

## **Using IPM Methods for Dealing with Major Insect Pests of Dahlias**

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In the spring of 2018, Nick Weber of the Maryland Dahlia Society asked us to develop an IPM approach for dealing with insect and mite pests of dahlia plantings. Over the years we have developed many biological control programs for greenhouse crops with good success rates. We decided that a combination of systemic chemical and biological control releases could work well. Working closely with Nancy Rechcigl of Syngenta, Bell Nursery of Burtonsville, Jan Meneley of AgBio of Westminster, CO, and Koppert Company, we analyzed several products before settling on use of Mainspring drenches applied twice during the year combined with predacious mite releases, use of banker plants, use of predacious insects, and pheromone and food baited sticky traps.

The first step was obtaining seed from Ball International of an ornamental pepper called “Purple Flash.” We used Purple Flash since it had a characteristic of continual blooming during the growing season. These pepper plants would be utilized as a banker plant to produce pollen and nectar to feed a predacious bug called Orius, used to control thrips. The seed were turned over to Bell nursery in March to start growing the pepper plants. Pepper plants are slow to get going and

we needed them in bloom by mid-summer, so 3 months needed to be allotted to have them in bloom for our Maryland growing season.

The dahlia tubers were planted at two sites. One in Brookeville, Heritage Rosarium owned by Nick Weber and the other in Damascus, MD, owned by John Spangenburg . At both sites the tuber were planted in late May of 2018. We have treated blocks and conventional treated blocks of plants. On the treated blocks we made a soil drench of Mainspring at a rate of 8 oz. /100 gallons of water. Each plant drenched at the base with 8 oz. (237 mL or .24 L) of prepared liquid solution.

Mainspring™ GNL is a suspension concentrate (SC) formulation containing 1.67 pounds of cyantraniliprole per gallon. Cyantraniliprole belongs to the anthranilic diamide chemical class, introducing a new class of chemistry in IRAC Group 28 to ornamental insect control. Mainspring quickly stops insect feeding after ingestion. It is compatible with many beneficial insects and mites.

This Mainspring application provided protection from aphids and thrips feeding on foliage and dahlia stems. The two common species of aphids found on dahlias are green peach aphid and melon aphid. Plants were monitored on a weekly basis and no aphids were detected in the first 12 weeks of growth. Also, no thrips populations were found on treated plants.

We obtained *Amblyseius cucumeris* mites, a predatory mite that feeds on thrips nymphs. This species of thrips predatory mite has been used for prevention, control, and maintenance of various thrips species with fairly good success in greenhouse operations. The mites use sucking mouth parts to pierce and ingest contents of their prey. We purchased the mites under the name THRIPEX-PLUS from Koppert Biological Systems. For the first release we used mites in a loose grain container mix. The grain was sprinkled on foliage and flowers of dahlias. The growers found the grain mix undesirable in appearance so we switched to using *A. cucumeris* in small sachets. Each paper sachet with hook contains 1,000 predatory mites and grain mites (all stages), mixed with bran.

*Amblyseius cucumeris* performs best in temperature under 90 F (check on this temp). Normally in Maryland temperatures reach above these temperatures in July and August so we switched to the predacious mite *Amblyseius swirskii* which performs better at higher temperatures. This mite is about 2 – 3 times the cost of *A. cucumeris*. July 26, 2018 switched to *A. swirskii* LP sachets.

### *Orius*

Materials used – Two (2) 100 mL bottles containing 1000 minute pirate bugs.

Pirate bugs were sprinkled at each purple flash pepper plant at both sites on August 30, 2018.

**Application Breakdown:**

	Systemic-Mainspring®	Thripex	Swirskii	Minute Pirate Bug
Applied June 12	8 oz. of prepared solution applied as drench at base			
Released June 28		1 sachet/plant (hung) The First application was a sprinkled grain mix.		
Released July 12		1 sachet/plant (hung)		
Released July 26			1 sachet/plant (hung)	
Released Aug 13			2 sachets/plant (1 hung, 1 sprinkled)	
Released Aug 30			2 sachets/plant (1 hung, 1 sprinkled)	Sprinkled at each pepper plant
Released Sep 13		2 sachets/plant (1 hung, 1 sprinkled)		
Released Oct 4		2 sachets/plant (1 hung, 1 sprinkled)		

### Trial Cost Breakdown:

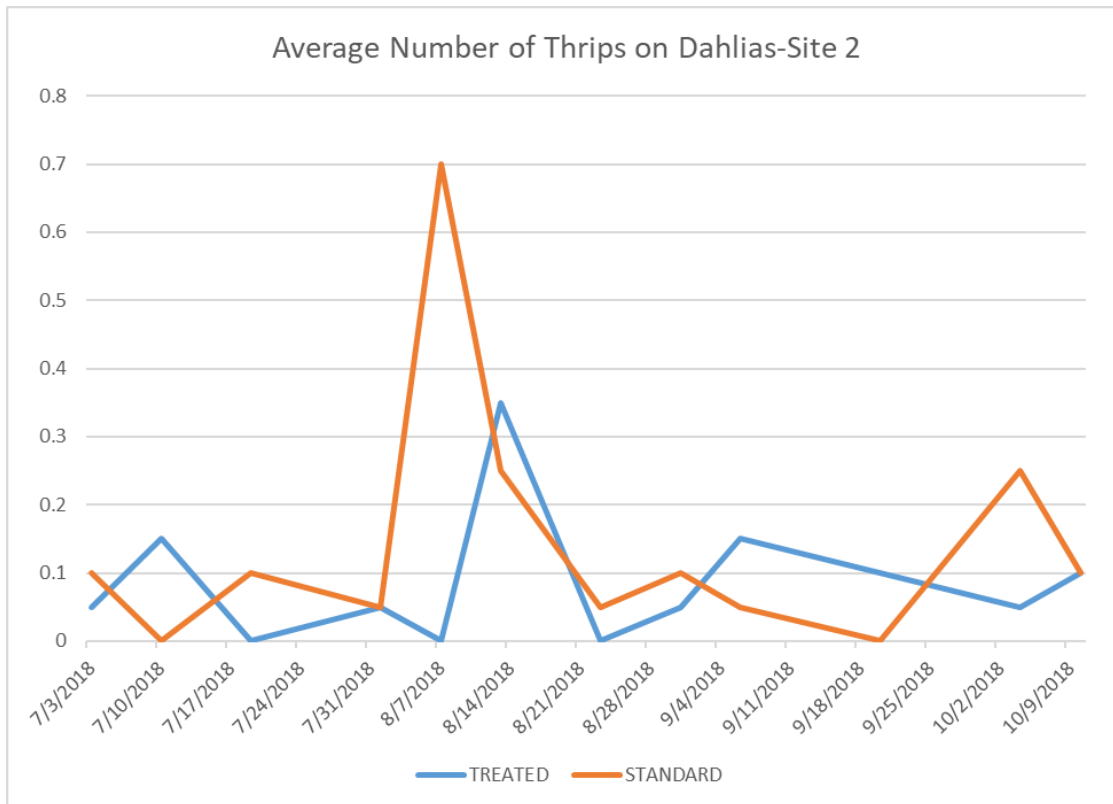
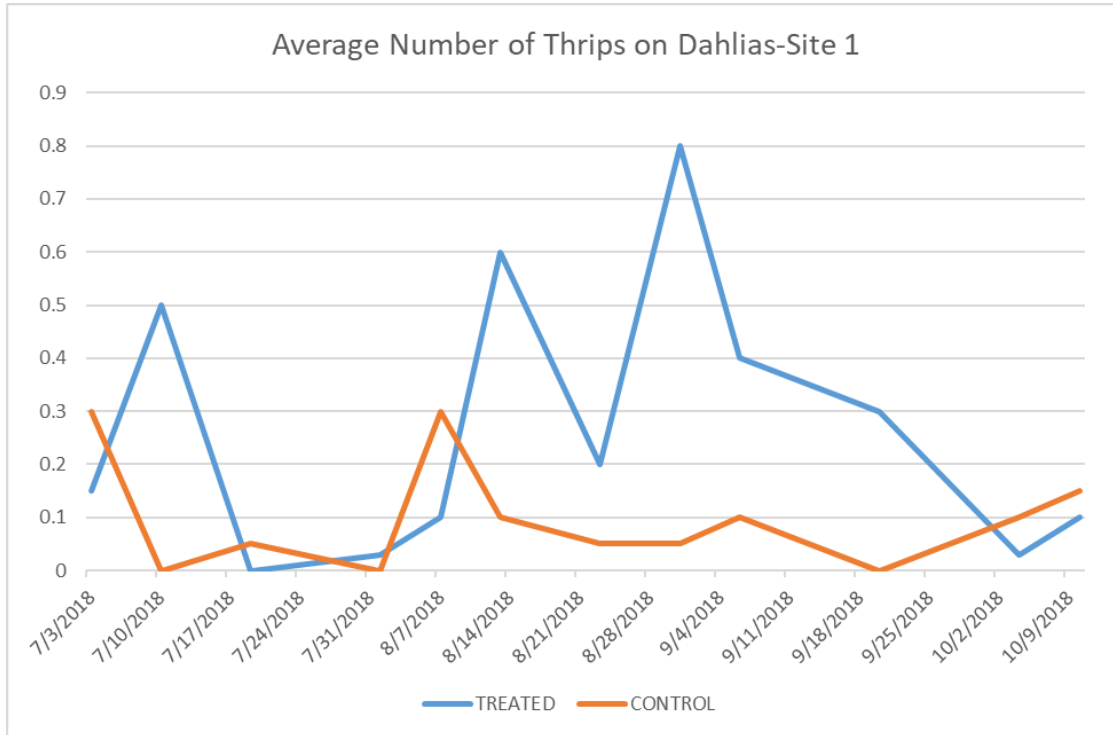
	Thripex (per 500 sachets)	Swirskii (per 500 sachets)	Minute Pirate Bug (per 2 100 ml bottle)	Shipping & Handling	Prorated price per 254 treated plants*
June 28	\$166.75			\$51.73	\$110.99 (at \$0.4369/unit)
July 12	\$166.75			\$53.41	\$111.84 (at \$0.4403/unit)
July 26		\$349.75		\$39.72	\$197.85 (at \$0.7789/unit)
Aug 13		\$349.75		\$39.72	\$197.85 (at \$0.7789/unit)
Aug 30		\$349.75	\$273.00	\$39.72	\$470.85 (at \$1.8537/unit)
Sep 13	\$166.75			\$52.87	\$111.27 (at \$0.4392/unit)
Oct 4	\$166.75			\$53.89	\$112.09 (at \$0.4412/unit)

Total Material Cost: \$2,320.31

Prorated Cost: \$1,313.04

\*Prices indicated throughout reflect the cost of purchasing the obligatory package amount. The prorated price reflects the cost of the materials that were actually applied throughout the trial.

Data is collected every week to monitor effectiveness of treatment



## Summary

Mainspring (cyantraniliprole) at 8 oz/100 gallons of water, applied as a soil drench, was excellent in controlling the aphids on the treated plants and provided control for whole growing season. The Mainspring drench applications did not impact predator releases of the predacious mites or Orius released during our study. The season of 2018 had records amount of rain both in frequency and abundance. This general suppressed both Tetranychid mite (two-spotted spider mites) and thrips activity in the growing season. The dahlias in the biological control/systemic chemical control area had a greater number of blooms and thus had a slightly higher populations of thrips in blooms. The thrips populations remained low on the conventional treated plants and the plants that were treated with chemical and biological control.

The banker plants did well and the Orius populations after the initial release remained active throughout the season. We switch from releasing *Amblyseius cucumeris* in mid summer to release of *A. swirskii*. *A. swirskii* performs better in higher temperatures and we expected normal high temperatures of July through September. *A. swirskii* cost about 3 times the cost of *A. cucumeris*.

We encountered a pest during the study that we had not anticipated – spotted cucumber beetle. Working with Jan Meneley of AgBio, Inc of Westminster, CO, we evaluated a yellow sticky card baited with pheromone and essence of cucumber extract. The traps worked well in catching and preventing feeding damage to the petal rays of the dahlias.

The quality of the plants and flowers were equally high on the conventional and biological/systemic chemical treated plants.

We would like to conduct a second year of this project, hopefully, with a less rainy season. We will try reducing the number of biological releases to reduce the cost per plant.

