The Entomology Research Laboratory

What have we been up to in 2018?

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Bringing In Un-BEE lievalbe Beneficials to Your Production Areas

Fig. 1. Habitat hedge planting of annuals at local retail greenhouse/nursery.

Habitat loss and the widespread use of chemical insecticides are major contributors to declines in beneficial insects, such as pollinators and beneficials like predators and parasites that help keep pest populations in balance. There is great interest in establishing pollinator gardens using perennials and annuals to support bees and other beneficial insects. Some beneficials play a role in both pest management and pollination. For example, many syrphid flies are pest-fighting pollinators. As adults, they pollinate and feed on pollen and nectar. The larvae of many species are predators of aphids and other pests. Planting flowering hedges within a nursery or landscape setting provides enticing habitats for these insects and may contribute to enhanced pollinator populations and fewer pest problems, thereby eliminating the need to apply pesticides. Summer 2018 was the second year of establishing diverse habitat hedges containing flowering annuals (Fig. 1). Hedges were a mixture of directly seeded or transplanted wild cosmos, sunflower, plains coreopsis, Indian blanket, blue cornflower, zinnia, sweet and royal carpet alyssum, lacy phacelia, and hero yellow marigold. Syrphid flies and the predatory bug Orius were the most frequently observed at the hedges, with these two groups averaging 64% and 25%, respectively, of the total beneficial insects recorded over two summers. Other visitors included small parasitic wasps, lady beetles, assassin, ambush and damsel bugs and tachinid fly parasite adults and eggs (on Japanese beetles). The number of beneficials within hedges ranged from a total of 0-31 insects at each observation date. Over the experiment period, of the 10 different plant species tested, the most natural enemies were observed on sunflower (28%), the alyssums (12%), zinnias (12%) and cosmos (11%). This project will continue for the nest 3 years.

View the following link about the hedges http://vermontnews-guide.com/flower-power-at-hildene/ and visit our **Landscape IPM Webpage:** https://www.uvm.edu/~entlab/Landscape%20IPM/LandscapeIPM.html

Are You Constantly Struggling with Pest Issues in Greenhouse Ornamentals & High Tunnels?

We can help *YOU!* The VT Greenhouse IPM One-on-One Program works with growers to encourage use of IPM for **greenhouse ornamentals** and **high tunnels**. Individualized goal-oriented educational programs provide hands-on learning tailored to your unique interests, skill levels and needs. Growers in general say participating in the program gave them greater confidence in their ability to identify and manage pests and they transferred this knowledge to co-workers. If you're a VT grower and would like to be a part of this program, please contact us or fill out the *"Part of the Action"* form. If you consistently struggle with pests, view the handout "*Critical Questions to Consider to Help Manage Persistent Pest Problems & Attracting and Sustaining Aphid Natural Enemies in High Tunnels'* in your folder.

Go to the following webpages for pest management information and project updates related to:
Greenhouse IPM: https://www.uvm.edu/~entlab/Greenhouse%20IPM/UVMGreenhouseIPM.html
High Tunnels: https://www.uvm.edu/~entlab/High%20Tunnel%20IPM/HighTunnelIPM.html

Saffron, A New High-Value Crop for Diversified Farmers

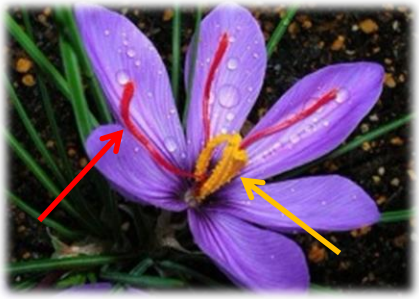

Fig. 2. Saffron is the stigmas (red arrow) of a fall-blooming crocus. The stamens (yellow arrow) are sold as food coloring.

Saffron (*Crocus sativus L.*) is the most expensive spice in the world, with a retail price of over $5,000/lb. It is commonly used as a food flavoring in Mediterranean cuisine, but also is believed to have medicinal properties which increases its economic value. Saffron is made from the flower stigmas (Fig. 2). Saffron is adapted to arid/semi-arid areas and believed to tolerate low temperatures to -4°F. When the UVM scientists started their research in 2015, they assumed safforn might not survive the cold Vermont winters, so they began by growing it in high tunnels. They tested two cultivation methods initially: in plastic milk crates and in raised beds. The hypothesis was that saffron will only survive cold Northern winters if grown in the protection of

high tunnels. If grown in crates, growers could remove them in the early spring when the corms are dormant, and store them until Sept., when the saffron blooms (2-4 wk, Oct. – Nov.). This would allow growers to use the tunnels for other high value crops from Mar.–Sept. We obtained saffron yields averaging 0.88 – 1.39 grams/meter sq., which was much greater than yields from other established saffron growing regions.Their saffron yields and quality were high. Since then they have also grown saffron outside in the field, and so far it appears that the corms can survive the cold soil temperatures that occur in USDA coldhardiness zone 4. There are many questions remaining about how best to grow saffron, but the results so far are promising. The retail price of saffron in Vermont health food stores is $19/gr, but the locally-grown product could fetch a higher price. A Vermont grower who planted 2,500 corms in 2017 produced 30 grams of saffron (5,000 flowers). She sold her crop for $25/gram for use by a New York City chef who valued the high quality and VT-grown brand. As a result of considerable media coverage, hundreds of growers across the US planted saffron for the first time in 2017. With funds from the VT Dept. of Agric., we are assessing the suitability of growing saffron in the field (not in high tunnels) in different coldhardiness zones in Vermont.

To learn more, visit our **Saffron Website**: https://www.uvm.edu/~saffron/

Saffron and Solar Farms: A Win/Win for the Environment and Agriculture

University of Vermont researchers, who demonstrated that saffron could be profitably grown in Vermont, have teamed up with Peck Solar, a Burlington-based electrical contractor and solar installer, to test the potential of growing saffron within their Vermont solar fields. To help keep their farms financially viable, farmers have been building ground-mounted solar arrays on their land instead of selling to real estate developers. This has led to vocal opposition from some groups. The concern is that farmers will take advantage of the lower-risk, higher reward opportunities of energy generation, and discontinue farming, which can be high risk as weather conditions become more extreme and unpredictable and milk prices fall. Over 24 million acres of agricultural land have been lost to development nationally since 1982. A 4.3% drop in the number of US farms was observed from 2007-2012. The UVM researchers are testing if yields are better when saffron is grown in front, behind or under solar arrays (Fig. 3). They will evaluate corm development and survival based on planting position in the spring. Peck Solar is working with farmers around VT to help them capitalize on their land value through construction of solar arrays. Saffron could add even more value to farmers from solar fields.

Fig. 3. Saffron crocuses blooming in a raised bed within a Vermont solar array.

How attractive are Marigolds for luring Western Flower Thrips out of your Crop?

We assessed marigold attractiveness to western flower thrips (WFT) in the flowering and non-flowering bedding plants during the spring and summer growing seasons in greenhouse trials. The number of WFT attracted to the marigold and on the bedding plants were counted. We tested red and white petunias; yellow and purple calibrachoas; orange and yellow osteospermums; pink and red verbenas; purple and white New Guinea impatiens; and red and orange marigolds. We also tested both orange and yellow marigolds within yellow marigold crop plants. Consistent results over all years were observed: marigolds were attractive to WFT in both flowering and non-flowering stages of the crop, but were more attractive when crop plants were not flowering. We also found yellow marigolds were more attractive than orange marigolds. When flowering yellow marigolds were placed in the center of WFT hot spots, more WFT were detected in the marigolds than on nearby crop plants. The marigold trap plants were more effective before the crop plants began to flower. This demonstrates the importance of getting the flowering marigold trap plants in the crop early to attract WFT out of the crop before flowering.

Scientists, Technicians and Students Involved with these Activities

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