

Supplemental material

Table S1. Statistics (*F*, *DF*, *P*) for mean adult and larval thrips density repeated measures analyses using PROC GLIMMIX (SAS, Cary, NC).

Effect	DF	Adult Thrips (<i>F</i> , <i>P</i>)		Larval Thrips (<i>F</i> , <i>P</i>)	
		2018	2019	2018	2019
date	6, 404	336.7, <0.0001	277.76, <0.0001	61.58, <0.0001	181.97, <0.0001
mulch	1, 8	5.91, 0.0412	62.11, <0.0001	3.82, 0.0863	33.49, 0.0004
mulch*date	6, 404	8.62, <0.0001	8.8, <0.0001	12.76, <0.0001	9.28, <0.0001
cult	2, 18	0.76, 0.4825	10.42, 0.001	9.19, 0.0018	13.46, 0.0003
mulch*cult	2, 18	0.08, 0.9267	2.81, 0.087	0.38, 0.6881	3.16, 0.0669
cult*date	12, 404	1.32, 0.2031	2.14, 0.014	2.89, 0.0007	4.46, <0.0001
mulch*cult*date	12, 404	0.71, 0.7402	0.31, 0.9884	0.8, 0.6459	2.06, 0.0186
insecticide	1, 404	2.63, 0.1055	632.34, <0.0001	275.51, <0.0001	781.2, <0.0001
mulch*insecticide	1, 404	0.29, 0.5879	2.74, 0.0987	3.89, 0.0492	3.77, 0.0527
cult*insecticide	2, 404	0.87, 0.4211	1.49, 0.2275	0.5, 0.6071	1.51, 0.222
insecticide*date	6, 404	1.61, 0.1436	123.5, <0.0001	14.59, <0.0001	85.87, <0.0001
mulch*insecticide*					
date	6, 404	1.14, 0.3397	2.77, 0.0118	1.17, 0.3215	0.6, 0.7333
cult*insecticide*					
date	12, 404	0.38, 0.9696	1.01, 0.4359	0.5, 0.9132	1.56, 0.1022

¹ Values in bold are significant at $\alpha=0.05$.

Table S2. Statistics (*F*, *DF*, *P*) for proportion of large onion bulbs (diameter >7.3 cm) and mean total yield (metric tons/ha) analyses using PROC GLIMMIX (SAS, Cary, NC).

Effect	DF	Marketable Yield (metric tons/ha) (<i>F</i> , <i>P</i>)		Proportion Large Bulbs (<i>F</i> , <i>P</i>)	
		2018	2019	2018	2019
mulch	1, 5	0.09, 0.7766	1.01, 0.3602	0.04, 0.8518	4.70, 0.0824
cult	2, 20	97.68, <0.0001	27.41, <0.0001	68.45, <0.0001	35.79, <0.0001
mulch*cult	2, 20	3.30, 0.0578	0.17, 0.8486	4.80, 0.0198	0.06, 0.9404
insecticide	1, 32	32.69, <0.0001	148.02, <0.0001	116.87, <0.0001	288.55, <0.0001
cult*insecticide	2, 32	2.52, 0.0965	17.18, <0.0001	9.71, 0.0005	10.45, 0.0003
mulch*insecticide	1, 32	1.09, 0.3049	0.99, 0.3273	0.26, 0.6164	26.89, <0.0001

¹ Values in bold are significant at $\alpha=0.05$.

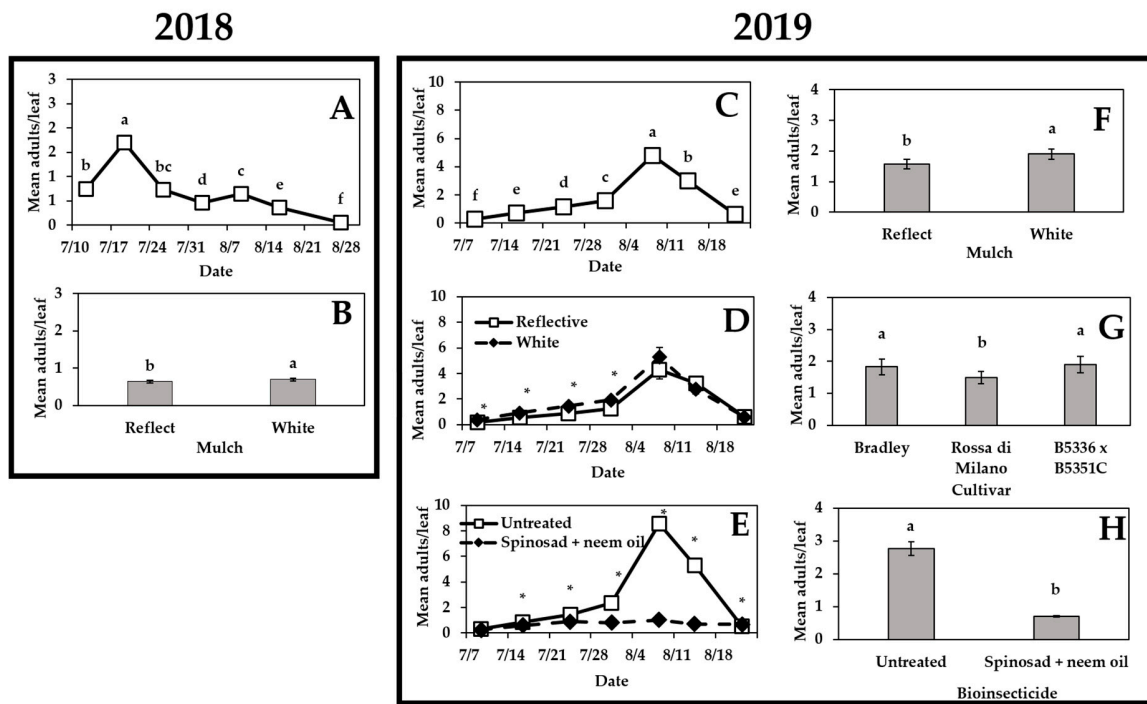


Figure S1. Significant lower order effects of interactions on adult thrips densities not included in the main text. Effects of date (A, C), mulch (B, F), cultivar (G), bioinsecticide (H), and the interactions of mulch by date (D), and bioinsecticide by date (E) on mean (\pm SE) adult thrips densities in Geneva, New York, USA. Thrips densities are calculated as thrips/leaf. Means with asterisks (*) or different letters are significantly different at $\alpha = 0.05$ using Tukey's LSD posthoc test. Letters are listed from top to bottom in the order of treatments in the legend.

2018

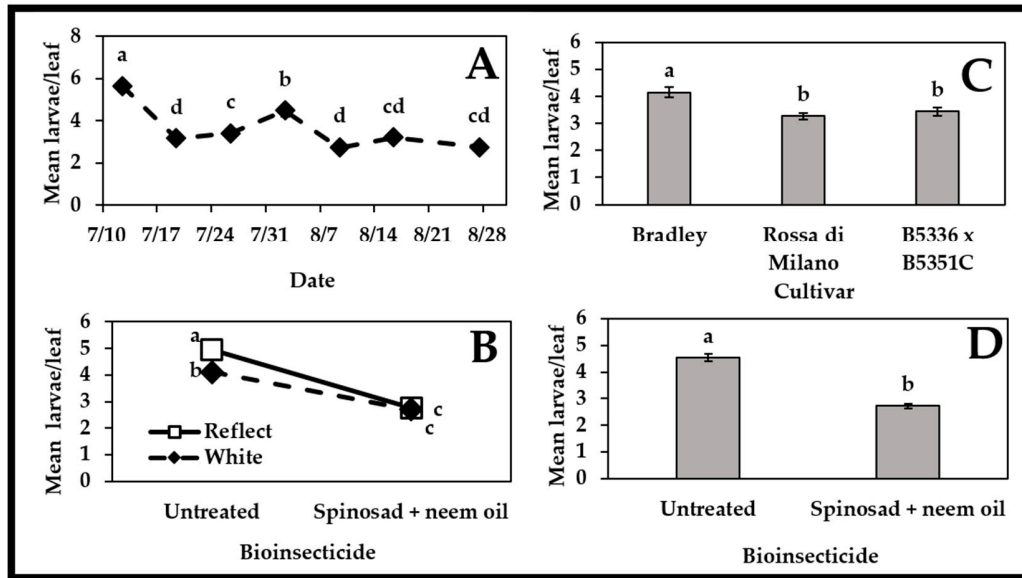


Figure S2. Significant lower order effects of interactions on larval thrips densities not included in the main text in the 2018 trial. Effects of date (A), the interaction of mulch by bioinsecticide (B), cultivar (D), and bioinsecticide (E) on mean (\pm SE) adult thrips densities in Geneva, New York, USA. Thrips densities are calculated as thrips/leaf. Means with asterisks (*) or different letters are significantly different at $\alpha = 0.05$ using Tukey's LSD posthoc test. Letters are listed from top to bottom in the order of treatments in the legend.

2019

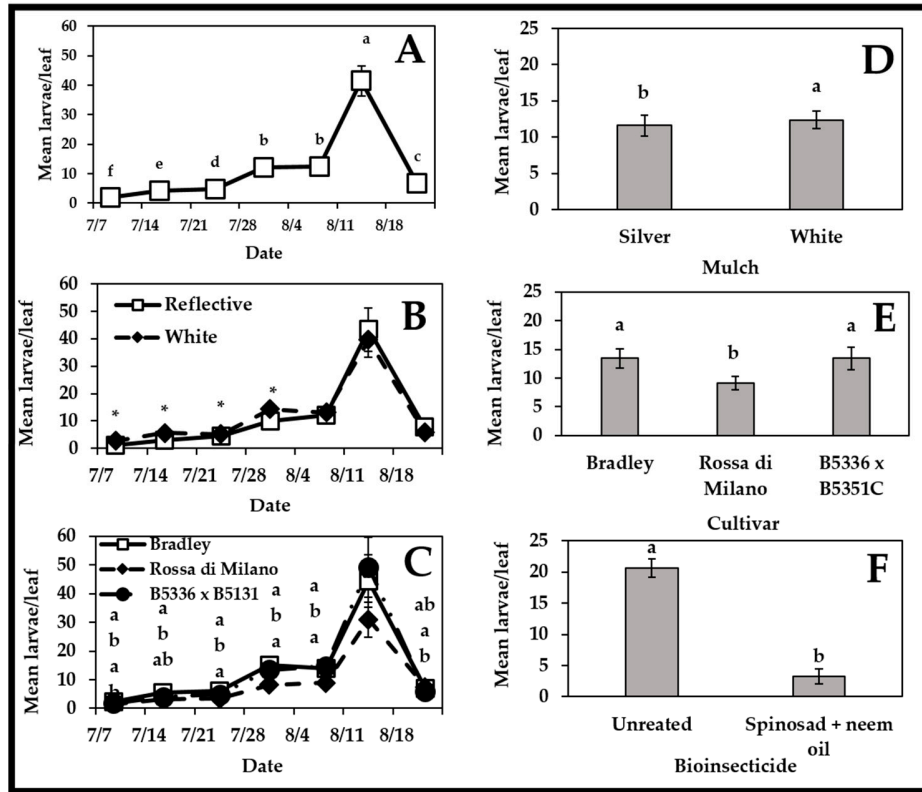


Figure S3. Significant lower order effects of interactions on larval thrips densities not included in the main text in the 2019 trial. Effects of date (A), the interactions of mulch by date (B) and cultivar by date (C), mulch (D), cultivar (E), and bioinsecticide (F) and on mean (\pm SE) adult thrips densities in Geneva, New York, USA. Thrips densities are calculated as thrips/leaf. Means with asterisks (*) or different letters are significantly different at $\alpha = 0.05$ using Tukey's LSD posthoc test. Letters are listed from top to bottom in the order of treatments in the legend.

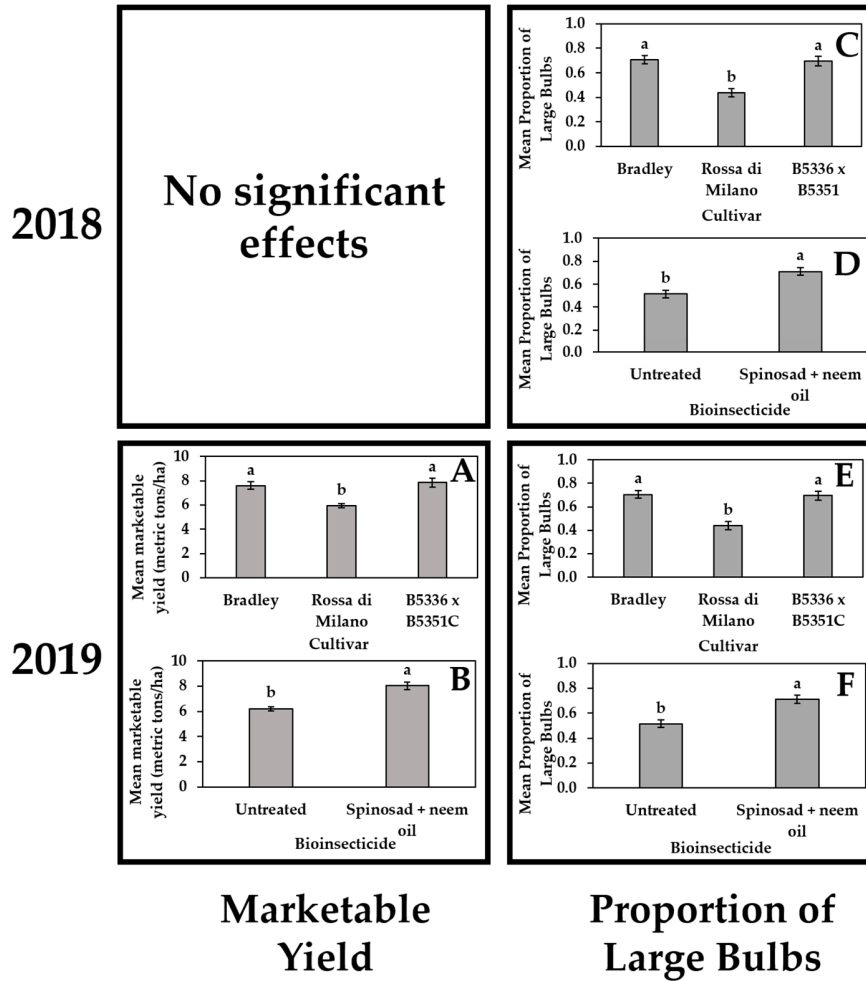


Figure S4. Significant lower order effects of interactions on bulb yield not included in the main text. Effects of cultivar (A, C, E) and bioinsecticide (B, D, F) on mean (\pm SE) marketable yield (metric tons/ha, A, B) and the mean (\pm SE) proportion of large bulbs (C-F) in 2018 (C, D) and 2019 (A, B, E, F) in Geneva, New York, USA. There were no significant effects on marketable yield not already included in the main text in the 2018 trial. Large bulbs are defined as having a diameter >7.3 cm. Means with different letters are significantly different at $\alpha = 0.05$ using Tukey's LSD posthoc test.