 F = 9.14; df = 5, 18*	*P <0.001 F = 12.85; df = 5, 18*	*P = 0.017 F = 3.73; df = 5, 18*	*P = 0.343 F = 1.21; df = 5, 18*

11 Sept

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UTC	3.3 ± 0.9	0	100	0	0
2. Baythroid XL	1.5 ± 0.3	0	100	0	0
3. Plinazolin	3.3 ± 1.3	12.5 ± 12.5	87.5 ± 12.5	0	0
4. Proclaim	0.3 ± 0.3	0	100	0	0
5. Intrepid	3.0 ± 1.6	0	76.2 ± 23.8	0	23.8 ± 23.8
6. Exirel	2.5 ± 0.9	19.4 ± 10.0	80.6 ± 10.0	0	0
ANOVA	*P = 0.248 F = 1.47; df = 5, 18*	*P = 0.363 F = 1.20; df = 5, 13*	*P = 0.583 F = 0.78; df = 5, 13*		*P = 0.409 F = 1.09; df = 5, 13*

26-Sept

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UC	15.5 ± 1.2 b	13.1 ± 7.2 b	86.9 ± 7.2 ab	0	0
2. Bythroid XL	28.8 ± 1.9 a	15.4 ± 7.5 ab	82.3 ± 8.1 ab	0	2.3 ± 2.3
3. Pazolin	10.5 ± 3.7 bc	28.1 ± 13.5 ab	67.7 ± 16.1 ab	0	4.2 ± 4.2
4. Prlaim	2.0 ± 0.7 c	68.8 ± 23.7 a	31.3 ± 23.7 b	0	0
5. Inpid	6.0 ± 2.0 bc	4.5 ± 4.5 b	93.2 ± 6.8 a	0	2.3 ± 2.3
6. Erel	17.8 ± 5.2 ab	18.1 ± 6.9 ab	79.9 ± 8.6 ab	2.1 ± 2.1	0
ANOV	*P <0.001 F = 11.01; df = 5, 18*	*P = 0.024 F = 3.43; df = 5, 18*	*P = 0.046 F = 2.84; df = 5, 18*	*P = 0.446 F = 1.00; df = 5, 18*	*P = 0.664 F = 0.652; df = 5, 18*

2-October

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UC	70.5 ± 13.9 ab	36.4 ± 10.8 ab	62.7 ± 11.7 ab	0	0.9 ± 0.9
2. Bythroid XL	57.5 ± 10.9 ab	16.9 ± 4.9 b	79.9 ± 4.6 a	1.3 ± 0.7	2.0 ± 0.8
3. Pazolin	74.3 ± 10.4 ab	46.9 ± 9.3 ab	49.3 ± 10.2 abc	1.7 ± 0.7	2.2 ± 0.8
4. Prlaim	33.8 ± 3.1 ab	69.2 ± 8.0 a	20.1 ± 4.7 c	3.1 ± 3.1	7.5 ± 4.9
5. Inpid	28.8 ± 4.0 b	47.4 ± 9.3 ab	39.6 ± 9.8 bc	4.9 ± 1.8	8.3 ± 2.6
6. Erel	76.0 ± 13.1 a	45.4 ± 5.6 ab	53.9 ± 6.0 abc	0.3 ± 0.3	0.3 ± 0.3
ANOV	*P = 0.010 F = 4.24; df= 5, 18*	*P = 0.010 F = 4.25; df = 5, 18*	*P = 0.002 F = 6.03; df = 5, 18*	*P = 0.249 F = 1.47; df = 5, 18*	*P = 0.100 F = 2.19; df = 5, 18*

9-October

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UC	133.0 ± 21.2	47.6 ± 8.8 b	46.6 ± 9.6 ab	0.6 ± 0.4	5.1 ±2.0
2. Bythroid XL	98.0 ± 9.5	45.4 ± 3.9 b	52.8 ± 3.3 a	0	1.8 ± 0.8
3. Pazolin	132.8 ± 22.0	66.3 ± 6.9 ab	31.4 ± 7.9 abc	0.1 ± 0.	2.1 ± 1.1
4. Prlaim	105.3 ± 19.1	78.1 ± 5.8 a	13.2 ± 3.9 c	2.9 ± 1.3	5.8 ± 2.4
5. Inpid	81.3 ± 10.0	74.1 ± 3.1 a	20.5 ± 4.6 bc	2.9 ± 1.2	2.5 ± 1.7
6. Erel	157.5 ± 23.2	55.6 ± 1.5 ab	40.4 ± 2.4 ab	1.8 ± 0.6	2.2 ± 1.3
ANOV	*P = 0.086 F = 2.32; df = 5, 18*	*P = 0.002 F = 6.12; df = 5, 18*	*P = 0.001 F = 6.77; df = 5, 18*	*P = 0.040 F = 2.97; df = 5, 18*	*P = 0.388 F = 1.11; df = 5, 18*

17-Oct

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UC	121.3 ± 7.6	67.8 ± 3.9 ab	29.2 ± 5.2 b	0.4 ± 0.4	2.6 ± 1.5
2. Bythroid XL	166.5 ± 11.5	47.4 ± 4.6 b	46.1 ± 2.6 a	1.1 ± 0.5	5.4 ± 2.0
3. Pazolin	182.8 ± 15.5	64.5 ± 4.8 ab	26.0 ± 3.8 b	0.8 ± 0.6	8.7 ± 5.4
4. Prlaim	125.8 ± 23.6	81.0 ± 3.2 a	9.2 ± 3.1 c	3.4 ± 2.1	6.4 ± 2.9
5. Inpid	142.8 ± 10.0	71.5 ± 6.0 a	14.9 ± 1.5 bc	3.3 ± 1.8	10.3 ± 7.2
6. Erel	177.8 ± 32.1	60.8 ± 4.4 ab	28.2 ± 4.7 b	2.6 ± 1.0	8.4 ± 4.6
ANOV	*P = 0.126 F = 2.01; df = 5, 18*	*P = 0.002 F = 6.05; df = 5, 18*	*P <0.001 F = 12.02; df = 5, 18*	*P = 0.392 F = 1.10; df = 5, 18*	*P = 0.847 F = 0.39; df = 5, 18*

24-Oct

TRT	# tomatoes	% Clean	% Worm	% Stink Bug	% Disease
1. UC	200.0 ± 16.8	62.1 ± 4.4	32.2 ± 4.5 a	2.6 ± 1.3	2.5 ± 0.7
2. Bythroid XL	156.5 ± 24.2	58.9 ± 3.9	32.3 ± 3.2 a	2.3 ± 0.5	5.1 ± 3.2
3. Pazolin	201.8 ± 34.1	64.2 ± 7.6	21.7 ± 5.1 abc	4.9 ± 1.3	7.7 ± 2.7
4. Pclaim	127.5 ± 24.0	77.6 ± 7.1	6.6 ± 3.0 c	8.4 ± 2.3	4.0 ± 2.7
5. Inpid	167.0 ± 19.7	67.4 ± 8.2	11.6 ± 1.6 bc	9.5 ± 5.7	8.4 ± 2.2
6. Erel	181.8 ± 24.2	57.1 ± 2.5	24.8 ± 3.0 ab	6.7 ± 1.2	7.9 ± 2.6
ANOV	*P = 0.291 F = 1.34; df = 5, 18*	*P = 0.235 F = 1.51; df = 5, 18*	*P <0.001 F = 8.79; df = 5, 18*	*P = 0.329 F = 1.25; df = 5, 18*	*P = 0.468 F = 0.96; df = 5, 18*

Watermelon 2024 Spider Mites

Location: Carvel REC, Field 12
Variety: 'Road Trip', 'Wingman' pollenizer
Planting Date: ~May 20
Experimental Design: RCBD with 9 treatments and 5 replicates
Plot Size: 2 rows x 10 plants
Row Spacing: 7'
Plant Spacing:36"
Treatment Method: CO_2-pressurized backpack sprayer with a 4.5' boom fitted with 4 D6-45 nozzles calibrated to deliver 53.6 GPA at 50 PSI
Treatment Date: 5 July
Sample Size: 10 'Road Trip' crown area leaves per plot
Data Analysis: ANOVA, Tukey-Kramer HSD means separation; Data $Log_{10}(X + 0.1)$ transformed for analysis.
Notes: Field was infested with spider mites collected from pokeweed collected from several watermelon fields in Delaware and Maryland on June 22. Field was treated with carbaryl (1 qt, 30 GPA) on 27-June to flare mites and suppress predators.

One plot (rep III, trt 9) was excluded from the analysis on 25-July due to extremely high outlier mite counts

TRT	Rate
1. UTC	---
2. Oberon 2SC	7.0 fl oz
3. 009EPA	50 fl oz/100 gal
4. Oberon 2 SC + 009EPA	7.0 fl oz + 32 fl oz/ 100 gal
5. Magister + 009EPA	24.0 fl oz + 32 fl oz/ 100 gal
6. Magister	24.0 fl oz
7. Zeal SC	5.0 fl oz
8. Zeal SC + 009EPA	5.0 fl oz + 32 fl oz/ 100 gal
9. Banter	16.0 fl oz

All treatments without 009EPA (trts 2, 6, 7, and 9) received Induce at 0.0025% v/v

TRT	3-July (2D PRE)	10-July (5DAT)	16-July (11 DAT)	25-July (20 DAT)
1	13.9 ± 6.8	27.3 ± 21.8	22.8 ± 14.8 ab	51.1 ± 23.2 ab
2	29.9 ± 18.8	5.6 ± 1.2	1.6 ± 0.6 ab	4.7 ± 1.5 ab
3	24.1 ± 9.7	31.6 ± 14.0	35.4 ± 16.5 a	71.5 ± 34.4 a
4	5.7 ± 1.4	1.9 ± 0.5	1.5 ± 1.0 b	7.4 ± 4.2 ab
5	18.7 ± 16.1	6.7 ± 3.5	5.6 ± 4.4 ab	5.2 ± 0.8 ab
6	21.2 ± 13.0	3.9 ± 0.9	8.9 ± 4.7 ab	22.1 ± 8.9 ab
7	9.7 ± 6.3	3.4 ± 1.7	1.1 ± 0.2 b	1.6 ± 0.7 b
8	13.3 ± 4.7	4.1 ± 1.9	1.5 ± 0.5 b	1.8 ± 0.9 b
9	22.8 ± 16.0	9.4 ± 5.3	28.9 ± 24.3 ab	17.8 ± 4.2 ab
ANO	*P = 0.931* *F = 0.37; df = 8, 36*	*P = 0.195* *F = 1.49; df = 8, 35*	*P = 0.007* *F = 3.22; df = 8, 36*	*P = 0.026* *F = 2.58; df = 8, 34*

TRT Comparison

Date	TRT 1 vs 3	TRT 2 vs 4	TRT 6 vs 5	TRT 7 vs 8
July 3	*NS, P = 0.210, t = 0.85; df = 8.0*	*NS, P = 0.452, t = -0.13, df = 4.4*	*NS, P = 0.278, t = 0.62, df = 7.5*	*NS, P = 0.193, t = 0.92, df = 7.1*
July 10	*NS, P = 0.282, t = 0.60, df = 8.0*	*2>4, P = 0.048, t = -2.07, df = 4.9*	*NS, P = 0.480, t = 0.05, df = 5.0*	*NS, P = 0.477, t = -0.06, df = 7.5*
July 16	*NS, P = 0.286, t = 0.59, df = 7.9*	*NS, P = 0.287, t = -0.59, df = 7.6*	*NS, P = 0.125, t = 1.26, df = 6.5*	*NS, P = 0.481, t = 0.049, df = 5.1*
July 25	*NS, P = 0.476, t = -0.06, df = 7.7*	*NS, P = 0.415, t = -0.23, df = 5.2*	*NS, P = 0.063, t = 1.84, df = 4.9*	*NS, P = 0.449, t = 0.13, df = 8.0*

Zucchini 2024 Squash Vine Borer

Location: Milton DE
Variety: 'Spineless Beauty'
Planting Date: June 2 transplant into no-till crimson clover cover crop (mowed, treated with glyphosate)
Experimental Design: RCBD with 4 treatments and 5 replicates
Plot Size: 1 row x 7 plants
Row Spacing: 2'
Plant Spacing: 2'
Treatment Method: CO_2-pressurized backpack sprayer with a single-row boom equipped with 2 D2 tips and #25 cores delivering 40 GPA at 38 PSI
Treatment Date: 11-June, 17-June, 24-June, 2-July, 9-July
Evaluation Date: 17-July
Sample Size: 7 plants per plot
Data Analysis: ANOVA, Tukey-Kramer HSD means separation
Notes: Product use above label constrictions

Poast was applied at 1.5 pints on 17-June. Anarchy 30SG was applied at 5.3 oz/A on 17-June for striped cucumber beetle management

TRT	**Rate**
1. UTC	---
2. Warrior II* Lamcap II	1.92 fl oz/A
3. Coragen	4.75 fl oz/A
4. Entrust	6.0 fl oz/A

*Applications on 2-July and 9-July with Lamcap II

TRT	**# Infested Plants**	**Total Worms**	**Small**	**Medium**	**Large**	**Exits**
UTC	5.6 ± 0.5 a	13.2 ± 1.9 a	2.8 ± 1.5	1.4 ± 0.6	7.6 ± 2.3 a	2.0 ± 0.8 a
WaorII/ LamapII	0.4 ± 0.4 b	0.6 ± 0.6 c	0	0	0.4 ± 0.4 b	0.2 ± 0.2 b
Coren	0 b	0 c	0	0	0 b	0 b
Entrut	4.0 ± 0.5 a	5.6 ± 0.9 b	2.0 ± 0.3	1.4 ± 0.5	2.2 ± 0.7 b	0.2 ± 0.2 b
ANO	*P <0.001 F = 41.70; df = 3, 16*	*P <0.001 F = 32.01; df = 3, 16*	*P = 0.041 F = 3.46; df = 3, 16*	*P = 0.022 F = 4.21; df = 3, 16*	*P = 0.002 F = 8.09; df = 3, 16*	*P = 0.018 F = 4.51; df = 3, 16*

Alfalfa 2024 Alfalfa Weevil 1

Location: Felton, DE
Variety:
Experimental Design: RCBD with 8 treatments and 4 replicates
Plot Size: 4.5’ x 20’
Row Spacing: 7’
Treatment Method: CO_2-pressurized backpack sprayer with a 54” boom fitted with 4, 11002 nozzles spaced 18” apart calibrated to deliver 15.7 GPA at 31 PSI.
Treatment Date: 20-March
Sample Size: 10 stems per plot
Data Analysis: ANOVA, Tukey-Kramer HSD means separation;

Notes: All treatments tank-mixed with 2 qts glyphosate. All plots were treated with lambda-cyhalothrin on 27-March, thus only a single post-application sample was collected from the trial. Plinazolin is not labeled. Plots were destroyed after evaluation.
Some tested products are active by ingestion and thus require several days to kill larvae, the full effect may not have been captured in this trial.

TRT	**Rate/A**	**25-March 5DAT**
1. UTC	---	18.3 ± 8.6
2. Baythroid XL	2.8 fl oz	8.3 ± 3.4
3. Mustang	4.0 fl oz	12.5 ± 5.2
4. Endigo ZCX	4.5 fl oz	14.3 ± 6.2
5. Steward	9.0 fl oz	16.5 ± 7.1
6. Experimental	4.5 fl oz	38.3 ± 12.4
7. Plinazolin	1.54 fl oz	11.0 ± 2.2
8. Plinazolin	2.05 fl oz	6.8 ± 2.1
ANOVA		*P = 0.075* *F = 2.18; df = 7, 23*

Due to limited human resources, only a generalized pre-treatment sample was taken on March 20. Rep 1 = 14 weevil larvae, Rep 2 = 22 larvae, Rep 3 = 33 larvae, Rep 4 = 20 larvae

Alfalfa 2024 Alfalfa Weevil 2

Location: Georgetown, DE
Variety:
Experimental Design: RCBD with 7 treatments and 4 replicates
Plot Size: 4.5' x 20'
Row Spacing: 7'
Treatment Method: CO_2-pressurized backpack sprayer with a 54" boom fitted with 4, 11002 nozzles spaced 18" apart calibrated to deliver 15.7 GPA at 31 PSI.
Treatment Date: 29-March
Sample Size: 10 stems per plot
Data Analysis: ANOVA, Tukey-Kramer HSD means separation;

Notes: Plinazolin is not labeled. Plots were destroyed after evaluation.
Field was mixed stand with orchard grass interseeded.

We were unable to collect and process a full pre-treatment sample from the plots. Instead, 15 representative stems were collected from each rep on March 29. Rep I = 13, Rep II = 80, Rep III = 40, Rep IV = 43

TRT	**Rate/A**	**1 April 3 DAT (10 stems)**	**10 April 12 DAT (10 stems)**	**17 April 19 DAT (10 stems)**
1. UTC	---	29.3 ± 11.7	33.3 ± 8.0 a	25.8 ± 8.9 ab
2. Neemix	8.0 fl ozso	22.7 ± 4.4	31.5 ± 3.3 ab	39.0 ± 9.0 a
3. Mustang	4.0 fl oz	22.0 ± 3.4	23.0 ± 4.5 abc	15.5 ± 2.5 ab
4. Endigo ZCX	4.5 fl oz	8.8 ± 2.1	13.5 ± 3.7 bc	12.0 ± 0.0 ab
5. Steward	8.0 fl oz	17.8 ± 3.8	6.0 ± 3.6 c	9.5 ± 2.7 b
6. Experimental	4.0 fl oz	13.0 ± 3.0	6.0 ± 1.6 c	3.0 ab
7. Plinazolin	1.54 fl oz	13.8 ± 2.1	5.0 ± 1.2 c	3.3 ± 1.3 b
ANOVA		*P = 0.179 F = 1.68; df = 6, 20*	*P <0.001 F = 8.50; df = 6, 21*	*P = 0.010 F = 4.43; df = 6, 14*

Sorghum 2024 Sorghum Aphid

Location: Carvel REC, Field
Variety: 'M60GB88'
Planting Date: June 14
Experimental Design: RCBD with three treatments, 4 reps arranged on the perimeter of a sorghum field
Plot Size: 20' x 4 rows
Row Spacing: 15"
Plant Spacing: 65,000 seed/acre
Treatment Method: CO_2-pressurized backpack sprayer with a 7.5' boom equipped with 6, XR11003 nozzles on 18" spacing delivering 14.4 GPA at 15 PSI
Sample Size: 10 leaves from outermost two rows of the plot, 3rd leaf below head.
Data Analysis: Aphid counts per leaf Log_{10} +1 transformed for ANOVA. Tukey's HSD means separation. Presented are untransformed means and standard error.

Notes:

TRT no./ Material	Material	28-Aug (0 d PRE)	4-Sept (	19-Sept
1. UTC	---	37.5 ± 26.1	239.5 ± 181.7 a	81.9 ± 60.1 a
2. Centric	2.5 oz/A	14.1 ± 3.7	0.1 ± 0.1 b	0.7 ± 0.6 ab
3. Sivanto Prime	3.0 fl oz/A	62.4 ± 30.0	0.2 ± 0.2 b	0.0 b
ANVOA		*P = 0.385* *F = 1.06; df = 2, 9*	*P <0.001* *F = 32.43; df = 2, 9*	*P = 0.024* *F = 5.82; df = 2, 9*

Soybean 2024 Corn Earworm

Location: Frederica DE
Variety: Dyna grow 43EN61
Planting Date: June 10
Experimental Design: RCBD with 12 treatments and 4 replicates
Plot Size: 9' x 100'
Row Spacing: 15"
Plant Spacing:
Treatment Method: CO_2-pressurized backpack sprayer with a 7.5' boom equipped with 6 XR11003 nozzles calibrated to deliver 14.4 GPA at 15 PSI.
Treatment Date: 22-August
Sample Size: 30 sweeps with a 15" net; 10 row-ft per plot for yield sample
Harvest Date: 21-22 October
Data Analysis: ANOVA, Tukey-Kramer HSD means separation

Notes: All treatments were tank mixed with the adjuvant Penetrator Plus at 5.0 fl oz/A

TRT	Rate
1. UTC	---
2. Experimental	
3. Experimental	
4. Experimental	
5. Experimental	
6. Vantacor	1.73 fl oz
7. Besiege	9.0 fl oz
8. Elevest	6.7 fl oz
9. Elevest	9.6 fl oz
10. KN-128	4.0 fl oz
11. Hero	9.0 fl oz
12. Denim	8.0 fl oz

22-Aug, 0D PRE

TRT	Small CEW	Medium CEW	Large CEW	Total CEW	Soybean Looper	Green Cloverworm
1	13.8 ± 0.9	0.3 ± 0.3	0	14.0 ± 0.8	1.0 ± 0.7	0.3 ± 0.3
2	4.3 ± 1.9	1.5 ± 1.5	0	5.8 ± 1.3	1.8 ± 0.5	0
3	10.0 ± 2.0	1.3 ± 0.9	0	11.3 ± 2.9	1.8 ± 1.1	1.3 ± 0.8
4	11.8 ± 2.7	1.0 ± 0.4	0	12.8 ± 3.0	1.8 ± 1.1	0.5 ± 0.5
5	10.3 ± 2.3	0.8 ± 0.3	0	11.0 ± 2.1	2.8 ± 0.9	0
6	10.5 ± 1.9	1.3 ± 0.3	0	11.8 ± 1.9	2.5 ± 0.6	0.3 ± 0.3
7	6.8 ± 1.5	0.5 ± 0.5	0	7.3 ± 1.4	3.0 ± 0.8	0.8 ± 0.3
8	6.3 ± 3.6	2.3 ± 0.9	0	8.5 ± 4.3	1.3 ± 0.6	0.5 ± 0.3
9	11.3 ± 1.5	1.3 ± 0.3	0	12.5 ± 1.6	1.0 ± 0.4	0.8 ± 0.3
10	6.8 ± 2.3	1.3 ± 0.6	0	8.0 ± 2.0	1.5 ± 0.6	0.3 ± 0.3
11	11.8 ± 4.3	0.5 ± 0.3	0	12.3 ± 4.3	2.0 ± 1.4	1.0 ± 0.6
12	8.3 ± 2.2	1.8 ± 0.9	0	10.0 ± 2.9	1.5 ± 0.3	0
ANOVA	*P = 0.237 F = 1.35; df = 11, 36*	*P = 0.751 F = 0.68; df = 11, 36*		*P = 0.507 F = 0.95; df = 11, 36*	*P = 0.782 F = 0.64; df = 11, 36*	*P = 0.258 F = 1.31; df = 11, 36*

Other worms include Geometrid worms, beet armyworm, bean leafroller, and saltmarsh caterpillar

22-Aug, 0-D PRE

TRT	Other Worms	Total Stink Bugs	Pirate Bugs	Total Predators
1	0.3 ± 0.3	0.5 ± 0.3	3.5 ± 1.11.0	4.5 ±1. 0.6
2	0	0.3 ± 0.3	2.0 ± 1.1	2.5 ± 1.3
3	0.3 ± 0.3	0	2.8 ± 1.5	3.0 ± 1.4
4	0.3 ± 0.3	0	6.5 ± 2.5	8.8 ± 2.5
5	0.8 ± 0.5	0.3 ± 0.3	2.8 ± 0.6	3.5 ± 0.5
6	0.3 ± 0.3	0	3.3 ± 1.7	3.3 ± 1.7
7	0.5 ± 0.3	0.3 ± 0.3	3.5 ± 2.1	5.3 ± 2.1
8	0.5 ± 0.3	0	2.3 ± 0.6	3.8 ± 1.5
9	0	1.3 ± 0.6	0.8 ± 0.5	0.8 ± 0.5
10	0.8 ± 0.5	0	3.8 ± 1.1	3.8 ± 1.1
11	0.3 ± 0.3	0.3 ± 0.3	2.3 ± 0.8	2.8 ± 1.0
12	0.3 ± 0.3	0.5 ± 0.3	3.0 ± 2.0	3.5 ± 1.9
ANO	*P = 0.705 F = 0.73; df = 11, 36*	*P = 0.069 F = 1.92; df = 11, 36*	*P = 0.548 F = 0.90; df = 11, 36*	*P = 0.123 F = 1.66; df = 11, 36*

Total predators includes bigeyed bugs, spiders, predatory stink bugs, lacewings, and lady beetles.

26-August, 4 DAT

TRT	**Small CEW**	**Medium CEW**	**Large CEW**	**Total CEW**	**Soybean Looper**	**Green Cloverworm**
1	5.5 ± 1.9 ab	7.3 ± 2.1 a	0.5 ± 0.5	13.3 ± 2.0 a	2.5 ± 0.5 a	0
2	5.8 ± 0.6 ab	4.5 ± 2.4 ab	0	10.3 ± 2.6 ab	0.8 ± 0.5 ab	0
3	7.0 ± 1.6 a	3.8 ± 2.1 ab	0.5 ± 0.3	11.3 ± 3.6 a	2.0 ± 0.7 ab	0.5 ± 0.5
4	0.3 ± 0.3 c	0 b	0	0.3 ± 0.3 c	0.8 ± 0.3 ab	0
5	0.8 ± 0.5 c	0 b	0	0.8 ± 0.5 c	1.3 ± 0.5 ab	0
6	0.5 ± 0.3 c	0.3 ± 0.3 b	0	0.8 ± 0.5 c	0.5 ± 0.3 ab	0
7	0.8 ± 0.8 c	0 b	0	0.8 ± 0.8 c	1.0 ± 0.4 ab	0
8	0.3 ± 0.3 c	0 b	0	0.3 ± 0.3 c	0 b	0.3 ± 0.3
9	0.3 ± 0.3 c	0 b	0	0.3 ± 0.3 c	1.0 ± 0.4 ab	0
10	1.0 ± 0.6 c	0 b	0	1.0 ± 0.6 c	0 b	0
11	2.5 ± 0.9 bc	1.0 ± 1.0 b	0	3.5 ± 1.7 bc	0.5 ± 0.5 ab	0
12	0.5 ± 0.5 c	0 b	0	0.5 ± 0.5 c	0.3 ± 0.3 b	0
ANOA	P <0.001 F = 8.36; df = 11, 36	P <0.001 F = 4.42; df = 11, 36	P = 0.232 F = 1.36; d = 11, 36	P <0.001 F = 10.51; df = 11, 36	P = 0.002 F = 3.44; df = 11, 36	P = 0.526 F = 0.93; df = 11, 36

26-Aug, 4 DAT

TRT	**Other Worms**	**Total Stink Bugs**	**Pirate Bugs**	**Total Predators**
1	0	0.5 ± 0.3	3.3 ± 2.4	3.8 ± 2.5
2	0	0	0	0
3	0	0	2.8 ± 1.8	3.0 ± 2.0
4	0	1.0 ± 1.0	0.5 ± 0.3	0.5 ± 0.3
5	0	0	1.3 ± 1.3	1.3 ± 1.3
6	0	0	4.8 ± 2.5	5.3 ± 2.8
7	0	0	1.0 ± 1.0	1.3 ± 0.9
8	0	0.3 ± 0.3	0.5 ± 0.5	0.8 ± 0.3
9	0	0.3 ± 0.3	1.5 ± 0.5	2.0 ± 0.8
10	0	0.5 ± 0.3	0.5 ± 0.3	0.8 ± 0.3
11	0	0	0	0
12	0	0	0.3 ± 0.3	0.5 ± 0.3
ANOVA		*P = 0.521 F = 0.93; df = 11, 36*	*P = 0.195 F = 1.45; df = 11, 36*	*P = 0.181 F = 1.48; df = 11, 36*

29-August, 7 DAT

TRT	Small CEW	Medium CEW	Large CEW	Total CEW	Soybean Looper	Green Cloverworm
1	9.8 ± 4.2 a	3.3 ± 1.1 a	0.5 ± 0.3 ab	13.5 ± 4.6 a	1.0 ± 0.4	0.3 ± 0.3
2	5.8 ± 1.5 ab	2.8 ± 1.2 ab	0.5 ± 0.5 ab	9.0 ± 1.6 ab	1.0 ± 0.4	0.3 ± 0.3
3	12.0 ± 3.6 a	1.7 ± 1.7 ab	1.7 ± 0.7 a	15.3 ± 5.5 a	0.3 ± 0.3	0
4	0 b	0.3 ± 0.3 ab	0 b	0.3 ± 0.3 b	1.0 ± 0.6	0
5	1.0 ± 1.0 b	0 b	0 b	1.0 ± 1.0 b	1.5 ± 1.2	0
6	0 b	0 b	0 b	0 b	1.5 ± 0.6	0
7	0 b	0 b	0 b	0 b	0.5 ± 0.3	0
8	0.3 ± 0.3 b	0.3 ± 0.3 ab	0.3 ± 0.3 b	0.8 ± 0.5 b	0	0
9	0 b	0 b	0 b	0 b	0.5 ± 0.3	0.3 ± 0.3
10	0.5 ± 0.5 b	0 b	0 b	0.5 ± 0.5 b	0.3 ± 0.3	0
11	4.8 ± 1.3 ab	0.5 ± 0.5 ab	0 b	5.3 ± 1.5 ab	1.3 ± 0.3	0
12	1.0 ± 1.0 b	0 b	0 b	1.0 ± 1.0 b	0	0
ANO	*P <0.001 F = 6.11; df = 11, 35*	*P = 0.002 F = 3.57; df = 11, 35*	*P = 0.002 F = 3.63; df = 11, 35*	*P <0.001 F = 7.57; df = 11, 35*	*P = 0.330 F = 1.19; df = 11, 35*	*P = 0.648 F = 0.79; df = 11, 35*

29-Aug, 7 DAT

TRT	Other Worms	Total Stink Bugs	Pirate Bugs	Total Predators
1	0.8 ± 0.5	0	3.5 ± 2.3	5.5 ± 2.7
2	0	0	1.3 ± 0.9	2.3 ± 1.3
3	0	0	1.0 ± 0.6	2.3 ± 0.9
4	0	0	7.5 ± 2.9	8.8 ± 2.9
5	0	0.5 ± 0.3	3.5 ± 1.5	4.8 ± 1.3
6	0	0	8.0 ± 3.2	9.0 ± 3.1
7	0	0.5 ± 0.3	4.0 ± 2.1	5.5 ± 2.1
8	0	0	3.0 ± 1.6	4.5 ± 2.4
9	0	0.3 ± 0.3	3.3 ± 1.7	3.8 ± 2.1
10	0	1.0 ± 0.7	13.0 ± 9.9	16.8 ± 10.3
11	0	0	4.3 ± 2.6	5.3 ± 2.4
12	0	0.5 ± 0.3	1.3 ± 0.9	2.5 ± 1.0
ANO	*P = 0.025 F = 2.38; df = 11, 35*	*P = 0.166 F = 1.53; df = 11, 35*	*P = 0.487 F = 0.97; df = 11, 35*	*P = 0.314 F = 1.22; df = 11, 35*

5-Sept, 14 DAT

TRT	Small CEW	Medium CEW	Large CEW	Total CEW	Soybean Looper	Green Cloverworm
1	2.0 ± 0.7 a	0.3 ± 0.3	0.5 ± 0.3	2.8 ± 0.9 ab	2.5 ± 1.3	0.3 ± 0.3
2	1.5 ± 0.3 a	1.5 ± 0.9	0.5 ± 0.5	3.5 ± 0.9 a	1.8 ± 0.9	0
3	2.0 ± 0.6 a	0.3 ± 0.3	0.3 ± 0.3	2.5 ± 0.6 abc	1.8 ± 0.5	0
4	0 b	0.3 ± 0.3	0	0.3 ± 0.3 c	0	0
5	0.3 ± 0.3 ab	0	0	0.3 ± 0.3 c	0.5 ± 0.3	0
6	0.3 ± 0.3 ab	0	0	0.3 ± 0.3 c	1.0 ± 0.7	0
7	0 b	0.5 ± 0.5	0	0.5 ± 0.5 bc	2.0 ± 1.2	0
8	0.5 ± 0.5 ab	0	0	0.5 ± 0.5 bc	0.3 ± 0.3	0
9	0 b	0	0.3 ± 0.3	0.3 ± 0.3 c	0.3 ± 0.3.	0
10	0.3 ± 0.3 ab	0	0	0.3 ± 0.3 c	0.3 ± 0.3	0
11	0.8 ± 0.5 ab	0	0	0.8 ± 0.5 bc	1.5 ± 0.6	0
12	0 b	0.3 ± 0.3	0	0.3 ± 0.3 c	0.5 ± 0.5	0
ANO	*P <0.001 F = 4.52; df = 11, 36*	*P = 0.102 F = 1.75; df = 11, 36*	*P = 0.433 F = 1.04; df = 11, 36*	*P <0.001 F = 5.64; df = 11, 36*	*P = 0.171 F = 1.51; df = 11, 36*	*P = 0.465 F = 1.00; df = 11, 36*

5 September, 14 DAT

TRT	Other Worms	Total Stink Bugs	Pirate Bugs	Total Predators
1	0.5 ± 0.3	0.3 ± 0.3 ab	1.8 ± 1.0	2.0 ± 1.1
2	0.3 ± 0.3	0 b	3.0 ± 1.5	3.0 ± 1.5
3	0.5 ± 0.3	0 b	3.0 ± 1.1	3.0 ± 1.1
4	0	0 b	1.0 ± 0.4	2.0 ± 0.8
5	0	0.3 ± 0.3 ab	0	0
6	0	0 b	1.5 ± 1.0	1.5 ± 1.0
7	0	0.8 ± 0.3 a	3.8 ± 2.1	4.5 ± 1.9
8	0	0 b	2.0 ± 2.0	2.0 ± 2.0
9	0	0 b	1.5 ± 0.6	1.5 ± 0.6
10	0	0 b	5.0 ± 3.5	5.0 ± 3.5
11	0.3 ± 0.3	0 b	4.0 ± 3.4	4.3 ± 3.6
12	0.3 ± 0.3	0.3 ± 0.3 ab	0	1.0 ± 1.0
ANO	*P = 0.248 F = 1.33; df = 11, 36*	*P = 0.021 F = 2.45; df = 11, 36*	*P = 0.665 F = 0.77; df = 11, 36*	*P = 0.759 F = 0.67; df = 11, 36*

TRT	Sample Weight (adjusted to 13% moisture)	Yield (Bu/A)
1	190.9 ± 12.8	24.4 ± 1.6
2	210.9 ± 36.0	27.0 ± 4.6
3	234.0 ± 28.6	30.0 ± 2.3
4	238.9 ± 17.9	30.6 ± 2.3
5	237.4 ± 13.1	30.4 ± 1.7
6	276.5 ± 39.7	35.4 ± 5.1
7	233.6 ± 23.1	29.9 ± 3.0
8	221.9 ± 19.3	28.4 ± 2.5
9	348.9 ± 71.0	44.7 ± 9.1
10	221.4 ± 71.0	28.3 ± 9.1
11	242.8 ± 20.0	31.1 ± 2.6
12	189.4 ± 18.3	24.3 ± 2.3
ANO	$P = 0.246$ $F = 1.34$; $df = 11, 36$	$P = 0.246$ $F = 1.34$; $df = 11, 36$

Soybean Cover Crop Experiment 2023-2024

Location: Georgetown Zoar Rd
Broadcast Date: September 27
Previous Crop: Corn
Plot Size: 60’ x 100’
Sample: 4-ft^2 shingles per plot
Preliminary Analysis: ANOVA
Notes: cover crop seed inconsistently germinating and establishing (12/1)

Total Slugs

Date	Canola	Crimson	Rye	Check	ANOVA
12/1	33.0 ± 2.0	28.0 ± 3.9	43.5 ± 4.4	29.3 ± 6.6	*P = 0.117* *F = 2.42; df = 3, 12*
12/13	11.5 ± 5.4	15.3 ± 2.8	16.5 ± 3.8	11.0 ± 2.5	*P = 0.511* *F = 0.81; df = 3, 12*
2/8	14.3 ± 2.8	16.3 ± 4.1	12.5 ± 0.9	14.0 ± 2.0	*P = 0.807* *F = 0.325; df = 3, 12*
3/8	20.3 ± 3.8	19.8 ± 2.3	17.8 ± 4.9	17.0 ± 4.4	*P = 0.924* *F = 0.16; df = 3, 12*
3/22	19.0 ± 2.3	13.0 ± 2.0	9.3 ± 2.9	12.8 ± 3.2	*P = 0.122* *F = 2.37; df = 3, 12*
3/26	25.0 ± 1.8 a	15.0 ± 4.0 ab	9.0 ± 3.2 b	12.3 ± 3.6 ab	*P = 0.024* *F = 4.52; df = 3, 12*
4/19	40.0 ± 4.1	33.0 ± 5.5	22.5 ± 5.2	41.8 ± 11.8	*P = 0.282* *F = 1.43; df = 3, 12*
5/9	17.8 ± 12.8	7.5 ± 4.4	19.5 ± 7.4	17.5 ± 7.3	*P = 0.751* *F = 0.41; df = 3, 12*

Location: Middletown Cedar Lane
Broadcast Date: October 10
Previous Crop: soybean
Plot Size: 80’ x 100’
Sample: 4-ft^2 shingles per plot
Notes: New site, not previously planted in multi-species cover crop. Cover crop 2023-2024 crimson clover/rye. Low cover crop emergence, high amount of weedy growth as of 11/27.

Total Slugs

Date	Canola	Crimson	Rye	Check	ANOVA
11/27	23.8 ± 10.5	16.0 ± 3.9	15.8 ± 4.2	13.0 ± 6.7	*P = 0.718* *F = 0.456; df = 3, 12*
12/13	13.5 ± 4.7	9.8 ± 2.3	9.8 ± 2.8	9.8 ± 3.8	*P = 0.837* *F = 0.283; df = 3, 12*
3/4	12.3 ± 2.4	6.8 ± 0.9	9.5 ± 0.9	11.0 ± 3.3	*P = 0.345* *F = 1.22; df = 3, 12*
3/12	4.0 ± 0.6	6.3 ± 1.9	5.0 ± 1.2	5.0 ± 2.0	*P = 0.696* *F = 0.50; df = 3, 7*
3/22	10.0 ± 2.3	7.0 ± 1.8	6.5 ± 1.6	7.5 ± 2.6	*P = 0.659* *F = 0.55; df = 3, 12*
3/27	9.8 ± 1.8	9.8 ± 1.6	7.3 ± 1.4	9.0 ± 4.0	*P = 0.872* *F = 0.23; df = 3, 12*
4/5	20.8 ± 3.2	13.8 ± 3.8	12.3 ± 2.4	11.0 ± 3.5	*P = 0.204* *F = 1.78; df = 3, 12*

Location: Middletown Levels Rd
Broadcast Date: October 13
Previous Crop: corn
Plot Size: 80’ x 100’
Sample: 4-ft^2 shingles per plot
Notes: New site, not previously planted in multi-species cover crop. High corn residue, high amount of green weedy cover. Relatively low clover and radish stand establishment as of 11/27

Total Slugs

Date	Canola	Crimson	Rye	Check	ANOVA
11/27	9.5 ± 2.5	7.8 ± 2.5	11.0 ± 2.6	10.8 ± 2.9	*P = 0.812* *F = 0.319; df = 3, 12*
3/4	4.3 ± 0.9	5.5 ± 1.3	6.0 ± 1.5	5.8 ± 1.7	*P = 0.811* *F = 0.32; df = 3, 12*
3/12	11.3 ± 2.3	6.5 ± 0.9	7.0 ± 1.6	10.8 ± 2.0	*P = 0.176* *F = 1.95; df = 3, 12*
3/22	3.0 ± 1.3	2.3 ± 0.9	4.5 ± 1.3	4.0 ± 2.0	*P = 0.683* *F = 0.509; df = 3, 12*
3/27	8.0 ± 0.7	5.0 ± 1.1	9.5 ± 1.2	8.3 ± 2.3	*P = 0.210* *F = 1.75; df = 3, 12*
4/5	10.5 ± 2.7	13.0 ± 6.4	14.0 ± 5.2	9.3 ± 3.4	*P = 0.880* *F = 0.22; df = 3, 12*
4/30	10.5 ± 5.1	10.0 ± 2.8	15.3 ± 7.1	9.5 ± 2.5	*P i= 0.817* *F = 0.312; df = 3, 12*
5/10	33.0 ± 19.2	37.8 ± 22.0	57.8 ± 21.9	29.0 ± 11.7	*P = 0.725* *F = 0.45; df = 3, 12*

Location: Gravel Hill, DE
Broadcast Date: October 5
Previous Crop: soybean
Plot Size: 60’ x 100’
Sample: 4-ft^2 shingles per plot
Notes: Plots installed in same sites as used in 2022-2023. Crimson clover poorly established in rep 2.

Total Slugs

Date	Canola	Crimson	Rye	Check	ANOVA
12/1	21.8 ± 9.0	11.3 ± 5.6	17.0 ± 3.6	14.0 ± 3.0	*P = 0.642* *F = 0.58; df = 3, 11*
12/13	13.0 ± 4.0	7.5 ± 3.8	13.0 ± 1.9	8.0 ± 2.1	*P = 0.44* *F = 0.96; df = 3, 12*
3/8	4.3 ± 2.5	3.5 ± 1.7	2.5 ± 0.9	3.3 ± 1.7	*P = 0.918* *F = 0.17; df = 3, 12*
3/13	6.8 ± 3.6	3.0 ± 1.7	6.0 ± 2.1	6.5 ± 2.3	*P = 0.709* *F = 0.47; df = 3, 12*
3/22	9.0 ± 3.2	2.8 ± 0.8	7.5 ± 4.8	7.8 ± 4.0	*P = 0.627* *F = 0.60; df = 3, 12*
4/19	3.5 ± 1.3	1.8 ± 0.5	2.5 ± 1.3	3.3 ± 0.5	*P = 0.609* *F = 0.63; df = 3, 12*
5/9	1.5 ± 0.3	1.3 ± 0.9	2.8 ± 1.1	1.3 ± 0.8	*P = 0.546* *F = 0.74; df = 3, 12*

Soybeans 2024 Slugs 1 – 2

Location: Middletown, DE, Ratledge Rd. Soybeans drilled, cotyledons emerging from soil at time of application

Dover, DE, Savannah Rd. Pre-plant application.

Treatment Date: May 7
Experimental Design: RCBD with 4 treatments and 4 replicates
Plot Size: 36’ x 30’
Treatment Method: CO_2-pressurized backpack sprayer with a 54” boom fitted with 4, 11002 nozzles spaced 18” apart calibrated to deliver 15.7 GPA at 31 PSI. Slug baits were applied between 5:30 and 7:00 PM.
Pellet slug bait broadcast with a Scott’s hand spreader.
Sample Size: 2 shingles per plot
Data Analysis: ANOVA

Notes: Middletown1 consisted of 82% gray garden slugs; Dover consisted of marsh slug. The weather station at West Dover, DE recorded 0.27”, 0.14”, 0.15”, and 0.06” of rain between May 4-7. The DEOS Glasgow DE weather station recorded 0.29” and 0.39” of rain on May 4-5.

TRT	**Rate**	**3 DAT Middletown 1**	**3 DAT Dover**
UTC	---	15.75 ± 3.35	0.75 ± 0.25
Deadline M-Ps	10 lbs/A	7.75 ± 2.06	0.25 ± 0.25
Slugger 360	10 lbs/A	10.75 ± 2.81	1.25 ± 1.25
SlugFest	23 fl oz/A	10.0 ± 3.16	1.75 ± 0.62
ANOVA		*P = 0.300 F = 1.37; df = 3, 12*	*P = 0.517 F = 0.80; df = 3, 12*

Soybean 2024 Stink Bugs

Location: Greenwood DE
Variety: Dyna Gro 33en42
Planting Date: 21 April
Experimental Design: RCBD with 7 treatments and 4 replicates
Plot Size: 18’ x 40’
Row Spacing: 15”
Plant Population: 134,000
Treatment Method: CO_2-pressurized backpack sprayer with a 7.5’ boom equipped with 6 XR11003 nozzles spaced at 18” and calibrated to deliver 15.6 GPA at 15 PSI.
Treatment Date: 31-July
Sample Size: 15 sweeps per plot
Data Analysis: ANOVA, Tukey-Kramer HSD means separation

Notes: Small field bordered by tax ditch on the left, mixed hardwoods to the rear. Nearby blacklight trap indicated very high green stink bug flight. Green stink bugs (pre spray) consisted of 94.8% of the stink bug complex, Brown stink bugs = 3.3%, and BMSB = 1.8%

TRT	Rate
1. UTC	---
2. Experimental	---
3. Experimental	---
4. Experimental	---
5. Experimental	---
6. Vantacor	1.73 fl oz
7. Besiege	9.0 fl oz

The adjuvant Penetrator Plus was added to each treatment at a rate of 5.0 fl oz/A

31-July (0D PRE) Stink bug counts

TRT	GSB-A	GSB-N	GSB Total	BSB-A	BSB-N	BMSB-A	BMSB-N	Total SBs
1	6.3 ± 1.9	2.3 ± 1.3	8.5 ± 2.9	0.3 ± 0.3	0	0.3 ± 0.3	0	9.0 ± 2.8
2	6.5 ± 1.3	6.5 ± 4.8	13.0 ± 3.5	0	0	0.3 ± 0.3	0.3 ± 0.3	13.5 ± 3.5
3	6.3 ± 2.0	4.3 ± 2.7	10.5 ± 4.6	0.8 ± 0.5	0.3 ± 0.3	0	0	11.5 ± 5.0
4	4.0 ± 1.1	10.0 ± 1.8	14.0 ± 2.5	0.3 ± 0.3	0	0.5 ± 0.5	0	14.8 ± 2.8
5	5.0 ± 0.8	3.8 ± 2.6	8.8 ± 2.3	0.3 ± 0.3	0	0	0.3 ± 0.3	9.3 ± 2.5
6	6.8 ± 2.1	3.3 ± 1.3	10.0 ± 2.5	0.8 ± 0.8	0	0	0	10.8 ± 2.9
7	7.8 ± 2.3	5.5 ± 2.3	13.3 ± 4.0	0.3 ± 0.3	0	0	0	13.5 ± 4.1
ANO	*P = 0.797 F = 0.51; df = 6, 21*	*P = 0.234 F = 1.48; df = 6, 21*	*P = 0.823 F = 0.47; df = 6, 21*	*P = 0.772 F = 0.54; df = 6, 21*	*P = 0.451 F = 1.00; df = 6, 21*	*P = 0.636 F = 0.72; df = 6, 21*	*P = 0.558 F = 0.83; df = 6, 21*	*P = 0.861 F = 0.415; df = 6, 21*

Herbivores July 31

TRT	Japanese Beetle	Bean Leaf Beetle	Green Clover Worm	Herbivore Totals
1	1.8 ± 1.1	0	0.8 ± 0.5	2.8 ± 1.4
2	1.8 ± 0.5	0	0	2.5 ± 0.9
3	1.8 ± 1.4	0.5 ± 0.5	1.8 ± 1.1	5.0 ± 1.2
4	0	1.0 ± 0.4	0	1.3 ± 0.6
5	1.8 ± 1.2	0.5 ± 0.3	0	2.8 ± 1.4
6	1.0 ± 0.4	0.3 ± 0.3	0.8 ± 0.5	2.8 ± 0.5
7	0.5 ± 0.5	1.0 ± 0.6	1.0 ± 0.7	3.3 ± 0.3
ANO	*P = 0.656 F = 0.70; df = 6, 21*	*P = 0.271 F = 1.27; df = 6, 21*	*P = 0.264 F = 1.39; df = 6, 21*	*P = 0.315 F = 1.27; df = 6, 21*

Other herbivores included in ‘Herbivore Total’ were grasshoppers and Dectes stem borer

Predators July 31

TRT	Lady Beetle	Lacewing	Pirate Bug	Big Eyed Bug	Spiders	Predator Totals
1	0	0.8 ± 0.3	1.0 ± 0.7	1.0 ± 0.7	2.8 ± 2.1	5.5 ± 1.8
2	0	2.3 ± 1.0	0	0	3.0 ± 0.4	5.3 ± 1.2
3	0.3 ± 0.3	0.8 ± 0.5	0.5 ± 0.5	0.3 ± 0.3	2.5 ± 0.9	4.3 ± 0.5
4	0.5 ± 0.3	0.3 ± 0.3	0.5 ± 0.5	0	2.0 ± 1.4	3.3 ± 1.7
5	0.3 ± 0.3	0.3 ± 0.3	0	0	2.5 ± 1.0	3.0 ± 1.2
6	0.3 ± 0.3	0.3 ± 0.3	0	0.3 ± 0.3	2.3 ± 1.3	3.0 ± 1.7
7	0.3 ± 0.3	0	0.3 ± 0.3	0.3 ± 0.3	1.0 ± 0.4	2.0 ± 0.7
ANO	*P = 0.709 F = 0.63; df = 6, 21*	*P = 0.046 F = 2.64; df = 6, 21*	*P = 0.499 F = 0.92; df = 6, 21*	*P – 0.312 F = 1.27; df = 6, 21*	*P = 0.935 F = 0.29; df = 6, 21*	*P = 0.505 F = 0.914; df = 6, 21*

Other predators included ambush bugs and praying mantids.

2-August

TRT	GSB-A	GSB-N	GSB Total	BSB-A	BSB-N	BMSB-A	BMSB-N	Total SBs
1	1.8 ± 0.5	2.5 ± 0.9 ab	4.3 ± 0.9	0	0	0	0	4.3 ± 0.9 ab
2	1.3 ± 0.5	0 b	1.3 ± 0.5	0	0	0	0	1.3 ± 0.5 b
3	1.3 ± 0.5	3.3 ± 1.4 ab	4.5 ± 1.4	0	0	0	0.5 ± 0.5	5.0 ± 1.1 ab
4	0.3 ± 0.3	1.8 ± 0.9 ab	2.0 ± 0.8	0	0	0	0	2.0 ± 0.8 ab
5	0.5 ± 0.5	1.0 ± 0.6 ab	1.5 ± 0.5	0.3 ± 0.3	0	0	0	1.8 ± 0.3 b
6	2.3 ± 1.1	4.3 ± 1.1 a	6.5 ± 2.1	0	0.3 ± 0.3	0	0	6.8 ± 1.9 a
7	1.0 ± 0.4	2.5 ± 0.9 ab	3.5 ± 1.0	0.3 ± 0.3	0	0	0	3.8 ± 1.0 ab
ANOVA	*P = 0.267 F = 1.38; df = 6, 21*	*P = 0.059 F = 2.45; df = 6, 21*	*P = 0.043 F = 2.68; df = 6, 21*	*P = 0.558 F = 0.83; df = 6, 21*	*P = 0.451 F = 1.00; df = 6, 21*		*P = 0.451 F = 1.00; df = 6, 21*	*P = 0.011 F = 3.71; df = 6, 21*

Herbivores, 2-August, 2DAT

TRT	Japanese Beetle	Bean Leaf Beetle	Green Clover Worm	Herbivore Totals
1	0.8 ± 0.8	0.5 ± 0.5	0.5 ± 0.3	1.8 ± 0.5
2	0.5 ± 0.3	0.3 ± 0.3	0.5 ± 0.3	1.5 ± 0.6
3	0.3 ± 0.3	0	0	03 ± 0.3
4	0.3 ± 0.3	0	0	0.3 ± 0.3
5	0.3 ± 0.3	0	0	0.3 ± 0.3
6	0.5 ± 0.5	0.8 ± 0.5	0	1.3 ± 0.8
7	0.3 ± 0.3	0	0	0.3 ± 0.3
ANO	*P = 0.960* *F = 0.24; df = 6, 21*	*P = 0.348* *F = 1.19; df = 6, 23*	*P = 0.056* *F = 2.50; df = 6, 21*	*P = 0.079* *F = 2.24; df = 6, 21*

Total also included grasshoppers

Predators, 2-August

TRT	Lady Beetle	Lacewing	Pirate Bug	Big Eyed Bug	Spiders	Predator Totals
1	0.3 ± 0.3	0	0	0.3 ± 0.3	3.3 ± 2.0	4.0 ± 2.0
2	0.3 ± 0.3	0.3 ± 0.3	0.5 ± 0.5	0	1.3 ± 0.5	2.3 ± 0.3
3	0	0	0	0	1.3 ± 0.9	1.3 ± 0.9
4	0	0.3 ± 0.3	0	0	1.3 ± 1.3	1.5 ± 1.2
5	0	0	2.5 ± 2.5	0.8 ± 0.8	2.0 ± 1.2	5.3 ± 2.8
6	0.3 ± 0.3	0.5 ± 0.3	0.3 ± 0.3	0	2.3 ± 1.4	3.3 ± 1.6
7	0.3 ± 0.3	0.8 ± 0.5	0.3 ± 0.3	0	0.3 ± 0.3	1.5 ± 0.6
ANO	*P = 0.801* *F = 0.50; df = 6, 21*	*P = 0.287* *F = 1.33; df = 6, 21*	*P = 0.541* *F = 0.86; df = 6, 21*	*P = 0.513* *F = 0.90; df = 6, 21*	*P = 0.707* *F = 0.63; df = 6, 21*	*P = 0.486* *F = 0.94; df = 6, 21*

6-August

TRT	GSB-A	GSB-N	GSB Total	BSB-A	BSB-N	BMSB-A	BMSB-N	Total SBs
1	6.0 ± 1.5	2.8 ± 1.0	8.8 ± 2.2	0	0	0.3 ± 0.3	0.3 ± 0.3	9.3 ± 2.2
2	0.5 ± 0.5	1.0 ± 0.4	1.5 ± 0.9	0	0	0	0	1.5 ± 0.9
3	2.3 ± 0.8	3.0 ± 2.4	5.3 ± 2.8	0	0	0.3 ± 0.3	0	5.5 ± 2.8
4	2.5 ± 0.9	1.8 ± 0.9	4.3 ± 1.4	0	0.3 ± 0.3	0	0	4.5 ± 1.2
5	3.0 ± 2.7	0.3 ± 0.3	3.3 ± 2.9	0.3 ± 0.3	0	0	0	3.5 ± 2.8
6	6.0 ± 1.8	4.8 ± 0.9	10.8 ± 2.3	0	0	0	0	10.8 ± 2.3
7	2.8 ± 1.2	2.0 ± 1.1	4.8 ± 2.3	0	0.5 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	5.8 ± 2.1
ANOA	P = 0.141 F = 1.83; df = 6, 21	P = 0.212 F = 1.55; df = 6, 21	P = 0.097 F = 2.10; df = 6, 21	P = 0.451 F = 1.00; df = 6, 21	P = 0.136 F = 1.86; df = 6, 21	P = 0.677 F = 0.67; df = 6, 21	P = 0.558 F = 0.83; df = 6, 21	P = 0.080 F = 2.23; df = 6, 21

Herbivores, 6-August, 6DAT

TRT	Japanese Beetle	Bean Leaf Beetle	Green Clover Worm	Herbivore Totals
1	1.5 ± 0.6	0.5 ± 0.5	1.0 ± 0.4 a	3.0 ± 0.7 a
2	0	0.8 ± 0.5	0 b	0.8 ± 0.5 ab
3	0.3 ± 0.3	0.3 ± 0.3	0.5 ± 0.3 ab	1.3 ± 0.5 ab
4	0	1.0 ± 0.7	0 b	1.0 ± 0.7 ab
5	0.5 ± 0.5	0	0 b	0.5 ± 0.5 b
6	0.3 ± 0.3	0.3 ± 0.3	0 b	0.5 ± 0.3 b
7	0.3 ± 0.3	0	0 b	0.3 ± 0.3 b
ANO	*P = 0.084 F = 2.20; df = 6, 21*	*P = 0.510 F = 0.906; df = 6, 21*	*P = 0.005 F = 4.33; df = 6, 21*	*P = 0.020 F= 3.26; df = 6, 21*

Total also included grasshoppers

Predators, 6-August

TRT	Lady Beetle	Lacewing	Pirate Bug	Big Eyed Bug	Spiders	Predator Totals
1	0	0.5 ± 0.3	0.5 ± 0.5	0.3 ± 0.3	0.8 ± 0.5	2.0 ± 0.8
2	0.3 ± 0.3	0.3 ± 0.3	1.5 ± 1.0	0.3 ± 0.3	0.5 ± 0.5	3.0 ± 1.5
3	0	0	1.3 ± 1.3	2.8 ± 2.8	1.0 ± 0.6	5.0 ± 2.9
4	0	0.3 ± 0.3	1.3 ± 0.5	0	1.3 ± 1.3	2.8 ± 1.8
5	0	0	1.0 ± 0.4	0.3 ± 0.3	0.3 ± 0.3	1.5 ± 0.6
6	0	0	0.3 ± 0.3	0	2.3 ± 1.3	2.5 ± 1.6
7	0.5 ± 0.3	0	0.3 ± 0.3	0.5 ± 0.5	0.5 ± 0.3	1.8 ± 0.9
ANO	*P = 0.136 F = 1.86; df = 6, 21*	*P = 0.300 F = 1.30; df = 6, 21*	*P = 0.744 F = 0.577; df = 6, 21*	*P = 0.558 F = 0.83; df = 6, 21*	*P = 0.649 F = 0.70; df = 6, 21*	*P = 0.772 F = 0.54; df = 6, 21*

13-Aug, 13 DAT

TRT	**GSB-A**	**GSB-N**	**GSB Total**	**BSB-A**	**BSB-N**	**BMSB-A**	**BMSB-N**	**Total SBs**
1	6.8 ± 3.1	6.8 ± 2.8	13.5 ± 4.2 a	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	0	14.3 ± 4.5 a
2	0.5 ± 0.3	0.8 ± 0.5	1.3 ± 0.8 b	0.5 ± 0.5	0.8 ± 0.8	0.3 ± 0.3	0	2.8 ± 0.9 b
3	3.3 ± 1.8	2.3 ± 0.5	5.5 ± 1.8 ab	0	1.0 ± 1.0	0	0	6.5 ± 2.7 ab
4	1.8 ± 0.5	2.0 ± 0.8	3.8 ± 0.8 b	0.3 ± 0.3	0	0	0.3 ± 0.3	4.3 ± 1.0 ab
5	1.0 ± 0.7	1.8 ± 1.0	2.8 ± 1.4 b	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	0.3 ± 0.3	3.8 ± 1.7 ab
6	2.8 ± 0.6	5.8 ± 1.5	8.5 ± 1.8 ab	0	1.0 ± 0.7	0.5 ± 0.5	0.3 ± 0.3	10.3 ± 2.2 ab
7	2.8 ± 0.9	2.3 ± 0.8	5.0 ± 1.4 ab	0	0.8 ± 0.3	0	0	5.8 ± 1.7 ab
ANO	*P = 0.114 F = 1.98; df = 6, 21*	*P = 0.038 F = 2.79; df = 6, 21*	*P = 0.007 F = 4.09; df = 6, 21*	*P = 0.749 F = 0.57; df = 6, 21*	*P = 0.801 F = 0.50; df = 6, 21*	*P = 0.749 F = 0.57; df – 6, 21*	*P = 0.677 F = 0.67; df = 6, 21*	*P = 0.029 F = 2.97; df = 6, 21*

Herbivores, 13-August, 13DAT

TRT	Japanese Beetle	Bean Leaf Beetle	Green Clover Worm	Herbivore Totals
1	0.5 ± 0.5	2.3 ± 1.3	0.8 ± 0.5	3.5 ± 1.8
2	0	0.3 ± 0.3	0	0.3 ± 0.3
3	0.8 ± 0.8	0	1.0 ± 0.7	1.8 ± 0.8
4	0	0	0	0
5	0	0.5 ± 0.3	0.5 ± 0.5	1.0 ± 0.7
6	0	0.3 ± 0.3	0	0.3 ± 0.3
7	0.3 ± 0.3	0.5 ± 0.5	0	0.8 ± 0.8
ANO	*P = 0.625 F = 0.74; df = 6, 21*	*P = 0.117 F = 1.96; df = 6, 21*	*P = 0.301 F = 1.30; df = 6, 21*	*P = 0.108 F = 2.02; df = 6, 21*

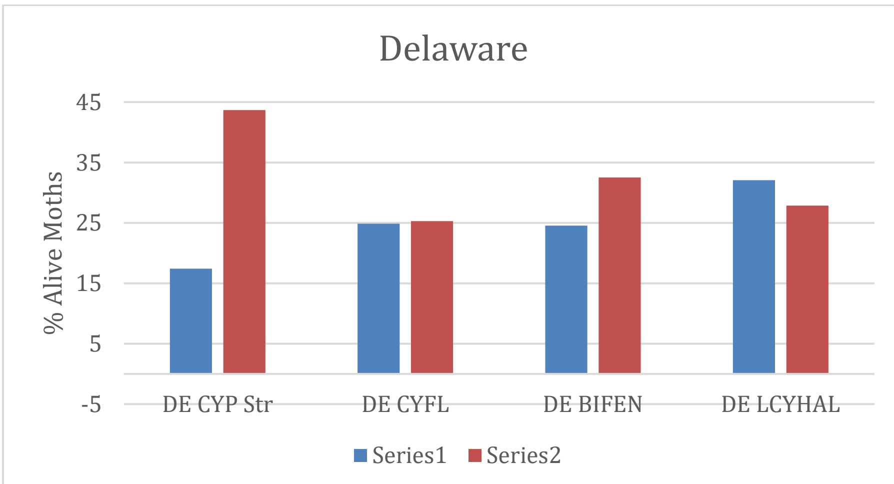
Total also included grasshoppers

Predators, 13-August, 13 DAT

TRT	Lady Beetle	Lacewing	Pirate Bug	Big Eyed Bug	Spiders	Predator Totals
1	0.3 ± 0.3	0	0	0.3 ± 0.3	3.3 ± 0.3	3.8 ± 0.5
2	0	0	0	0	1.0 ± 0.7	1.0 ± 0.7
3	0.8 ± 0.5	0	0.5 ± 0.5	0	1.5 ± 1.0	2.8 ± 1.1
4	0.8 ± 0.5	0	0	0	1.0 ± 0.4	1.8 ± 0.3
5	0	0	0	0	2.3 ± 1.1	2.3 ± 1.1
6	0	0	0	0	1.8 ± 1.0	1.8 ± 1.0
7	0	0	0	0	0.8 ± 0.5	0.8 ± 0.5
ANOVA	*P = 0.175 F = 1.68; df = 6, 21*		*P = 0.451 F = 1.00; df = 6, 21*	*P = 0.451 F = 1.00; df = 6, 21*	*P = 0.304 F = 1.29; df = 6, 21*	*P = 0.186 F = 1.64; 6, 21*

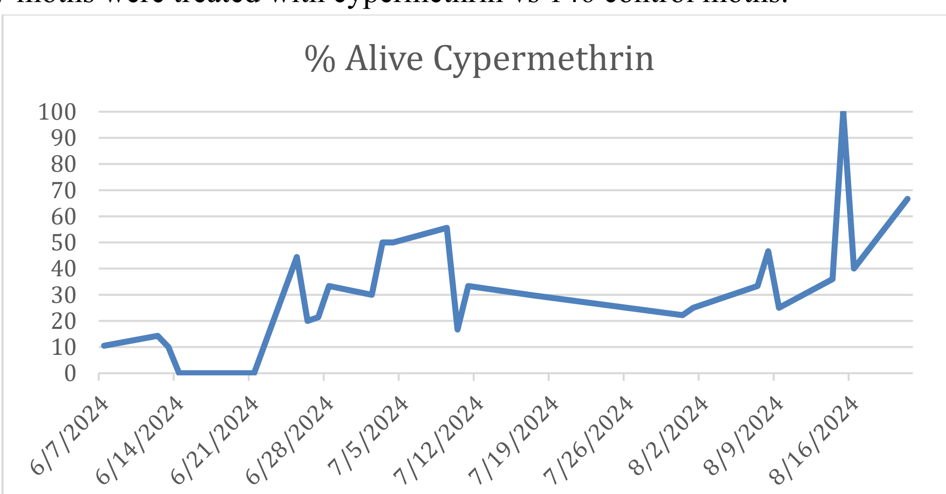
Corn Earworm 2024 Vial Bioassays

Male corn earworm were collected from hartstack pheromone traps after 1 night. Moths were cooled in the refrigerator to make removal from trap tops and placement into vials easier. 20-ml scintillation vials were treated with 5 ug of technical grade active ingredient dissolved in acetone. Open vials were placed on a hotdog roller to allow acetone to evaporate, ensuring an even coating of insecticide. Once moths were introduced into vials, lids were lightly screwed in place and vials placed at on an incline. After 24 hours, moths were evaluated for mortality, morbidity (not dead, but not capable of flight more than 3 ft) or resistant (alive moths able to fly more than 3 ft). Vials not used within 4 weeks of treating were discarded.



Series 1: June 7- June 28; 102 control moths, 92 cypermethrin, 106 cyfluthrin, 98 bifenthrin, and 100 lambda cyhalothrin treated moths. Presented are means corrected for UTC mortality using Abbott's formula. Series 2: July 32 to August 21; 95 control moths, 95 cypermethrin, 95 cyfluthrin, 94 bifenthrin, and 98 lambda-cyhalothrin treated moths.

In July, 147 moths were treated with cypermethrin vs 146 control moths.



Delaware 2024 Soybean Slug Survey

Several soybean fields in Kent and New Castle County were monitored for slugs during the spring 2024. At each field, 6 shingles were deployed in a W pattern across fields.

Average slug count/shingle (marsh and gray garden slugs combined)

Location	Week 1 3/29	Week 2 4/5	Week 3 4/11	Week 4 4/24	Week 5 5/2	Week 6 5/9	Week 7 5/16	Week 8 5/23	Week 9 5/30	Week 10 6/6	Final Stand Count (6 row ft)
Twin Willows, Kent	1.5	2.5	4.25	6.75	3.5	---	---	2.75	1.75	0.5	16.7
Woodland Beach, Kent	0	2.0	3.0	---	1.3	0.5	1.7	2.5	1.8	0.8	21.3
Savannah Rd, Kent	1.25	2.0	3.5	---	6.17	2.17	2.0	2.17	1.3	0.5	35.7
Fox Chase, Kent					5.6	1.0	2.4				35.8
Porters, Kent					5.3	2.8	1.8	0.17	---		
Dutch Neck, NCC	1.17	2.3	--- (Field planted)	2.3	3.17	5.7	---	0.8	0.5	0.17	26 (June 21 after replant)
Ratledge Rd 1, NCC	2.8	2.3	2.8	1.3	2.7 (Field planted)	3.3	1.3	0.5	0.7	0	38.4
Ratledge Rd 2, NCC	0.8	1.7	0.3	1.17	1.5 (soybean emerging)	3.0	1.7	1.5	0.7	0	37.2
Levels Rd, NCC			0.3	2.0	0.0	2.0	4.5	11.5	--- (Field worked, planted)	0 (0.7 June 10 and 0 June 17)	45.2

The Dutch Neck, NCC field was turbotilled just before planting. Field was re-worked and replanted due to slug damage.
The Ratledge Rd fields were drilled on 7” rows. The Levels Rd field was vertical-tilled and planted the week of 5/28

Delaware 2024 Stinkbugs in Soybeans Survey

Sampling was conducted on July 29th and August 14th. Teams of two people were dispatched to designated areas of Kent and Sussex counties. Teams drove east or west along roadways and stopped at a soybean field approximately every 5 miles. Sweeps were conducted at 12 fields on July 29th and at 14 fields on August 14th. At each field 10 sample sites were selected around the perimeter of the field. At each sample site a sweep sample of 25 sweeps was collected. Sweep net contents were stored in plastic bags labeled with coordinates and field information and stored in freezers. Over the following weeks sample contents were sorted and identified. Green Stink bug (*Chenavia* hilare) was the most common, representing 72% of all stinkbugs found. Brown Stink bugs (*Euschistus* spp.) represented 24% of stinkbugs found. Very few Brown Marmorated stink bugs were found, representing only 2.5% of stink bugs. The remaining "other" stink bugs included *Podisis maculiventris* and *Thyanta accera* in very low numbers. Twice as many stink bugs were collected in August, but there was little change in the ratios between Green and Brown stink bugs or adult and nymph stink bugs. Two fields were near to above threshold for stink bugs, all other fields were well below stink bug threshold.

Stink Bugs Collected from Delaware Sweep Samples			
	7/29	8/14	Total
Green Stink Bug Adult	47 50%	124 66.7%	171 61.1%
Green Stink Bug Nymph	8 8.5%	23 12.4%	31 11.1%
Brown Stink Bug Adult	22 23.4%	24 12.9%	46 16.4%
Brown Stink Bug Nymph	13 13.8%	6 3.2%	19 6.8%
Brown Marmorad Stink Bug	1 1.1%	6 3.2%	7 2.5%
Other Stink Bug	3 3.2%	3 1.6%	6 2.1%
Total	94	186	280

Insect Trapping 2024

Corn Earworm and Stink Bug Trapping Information Can Be Found by Google Search "UD Insect Trapping" or : https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/pest-management/insect-trapping/#:~:text=The%20University%20of%20Delaware's%20Extension,are%20posted%20on%20this%20website.

Black Cutworm and True Armyworm

Date	Salisbury, MD		Saford,		Sdlersvill, MD		Harrington, DE		Smyrna, DE		Middletown, DE	
	TAW	BCW	TAW	BC	TA	BC	TA	BC	TAW	BCW	TAW	BCW
4/12	-	-	-	-	0	11	-	-	-	-	-	-
4/19	2	1	0	0	3	26	56	71	1	4	0	16
4/26	7	1	0	11	3	26	23	41	1	0	0	-
5/3	0	7	0	12	10	27	57	52	0	0	0	0
5/10	0	0	0	17	0	8	4	16	1	2	-	-
5/17	0	6	0	8	0	13	-	-	1	0	0	0
5/24	-	-	0	10	0	11	1	51	-	0	0	-
5/31	-	-	0	-	0	7	3	21	4	0	1	29

Beet Armyworm

Date	Johnson Rd	Ellis Grove Rd	Redden Rd	Lowes Crossing Rd	Laurel Rd
7/18	32	45	9	1	3
7/30	23	54	48	2	0
8/5	24	43	0	4	11

San Jose Scale

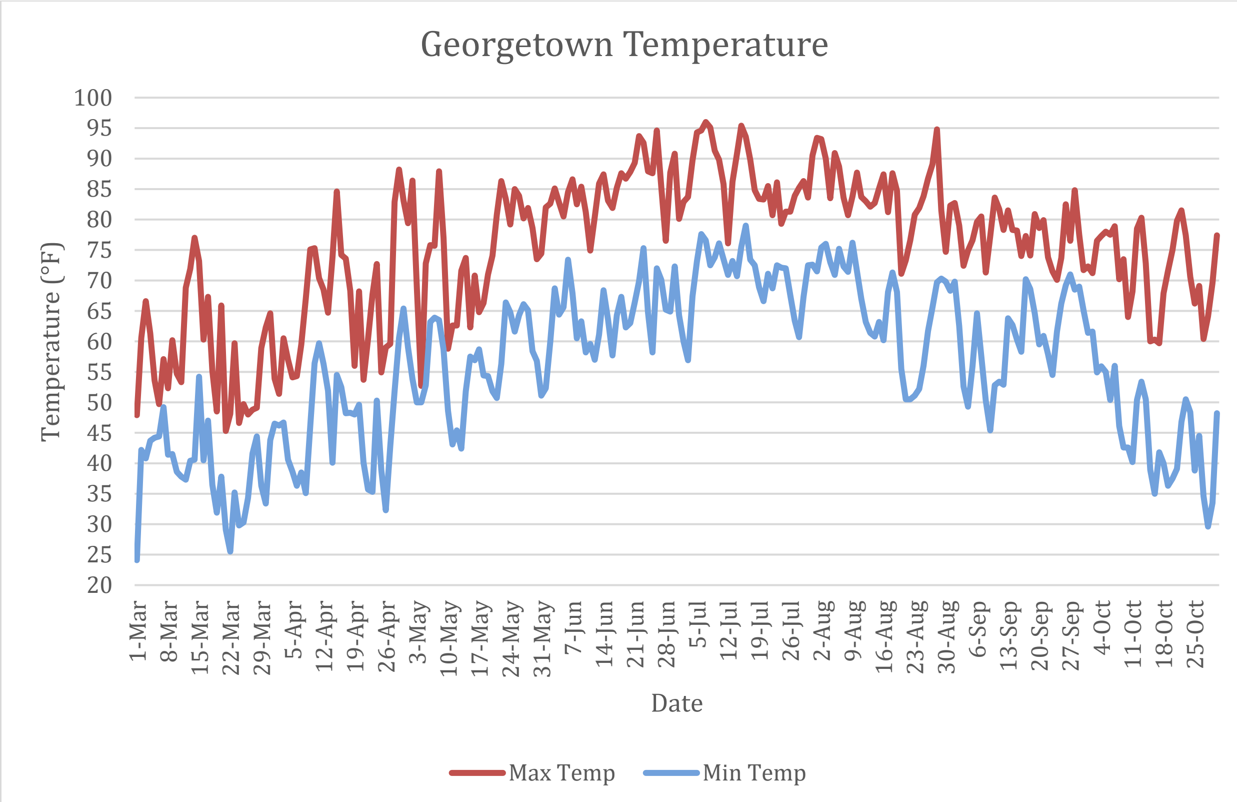
Location	Date	SJS	Notes
Port Penn	4/26	1	Trap deployed 8 days
Port Penn	4/30	8	
Bennett Orchds	4/25	0	Trap deployed 7 days
Bennet Orchrds	5/3	0	
Fifer Orchds	4/26	0	Trap deployed 8 days

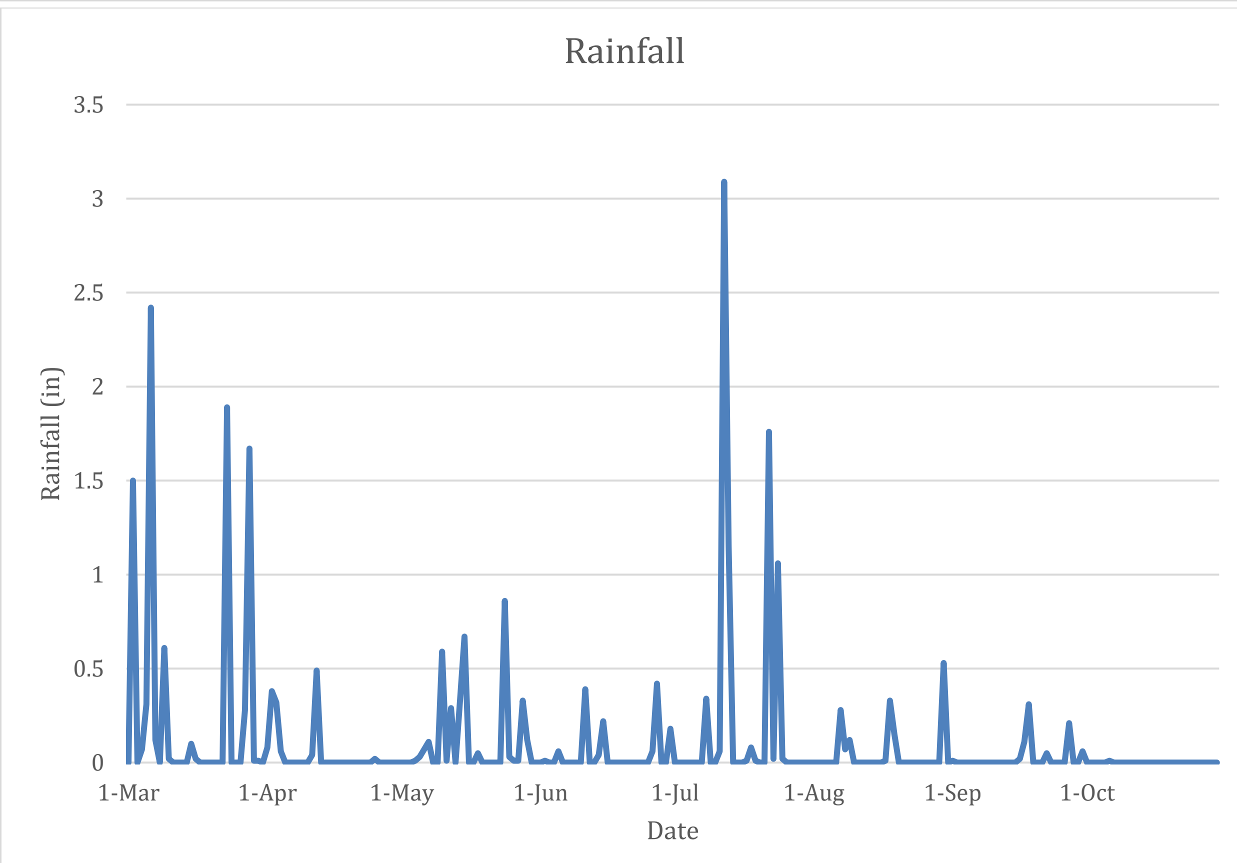
European Corn Borer Trapping

"Z"/Black tape lure trap was placed at (38.6343306, -75.4552884).
"E"/Red tape lure trap was placed at (38.6336271, -75.4546383)

Traps ran from June 5 to November 13, 2024. Traps were monitored every Wednesday for the intervening weeks (June 12, 19, 26; July 3, 10, 17, 24, 31; August 7, 14, 21, 28; September 4, 11, 18, 25; October 2, 9, 16, 23, 30; November 6, 13). **No** ECB were captured in these traps.

"NY strain" pheromone traps from Great Lakes IPM were deployed in 6 other locations throughout the state from late April through October. From these traps, 1 moth was found in an unrelated trap in Laurel, DE on August 5th and on 26th, 1 in Greenwood on August 15th, and 1 in Dover on August 22. Moths apparently present in region in very low numbers.


Georgetown Temperature
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
Temperature (°F)
1-Mar
8-Mar
15-Mar
22-Mar
29-Mar
5-Apr
12-Apr
19-Apr
26-Apr
3-May
10-May
17-May
24-May
31-May
7-Jun
14-Jun
21-Jun
28-Jun
5-Jul
12-Jul
19-Jul
26-Jul
2-Aug
9-Aug
16-Aug
23-Aug
30-Aug
6-Sep
13-Sep
20-Sep
27-Sep
4-Oct
11-Oct
18-Oct
25-Oct
Date
Max Temp
Min Temp


Rainfall
3.5
3
2.5
2
1.5
1
0.5
0
Rainfall (in)
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
Date

Delaware-Maryland in the year 2024

Pest	Acres Infested	% Acres Infested	Acres above ET	% Acres above ET	Acres Treated	% Acres Treated	# of apps/acres treated	Cost of 1 Insecticide	% loss per acre infested	# of apps per total soy acres	cost/acre	Overall % reduction	bushel lost per pest	Loss + Cost	Loss + Cost/acre	% Total Loss + Cost
Armyworm complex	52,316	8.2%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Banded Cucumber Beetle	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Bean Leaf Beetle	446,600	70.0%	0	0.0%	0	0.0%	0	$0.00	0.20	0.000	$0.00	0.14%	39,905	$392,669	$0.62	1.7%
Blister Beetle	63,800	10.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Corn Earworm	452,980	71.0%	114,840	18.0%	191,400	30.0%	1.01	$19.00	1.50	0.303	$5.76	1.07%	303,566	$6,660,057	$10.44	28.5%
Cutworms	12,760	2.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Dectes Stem Borer	279,444	43.8%	1,595	0.3%	0	0.0%	0	$0.00	1.25	0.000	$0.00	0.55%	156,059	$1,535,617	$2.41	6.6%
Garden Webworms	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Grape Colaspis	12,760	2.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Grasshopper	510,400	80.0%	0	0.0%	0	0.0%	0	$0.00	0.01	0.000	$0.00	0.01%	2,280	$22,438	$0.04	0.1%
Green Cloverworm	307,516	48.2%	0	0.0%	0	0.0%	0	$0.00	0.01	0.000	$0.00	0.00%	1,374	$13,519	$0.02	0.1%
Japanese Beetle	586,960	92.0%		0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Kudzu Bug	128	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Lesser Cornstalk Borer	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Mexican Bean Beetle	31,900	5.0%	638	0.1%	638	0.1%	1	$10.00	0.05	0.001	$0.01	0.00%	713	$13,392	$0.02	0.1%
Potato Leafhopper	210,540	33.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Saltmarsh Caterpillar	95,700	15.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Seedcorn Maggot	20,416	3.2%	1,914	0.3%	1,914	0.3%	1	$50.00	1.50	0.003	$0.15	0.05%	13,682	$230,329	$0.36	1.0%
Slugs*	139,084	21.8%	52,316	8.2%	127,600	20.0%	1	$35.00	4.50	0.200	$7.00	0.98%	279,623	$7,217,489	$11.31	30.9%
Soybean Aphid	56,144	8.8%	0	0.0%	0	0.0%	0	$0.00	0.02	0.000	$0.00	0.00%	502	$4,936	$0.01	0.0%
Soybean Gall Midge	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Soybean Looper	404,492	63.4%	0	0.0%	0	0.0%	0	$15.25	0.05	0.000	$0.00	0.03%	9,036	$88,912	$0.14	0.4%
Spider Mites	192,038	30.1%	38,280	6.0%	114,840	18.0%	1	$12.00	0.35	0.180	$2.16	0.11%	30,029	$1,673,564	$2.62	7.2%
Spotted Cucumber Beetle	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Stink Bugs (see box below)	542,938	85.1%	16,588	2.6%	37,642	5.9%	1	$13.00	1.75	0.059	$0.77	1.49%	424,494	$4,666,365	$7.31	20.0%
Thistle Caterpillar	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Threecornered Alfalfa Hopper	63,800	10.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Thrips	638,000	100.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Velvetbean Caterpillar	0	0.0%	0	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Other	0	0.0%	191	0.0%	0	0.0%	0	$0.00	0.00	0.000	$0.00	0.00%	0	$0	$0.00	0.0%
Automatic (no insects)	0	0.0%	0	0.0%	344,520	54.0%	1.25	$1.90	0.00	0.675	$1.28	0.00%	0	$818,235	$1.28	3.5%
	*slug trt: 4.1% Deadline, rest tillage for slug management specifically, estimate 7.9% acreage r								TOTAL	**1.421**	**$17.13**	**4.42%**	**1,261,262**	**$23,337,522**	**$36.58**	**100.0%**

SUMMARY DATA

Data Input

State	DE/MD
Year	2024
Total Acres	638,000
Yield/acre	42.7
Price/Bushel	$9.84
% Acres Scouted	35
Scouting Fee/scouted acre	$9.40
% Acres Insect Seed Trt.	55
Seed Trt Cost/treated ac	$6.50

Yield & Management Results

Total Bushels Harvested	27,242,600
Total Bushels Lost to Insects	1,261,262
Percent Yield Loss	4.42%
Yield w/o Insects	44.68
Ave. # Spray Applications	1.421
Seed Treated Acres	350,900
Scouted Acres	223,300

Economic Results

	Total	Per Acre
Foliar Insecticides Costs	$10,926,707	$17.13
Seed Treatment Costs	$2,280,850	$3.58
Scouting costs	$2,099,020	$3.29
Total Costs	$15,306,577	$23.99
Yield Lost to insects	$12,410,815	$19.45
Total Losses + Costs	$27,717,392	$43.44

Stink Bug Composition

Species	% of SB
Brown	33
Brown Marmorated	6
Green	60
Redbanded	0
Redshouldered	0
Southern Green	1
Total (make it 100%)	100

Insecticide Bioassays 2024 Striped Cucumber Beetle

Report to MarDel Watermelon Association
October 18, 2024

Background: Evidence from small plot trials in 2020 and 2021 suggested decreased pyrethroid efficacy for striped cucumber beetles in Salisbury MD and Georgetown DE. These plot trials were followed up with leaf spray bioassays in which freshly treated watermelon leaves treated via backpack sprayer at 40-50 GPA were placed in petri dishes with 5 cucumber beetles for 24 hours. Little mortality was observed from any pyrethroid treatment (Mustang 4 fl oz, Brigade 6.4 fl oz, Hero 10.3 fl oz), but greater mortality at higher-than-labeled rates of Brigade. Beetles appeared to be avoiding treated surfaces. Bioassays with carbaryl and acetamiprid resulted in rapid mortality. Here, two bioassays were used to test beetle response to bifenthrin and to cypermethrin (not currently used in cucurbit production but a standard used for assessing pyrethroid resistance in other insect species).

Bioassay 1: Organza fabric bags were dipped in insecticide solutions (equivalent to Mustang, 4.0 fl oz/A and 0.4 fl oz/A and Brigade, 6.4 fl oz/A and 0.64 fl oz/A dissolved in water at a 40 gallon per acre rate). Bags were allowed to air dry and 10 beetles were placed in each bag. Treated bags were also sent to Dr. Tom Kuhar to assess beetle response from Virginia. Control bags were dipped in water. Bags were hung from a shelf in the laboratory at room temperature. High levels of mortality in the control (>50%) at both Virginia and Delaware necessitated that another bioassay be developed.

Bioassay 2: Glass vial assays are used to assess corn earworm resistance to pyrethroids. In this bioassay, 20-mL scintillation vials were treated with technical grade active ingredient dissolved in acetone. Vials were rolled as the acetone evaporated to ensure an even coating of active ingredient. Control vials were treated with acetone only. Five striped cucumber beetles were placed in vials and given a very small piece of cucumber (about the size of 1 beetle) to serve as a moisture and food source (it was hypothesized that dehydration in the fabric bags caused high mortality in the control bags). Beetles tended to congregate on the cucumber slice. A minimum of 5 replicates per treatment were performed.

Results:

Treated glass vial bioassay % Alive Striped cucumber beetles per treatment and location.

Locati	**UTC**	**0.5 ug Cypmthrn**	**5 ug Cypmthr**	**0.5 ug Bfnthrn**	**5 ug Bfnthrn**
Asbury N (July 8), 5 reps	100 a	68.0 ± 13.6 b	0.0 c	44.0 ± 7.5 b	0.0 c
Georgetn, DE (11 June), 5 reps	100	95.2	0	100	33.3
DelmarE (26 July), 12 reps	100	68.3	30	85	45
SeaforE (26 July), 8 reps	100	80	87.5	90	37.5
Hurlock (27 July)reps)	100	84.4	28.9	85	2.5

Asbury population collected from (40.677069, -75.036347). ANOVA: $P < 0.001$; $F_{4,20} = 39.43$

Cucumber beetles collected in Virginia where initially tested in the organza fabric mesh bags but experienced high levels of mortality in the control treatment. Beetles exposed to cypermethrin-treated screens in insect traps in another experiment quickly died, but no additional pyrethroid testing was performed. At this time, evidence from this and related testing and small plot trials points towards pyrethroid susceptibility in mainland Virginia striped cucumber beetle populations.

Additional rates were tested from Georgetown DE on beetles collected on July 27 and 8 August:

TRT	**Date**	**% Alive**
Contol	27-July	76
Contol	8-Aug	100
0.5 ug Crmethrin	27-July	16
0.5 ug Crmethrin	8-Aug	96.7
1.0 ug Crmethrin	8-Aug	76.7
2.5 ug Crmethrin	8-Aug	60.0
5.0 ug Crmethrin	27-July	0
15.0 ug Cypermethrin	27-July	0
0.5 ug Bfenthrin	27-July	52
0.5 ug Bfenthrin	8-Aug	96.7
1.0 ug Bfenthrin	8-Aug	96.7
2.5 ug Bfenthrin	8-Aug	56.7
5.0 ug Bfenthrin	27-July	0
15 ug Bfenthrin	27-July	0

August 8 treatments were replicated 6 times

Discussion:

These trials suggest that the Bifenthrin LD50 as measured in the glass vial assay is very near 2.5 ug and that the response curve is steeper for bifenthrin. Further bioassay refinement is necessary. We did not run assays without the small slice of cucumber, but may need to modify the assay by removing it. Beetles congregating on the cucumber to feed may have resulted in less contact with treated vial surfaces reducing beetle response and resulting in greater response variation among Delmarva populations. However, there does appear to be a marked reduction in beetle response to pyrethroid challenge between Delmarva and New Jersey populations. It may be that in a field setting, beetles are able to quickly find refuge in the field to reduce their exposure to a lethal concentration and resume activity once residue degrades sufficiently. This behavior, coupled with what appears to be a reduced sensitivity to pyrethroids in the Delmarva population, explains variation in plot trial work and supports guidance not to rely on pyrethroids for striped cucumber beetle management in Delaware and Maryland. The New Jersey population appears to be sufficiently susceptible to pyrethroids, but beetles from cucurbit farms in close proximity spatially and temporally should be periodically tested.

Pheromone Lure Evaluation 2024 Corn Earworm

Experiment 1. Experimental lures were compared on producer farms in a randomized design with 4 replicates. Traps were placed along the perimeter of a commercial sweet corn field from late whorl stage to harvest. Traps were originally placed in a field in Magnolia, DE (39.0638880, -75.4892370) on 12 June. Once the sweet corn was harvested and destroyed, traps were redeployed along a mid-whorl stage sweet corn field in Laurel DE on 9-July (38.5095010, -76.5121040). On 3-Sept, traps were relocated to a early silking sweet corn field in Concord, DE (38.6400130, -75.5211840). Traps were checked twice weekly. Traps were not rotated during the experiment. Traps were separated by 200-250 feet.
The Hercon lures were replaced on 27-June, 12-July, 23-July, 9-Aug, 23-Aug, and 6-Sept. The Trece lures were replaced on 12-July and 9-Aug. The 3138 lure was replaced on 23-July. The 2900 lure was not replaced.

Lure	**17-June**	**24-June**	**27-June**	**1-July**	**5-July**	**8-July**	**12-July**	**16-July**	**19-July**
Hern	1.5 ± 0.9	0.5 ± 0.3	1.0 ± 0.4 ab	2.5 ± 0.6 b	6.8 ± 3.2 b	1.3 ± 0.9 b	5.0 ± 1.8	1.3 ± 0.9 b	5.8 ± 3.8
Trece	1.8 ± 1.4	0.3 ± 0.3	0.3 ± 0.3 ab	0.3 ± 0.3 b	1.3 ± 0.9 b	0.5 ± 0.5 b	0.3 ± 0.3	7.3 ± 7.3 ab	0.8 ± 0.3
3138	7.8 ± 3.9	1.5 ± 0.9	0.0 b	0.8 ± 0.5 b	7.0 ± 3.9 b	1.5 ± 0.9 b	0.0	1.5 ± 1.5 b	0.0
2900	---	10.0 ± 4.8	11.0 ± 5.2 a	58.3 ± 26.5 a	110.0 ± 47.1 a	36.0 ± 17.0 a	5.8 ± 3.8	30.5 ± 10.7 a	31.5 ± 14.7
ANO	*P = 0.183 F = 2.06; df = 2, 9*	*P = 0.044 F = 3.66; df = 3, 12*	*P = 0.032 F = 4.11; df = 3, 12*	*P = 0.022 F = 4.65; df = 3, 12*	*P = 0.019 F = 4.92; df = 3, 12*	*P = 0.031 F = 4.18; df = 3, 12*	*P = 0.153 F = 2.11; df = 3, 12*	*P = 0.025 F = 4.50; df = 3, 12*	*P = 0.058 F = 3.39; df = 3, 11*

Lure	**23-July**	**30-July**	**2-Aug**	**5-Aug**	**9-Aug**	**12-Aug**	**15-Aug**	**19-Aug**	**23-Aug**
Hern	9.0 ± 5.8 b	32.0 ± 9.2 b	46.8 ± 15.1 b	53.5 ± 20.5 ab	71.3 ± 31.5 b	11.0 ± 4.5 b	14.0 ± 9.0 ab	11.8 ± 7.0 b	2.0 ± 1.4 b
Trece	0.0 b	0.7 ± 0.3 b	2.5 ± 1.3 b	2.3 ± 1.2 b	8.0 ± 1.5 b	2.3 ± 0.9 b	2.3 ± 1. b1	0.8 ± 0.5 b	2.5 ± 0.9 b
3138	0.3 ± 0.3 b	20.3 ± 8.6 b	21.0 ± 10.5 b	25.7 ± 9.9 b	26.5 ± 16.7 b	4.3 ± 1.8 b	1.3 ± 0.3 b	3.3 ± 2.4 b	0.0 b
2900	81.3 ± 19.7 a	144.0 ± 18.2 a	114.5 ± 15.8 a	104.5 ± 23.6 a	264.3 ± 51.5 a	76.8 ± 12.5 a	41.7 ± 17.0 a	169.5 ± 30.0 a	22.8 ± 2.3 a
ANO	*P <0.001 F = 20.02; df = 3, 11*	*P <0.001 F = 29.71; df = 3, 11*	*P <0.001 F = 16.26; df = 3, 12*	*P = 0.014 F = 6.71; df = 3, 8*	*P = 0.001 F = 12.73; df = 3, 10*	*P <0.001 F = 28.14; df = 3, 12*	*P = 0.035; df = 3, 9*	*P <0.001 F = 25.46; df = 3, 11*	*P <0.001 F = 57.18; df = 3, 12*

Lure	26-Aug	30-Aug	3-Sept	6-Sept	10-Sept	13-Sept	18-Sept	20-Sept	25-Sept
Hern	3.8 ± 3.4 b	4.5 ± 3.2	4.0 ± 3.3 b	6.3 ± 3.3 ab	3.0 ± 2.0 b	35.8 ± 14.9	15.0 ± 7.5	4.5 ± 2.6	9.0 ± 4.7
Trece	0.3 ± 0.3 b	2.0 ± 1.1	1.0 ± 0.4 b	2.5 ± 0.5 b	0.8 ± 0.8 b	2.3 ± 1.4	1.3 ± 0.8	3.8 ± 1.9	9.8 ± 4.3
3138	0.8 ± 0.8 b	0.8 ± 0.5	3.0 ± 2.0 b	3.3 ± 2.6 b	2.5 ± 2.5 b	1.0 ± 0.7	1.5 ± 0.9	2.3 ± 1.3	1.5 ± 0.9
2900	39.8 ± 9.5 a	77.8 ± 12.6	73.3 ± 4.0 a	73.3 ± 34.5	90.3 ± 37.8 a	21.5 ± 7.3	28.0 ± 12.7	11.0 ± 4.9	27.3 ± 13.1
ANO	*P <0.001 F = 14.29; df = 3, 12*	*P <0.001 F = 33.37; df = 3, 12*	*P <0.001 F = 157.21; df = 3, 12*	*P = 0.020 F = 5.23; df = 3, 10*	*P = 0.004 F = 7.87; df = 3, 11*	*P = 0.035 F = 3.98; df = 3, 12*	*P = 0.073 F = 2.99; df = 3, 12*	*P = 0.232 F = 1.64; df = 3, 12*	*P = 0.137 F = 2.23; df = 3, 12*

Experiment 2. Hercon and 2900 lures were paired at three separate sweet corn fields in Delaware from 16-Aug to 1-Oct.

Site 1: Dover, DE (39.1191603, -75.5712286); approximately 300 ft separation

Hercon lure replaced 19-Sept; 4-Sept

Traps rotated 19-Sept, 4-Sept

Traps removed 1 Oct

Site 2: Laurel, DE (38.4996074, -75.4965529); approximately 1,200 ft separation

Hercon lure replaced 9-Sept

Site 3: Milton, DE (38.7410370, -75.3191261); approximately 500 ft separation

Hercon lure replaced: 1-Oct, 19-Sept, 3-Sept

Traps rotated: 19-September, 3-Sept

Dover, DE

Date	2900	Hercon
19-Ag	146	105
23-Au	30	119
30-Au	90	57
4-St	175	112
7-St	122	43
10-St	42	17
13-St	62	37
16-St	58	16
19-St	26	15
23-St	13	13
27-St	3	0

Laurel, DE

Date	2900	Hercon
20-Ag	300	183
6-Set	940	941
9-Set	60	34
12-St	73	76
18-St	45	46
25-St	25	24
1-O	14	25

Milton, DE

Date	2900	Hercon
19-Ag	212	180
23-Ag	258	149
26-Ag	474	238
30-Ag	499	147
3-Sep	327	95
7-Sep	104	78
10-St	73	46
12-St	80	29
16-St	79	17
19-St	12	3
26-St	48	28
1-Oct	22	11

Spotted Wing Drosophila 2024 Parasitoid Release

Spotted wing drosophila (SWD) is a significant pest of blueberries, caneberries, cherries and later maturing strawberry. Since its introduction and spread across the United States from 2008-2012, famers have heavily relied upon insecticide application to prevent unacceptable damage. SWD is native to Asia where multiple parasitoid wasps attack it. In the US, few parasitoids attack SWD and none do so to any significant effect. USDA has been evaluating parasitoids collected from SWD's native range under quarantine and are now releasing *Ganaspis brasiliensis*. The purpose of this project was to facilitate its establishment in Kent and Sussex counties Delaware at release sites that contained multiple SWD hosts and in close proximity to agricultural beneficiaries.

Approximately 300 *Ganaspis brasiliensis* wasps received from BIIRL were released on August 9th, September 6th, and October 3rd on the following three locations:

- Harrington (38.970288, -75.578797)
- Oakley (38.771246, -75.489555)
- Frankford (38.531473, -75.201474)

Fruit samples from reported SWD hosts were collected 7 times from each farm. Fruit samples consisted mostly of pokeweed at the Harrington site; pokeweed, elderberry, Hercules club, pawpaw and blackberry at the Oakley site, and at the Frankford site pokeweed, wild grape, and Hercules club.

Parasitoid wasps were recovered from fruit samples in low numbers. Three were collected from samples taken prior to the first parasitoid release on August 9, suggesting they are not the target species of interest. Parasitoids are being sent to BIIRL for identification. Low numbers of suspected SWD emerged from fruit samples. Many other Drosophilid flies also emerged from fruit samples. Suspected SWD and parasitoids were placed in alcohol and await confirmation.

Fruit collection

Location	**Date**	**# Berries**	**Wt. Berries (g)**
Frnkford	8 Jul	663	461.6
	5 Aug	465	151.8
	16 A	1596	537.4
	6 Sep	1580	648.9
	12 Se	872	872.0
	25 Se	1327	239.4
	7 Oct	322	102.1

Location	Date	# Berries	Wt. Berries (g)
Harrington	6 Jul	375	333.3
	5 Aug	1324	407.8
	16 A	771	211.6
	6 Se	1522	494.2
	12 Sp	900	274.7
	26 Sp	484	212.2
	8 Oc	441	152.1
Oakley	6 Jul	523	374
	6 Aug	1119	401.6
	16 A	1010	366.8
	6 Se	722	251.2
	12 Sp	435	411.1
	26 Sp	925	143.2
	8 Oc	539	97.5

Parasitoids recovered from fruit samples

Location	Number	Fruit Sample Collection Date	Parasitoid Emergence Date
Harringto	3	8/5	8/23
	2	9/26	10/1
	2	9/26	10/25
Oakley	7	9/12	10/24
Frankford	2	8/5	8/19
	1	9/6	9/20
	1	9/6	10/24

Suspected SWD Recovered from fruit samples

Location	Number	Fruit Sample Collection Date	Parasitoid Emergence Date
Harringto	1	9/6	9/27
	1	9/6	10/11
	1	9/26	10/25
	1	10/8	10/25
Oakley	1	8/16	10/1
	3	9/26	10/24
Frankford	1	9/6	10/24
	4	9/12	10/24