2021 Sweet Corn Seedcorn Maggot Management Trial

Arlington, Wisconsin, USA

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Methods

Objective: Evaluate the efficacy of five different at-plant insecticide treatments on two different sweet corn hybrids for control of seedcorn maggot (DIPTERA: *Delia platura*).

Experimental design: This trial was conducted at the University of Wisconsin's Arlington Agricultural Research Station, located 3 miles southeast of Arlington, WI, on a silt loam soil in 2021. Two separate plantings were established intended to evaluate efficacy against the second and third generation of the seedcorn maggot lifecycle, respectively. The second generation planting was established on May 26, 2021, at coordinates 43.316713, -89.335280, while the third generation planting was established Jun 23, 2021, at coordinates 43.317012, -89.333932. Each planting measured 120 ft. wide by 135 ft long, containing four replicates of 12 adjacent 10 ft (4 rows on 30 in. spacing) by 30 ft long plots, with 5 ft of unplanted space along rows separating replicates. Seed was planted using a 2-row planter equipped with a cone feeder. Each 30 ft. row received 45 seeds, for an approximate seed spacing of 8 in.

Treatments: Two sweet corn hybrids were used in this experiment: Syngenta GS 1453 was used for treatments 1-6, while Seminis SV1339SK was used for treatments 7-12. All seed was treated with the fungicides 42-S Thiram (5 fl oz/cwt), Apron XL (0.32 fl oz/cwt), Dividend Extreme (5 fl oz/cwt), Maxim 4FS (0.08 fl oz/cwt), and Vitavax 34 (3.6 fl oz/cwt). Insecticide treatments were as follows: treatments 1 and 7 received Poncho 600 (0.5 mg ai/seed), treatments 2 and 8 received Cruiser 5FS (0.25 mg ai/seed), treatments 3 and 9 received no insecticide, treatments 4 and 10 received Reatis (0.25 mg ai/seed), treatments 5 and 11 received Entrust (0.25 mg ai/seed), and treatments 6 and 12 received Fortenza (0.25 mg ai/seed). See **Table 1** for treatment details.

Table 1. Treatment details

		Syngenta GS 1453						Seminis SV1339SK					
Product	**Unit**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
42-S Thiram	fl oz/cwt	5	5	5	5	5	5	5	5	5	5	5	5
Apron Xl	fl oz/cwt	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Dividend Extreme	fl oz/cwt	5	5	5	5	5	5	5	5	5	5	5	5
Maxim 4FS	fl oz/cwt	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Vitavax 34	fl oz/cwt	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Poncho 600	mg ai/unit	0.5						0.5					
Cruiser 5FS	mg ai/unit		0.25						0.25				
Reatis	mg ai/unit				0.25						0.25		
Entrust	mg ai/unit					0.25						0.25	
Fortenza	mg ai/unit						0.25						0.25

Treatment products are shown in rows, with treatment numbers and corresponding rates are shown in columns. Hybrid variety is shown above treatment numbers.

Evaluation: Stand counts were performed in rows 2 and 3 in both plantings at two time points to evaluate seedling effects of either seedcorn maggot (SCM) damage or treatment-related delayed emergence. Stand counts were performed in the first planting on Jun 7 (12 days after planting, crop stage V1) and Jun 14 (19 days after planting, crop stage V2-V3). Stand counts in the second planting were performed on Jul 1 (8 days after planting, crop stage V1) and Jul 7 (14 days after planting, crop stage V2-V3). During the first stand count in both plantings, seedling damage was assessed by walking four paces into each plot and digging up five seedling in row 1 of the plot. The number of damaged plants, the number of plants with seedcorn maggot larvae present, and the total number of larvae present on the five seedlings was recorded.

Data analysis: Evaluation data was analyzed in R version 4.1.0 (R-Core Team, 2021). Stand counts are reported as percentage of total seeds planted (90 per two rows). Insect counts were log(x + 1) transformed. All response variables were analyzed using analysis of variance of a fitted linear model with the formula *response = hybrid * insecticide + rep.* This formula incorporates the hybrid corn variety, the insecticide, and the replicate as main effects, and the hybrid:insecticide interaction term.

Results – First planting

Stand counts: There was slightly higher emergence rate in the Seminis hybrid at the first stand count, particularly evident in the Entrust and Reatis treatments (F=4.938, P=.033). In addition, there was a significant difference in emergence between insecticide treatments across both hybrids in both the first stand count (F=5.800, P=.0006) and the second stand count (F=5.972, P=.0005). Entrust and Reatis improved stand count the most, with an estimated 12.8% and 11.1% increase versus control in the second stand count. Fortenza improved stand by 9.4%, while Cruiser and Poncho improved stand by 8.9% over control.

Insect damage: There was no significant difference between hybrids or insecticide treatments in the number of healthy plants per plot or in the number of SCM larvae found per 5 plants.

Results – Second planting

Stand counts: There was a greater difference in stand counts between hybrids in the second planting compared to the first planting, though similarly the Seminis hybrid had higher emergence. At the first count, the Syngenta plots has about 8.3% lower emergence versus the Seminis plots (F=34.715, P<.0001). There was also a significant difference in emergence between insecticides, with Reatis (+5.3% vs UTC) and Poncho (+1.7%) outperforming the other treatments (F=2.723, P=.036). At the second stand count, the difference between hybrids was more modest, with an average of 3.1% higher emergence in the Seminis plots (F=11.330, P=.002). Emergence differences among insecticide treatments were also apparent, with Reatis (+8.9% vs UTC) and Cruiser (+3.3%) outperforming the other treatments (F=2.224, P=0.075).

Insect damage: Unlike the first planting, there were significant differences in the number of damaged plants (F=2.888, P=0.029) and the number of larvae per 5 plants (F=5.635, P=0.003) between insecticide treatments. Cruiser and Poncho treatments had the lowest number of damaged plants, though results were mixed overall.

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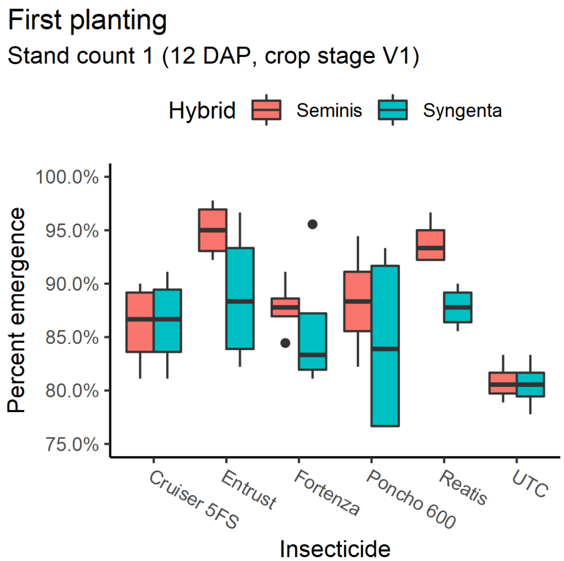
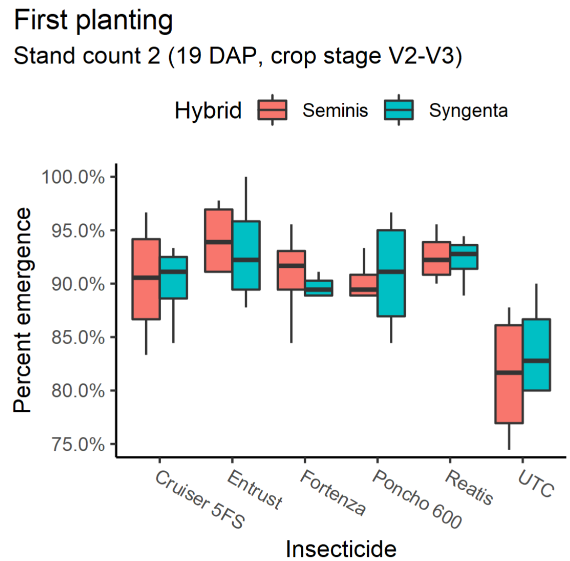
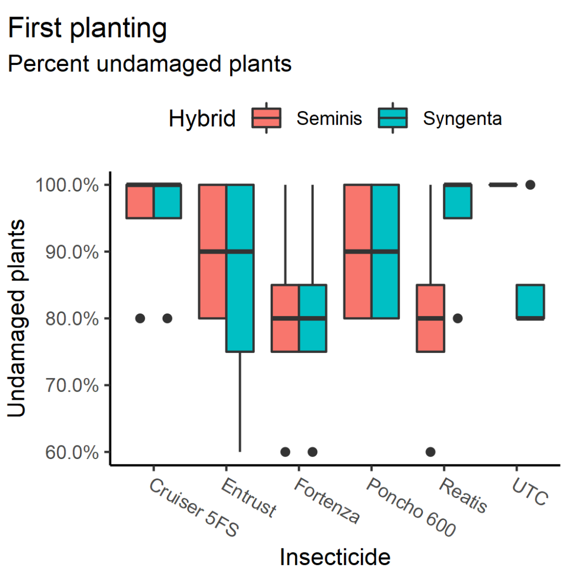
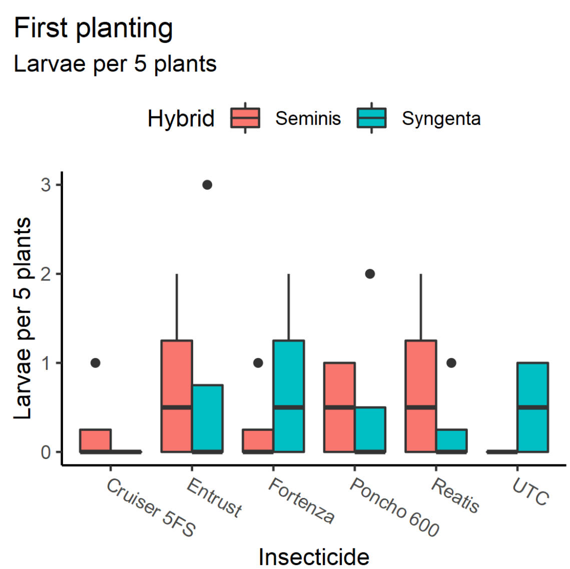
First planting (May 26, colonized by second gen SCM)





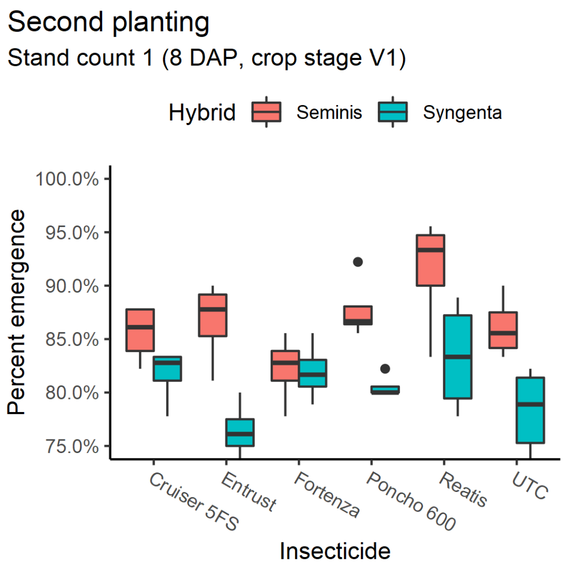


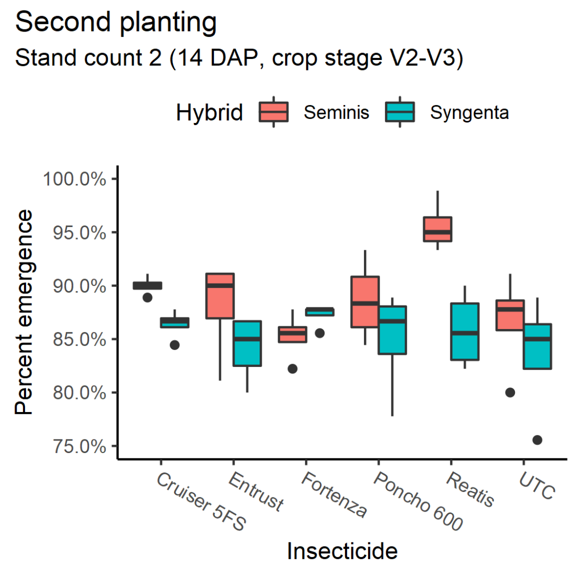


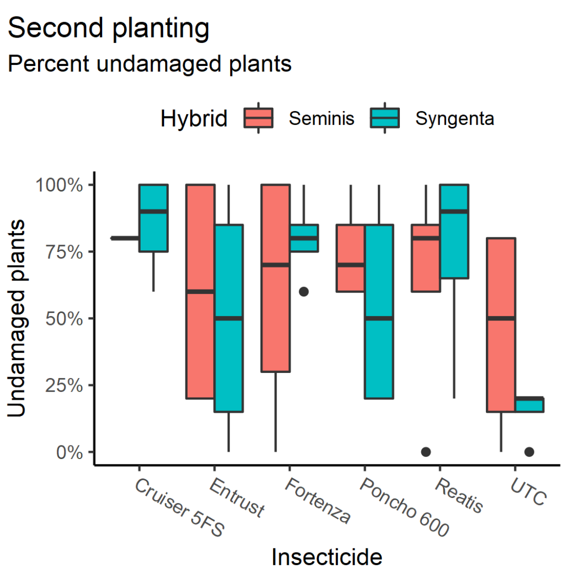
Statistical tests, first planting

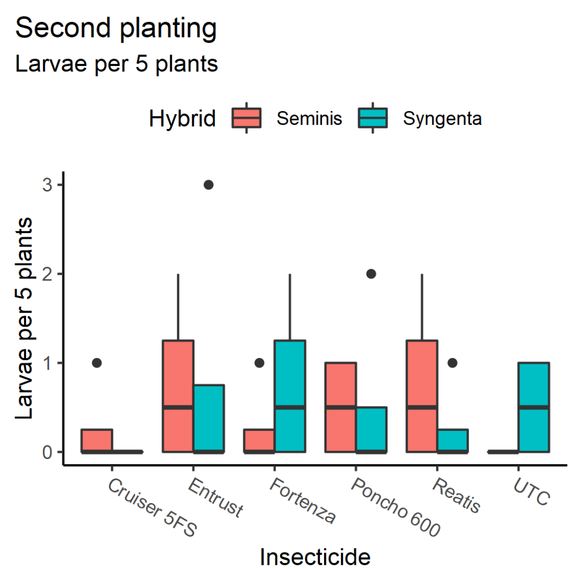
		Stand Ct 1			Stand Ct 2			Healthy plants			Larvae per 5 plants		
Factor	**df**	**F**	**P-value**	**Sig.**	**F**	**P-value**	**Sig.**	**F**	**P-value**	**Sig.**	**F**	**P-value**	**Sig.**
Hybrid	1, 33	4.938	0.033	*	0.001	0.971	ns	0.051	0.823	ns	0.000	1.000	ns
Insecticide	5, 33	5.800	0.0006	***	5.972	0.0005	***	1.312	0.283	ns	0.505	0.770	ns
Rep	3, 33	1.104	0.361	ns	0.582	0.631	ns	1.000	0.405	ns	0.595	0.623	ns
Hybrid*Insec.	5, 33	0.717	0.616	ns	0.187	0.965	ns	1.149	0.355	ns	0.625	0.682	ns

Second planting (Jun 23, colonized by third gen SCM)









Statistical tests, second planting

		Stand Ct 1			Stand Ct 2			Healthy plants			Larvae per 5 plants		
Factor	**df**	**F**	**P-value**	**Sig.**	**F**	**P-value**	**Sig.**	**F**	**P-value**	**Sig.**	**F**	**P-value**	**Sig.**
Hybrid	1, 33	34.717	<.0001	***	11.330	0.002	**	0.231	0.634	ns	0.002	0.965	ns
Insecticide	5, 33	2.723	0.036	*	2.224	0.075	.	2.888	0.029	*	5.740	0.001	***
Rep	3, 33	0.461	0.712	ns	0.016	0.997	ns	5.274	0.004	**	5.635	0.003	**
Hybrid*Insec.	5, 33	1.897	0.121	ns	1.936	0.115	ns	0.806	0.554	ns	0.532	0.750	