

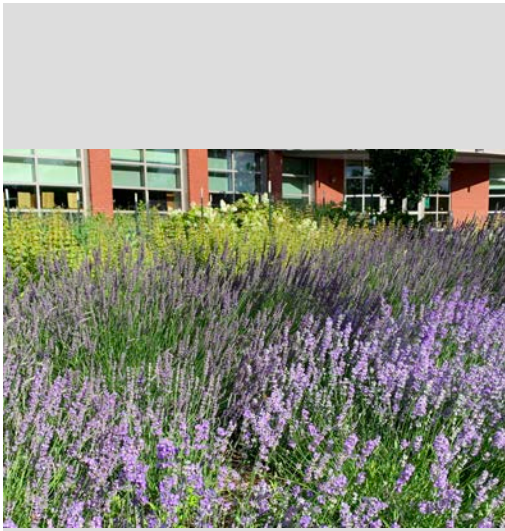
# Bee Campus USA - University of Vermont

Report on 2020

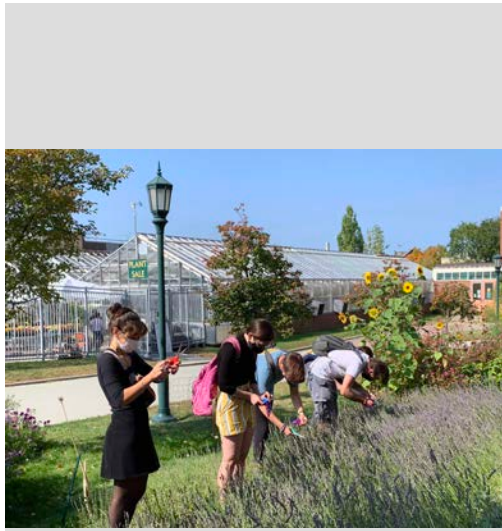
## Pollinator Habitat Creation & Enhancement

Despite the pandemic, landscape crews installed several new garden beds outside Votey Hall after significant underground utility infrastructure was replaced. This area was previously solely covered in turf. A large area of the turfgrass was replaced with pollinator-friendly herbaceous and woody plants (both native and non-native). Trees included: Cornelian cherry dogwood, serviceberry, panicle hydrangea, dwarf fothergilla, chokeberry, rhododendron and seven-sons flower. Herbaceous perennials included: black-eyed Susans, flowering onion, amsonia, goldenrod, oregano, catmint, daylily, geranium, and hosta. These plants will provide an extended availability of nectar and pollen over the growing season. No students, and only workers classified as “essential”, were permitted on campus during the summer of 2020. Normally the gardens on campus are maintained by two interns, as well as student and Master Gardener volunteers. This year, the work was achieved by Mark Starrett, Assoc. Professor of Horticulture in the Plant and Soil Science Department and one student intern, Eli Wilson. Despite the limited support available, numerous gardens were able to be enhanced. Areas that were improved for pollinator-friendliness included plants that were natives or plants with long-lived flowers. These plants included annuals such as: buckwheat, bee’s friend, dill, sunflowers, zinnias, spiderflowers, and single-flowered marigolds. Perennials included: sage, lavender, oregano, mint, blazing stars, chives, coneflower, black-eyed Susan’s, Queen Anne’s lace, sneezeweed and sea holly. Additionally, a 50’ long trellis garden was installed outside of Jeffords Hall and on it was grown cardinal climber, purple hyacinth bean and scarlet runner beans. These were to help to attract pollinators such as butterflies and hummingbirds. As a part of the service-learning activities of my course, Home and Garden Horticulture, I had students assist with the planting of numerous trees and shrubs on campus last fall. These included: a catalpa tree, smoketrees and dogwood bushes.

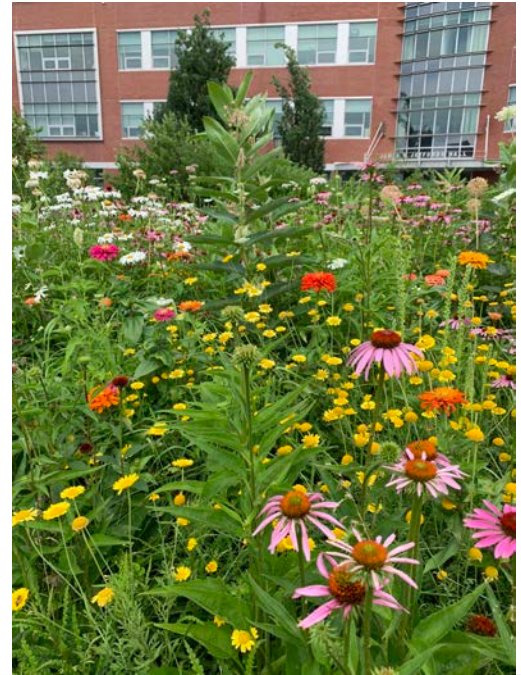




Perennial lavender serves both aesthetics in the landscape as well as in function for pollinators.



Lavender also serves a purpose, after the flowers are gone, for members of the UVM Horticulture Club to harvest it for scented bouquets.



A mix of perennials and annuals provides a long season of flowers for pollinators.

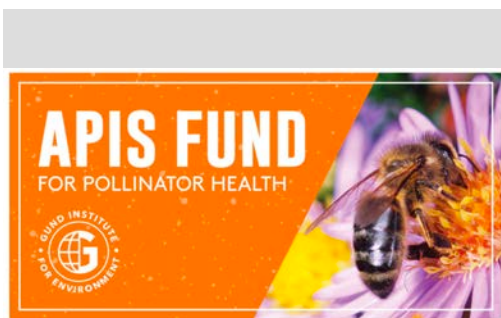
## Education & Outreach

Despite the COVID-19 pandemic, members of the University of Vermont (UVM) community pressed forward in regard to their pollinator research, education and outreach activities. The Gund Institute for Environment at UVM provided their first grants from the APIS Fund. One grant provided financial support to the Guanacaste Dry Forest Conservation Fund (a Vermont-based non-profit). An international array of researchers will analyze a decade's worth of bee species from across elevational gradients in the Guanacaste Dry Forest of Costa Rica, using DNA to identify bees and how they change over space and time. The second grant was awarded to Matthew Burke, a Gund Postdoctoral Fellow, who will explore how to best integrate solar energy facilities, pollinator and bird habitats, and grazing and crop production within Vermont's landscapes. The third award was made to Kristian Brevik for his project, "Ghosts of Extinction Yet to Come: Vermont Pollinators," which will create illuminated sculptures of eight species of threatened wild bee species. For more details about these awards, visit their website: <https://www.uvm.edu/gund/news/gund-names-inaugural-apis-fund-winners> Research from Gund Director, Taylor Ricketts and Gund Fellow, Insu Koh was published in *People and Nature* (17 August 2020) titled: "Partitioning Private and External Benefits of Crop Pollination Services". The modelling in this study was applied to California's Central Valley agricultural commodities.

<https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1002/pan3.10138> Jason Mazurowski, a 2019 graduate of UVM's Field Naturalist program, along with Professor Taylor Ricketts, are studying the potential for growing bee-friendly plants under the solar fields in Vermont. Erin O'Neill, a Master's student in Dr. Alison Brody's lab, taught second-graders how to



identify pollinators at the UVM Horticulture Farm. The “We Love Pollinators” workshop introduced youngsters to wonders of bees and the pollination services they provide. UVM undergraduate students, Gretchen Saveson and Joanna Santoro, along with PhD student, Jessica Cole, are working in Dr. Alison Brody’s lab to examine the importance of floral rewards to pollinators and yield in highbush blueberry. Dr. Samantha Alger has developed the “Vermont Bee Lab” at UVM. This is a diagnostic lab where beekeepers in the State of Vermont can submit samples for testing services. Dr. Alger also provided four talks to regional beekeeping associations using virtual methods to reach the participants. Lastly, despite the challenges presented by most events being held remotely, the UVM Beekeepers were able to host several virtual meetings and activities over the course of the year. These included: two sessions on beekeeping basics, one hive inspection streamed on their Facebook page, and limited in-person visits to the apiary to view bees in an observation hive. They also sponsored a photo contest to highlight “Pollinator Week” and donated a honey extractor to the Detroit Beekeepers in recognition of “Urban Beekeeping Day”.



2020 was the inaugural year for providing grants from the APIS Fund for Pollinator Health.



Professor Taylor Ricketts and Jason Mazurowski researching ways to enhance plantings for pollinators in solar fields in Vermont.



Erin O'Neill, a Master's student in Dr. Alison Brody's lab teaching South Burlington second-graders how to identify pollinators.

## Courses & Continuing Education

In 2020 there were 17 courses that provided information on topics such as: native plant ecology, pollinator biology, pollinator ecology, integrated pest management, pollinators and agriculture, and/or landscaping for pollinators. These courses included: Bees and Beekeeping, Biology, BioCORE, Conservation Biology, Diversified Farm Planning, Ecology & Evolution, Ecological Landscape Design, Ecology, Ecosystems & the Environment, Entomology & Pest Management, Field Zoology, Home & Garden Horticulture, Introduction to Beekeeping, Landscape Ecology, Living Landscapes, Native Pollinators-Ecology and Conservation, Permaculture, and Pollinators & Perennials. Of these courses, only Biology and BioCore are dual-listed as Continuing Education (CE) courses, however, all courses at UVM are open to CE students once matriculated students have had a chance to enroll. There are several notable courses that were offered this past year as related to pollinators. “Pollinators and Perennials” has been available for many years as an on-line course that students really enjoy. Two more recent additions to the curriculum include: “Bees and Beekeeping” and “Introduction to





Beekeeping". A new course offering in summer 2020 was, "Native Pollinators – Ecology and Conservation" which was offered by Jason Mazurowski. Jason is working with Professor Taylor Ricketts, Director of the Gund Institute for Environment on creating pollinator habitats for solar array fields.



Jason Mazurowski is the instructor for a new course in 2020, "Native Pollinators-Ecology and Conservation".



Chives, planted for the course, "Permaculture" have a dual purpose.



Art students benefit from a planting of sunflowers outside the Rubenstein School of the Environment and Natural Resources.

## Service-Learning

In spring and early summer of 2020, the President of the UVM Horticulture Club, Eli Wilson, sowed seeds of annuals and herbaceous perennials that were then grown on and planted in both the gardens on campus as well as at City Hall (Burlington, VT). The gardens at City Hall are typically one of the most visible gardens to tourists in Vermont. The gardens are located in the heart of downtown and they provide a welcome refuge for pollinators in that vicinity. The gardens are tended by volunteers from the Vermont Master Gardener Program. This provides an opportunity to engage with the local community in a highly visible off-campus location. In fall of 2020, a service-learning project was conducted by students in PSS015 Home and Garden Horticulture Lab. They renovated and added herbaceous perennials to a garden that was previously only ornamental grasses. They also planted several pollinator-friendly trees and shrubs on campus. This project involved a total of 20 students and took place over two weeks in the month of October. It is anticipated that each year students in PSS015 Home and Garden Horticulture labs will install and/or maintain pollinator-friendly gardens on campus.





Flowers, started by a summer intern on campus, were planted at Burlington's City Hall as part of the Horticulture Club's mission of outreach to the local community.



Students in Home and Garden Horticulture Lab planting a native smoketree on campus.



Students in Home and Garden Horticulture Lab planting native dogwood bushes on campus.

## Educational Signage

Due to restrictions on campus, we are limited to the number of signs we can put up; however, we do have a small sign that provides information about our solitary bee "house" in the arboretum on campus adjacent to Jeffords Hall. This is a permanent display. A temporary sign was put up by the Friends of the Horticulture Farm at the UVM Horticulture Research and Education Center for their "Pollinator Garden" (<https://fhfvt.org/>). This sign showcases the seasons that each species of plants in this garden is providing flowers (pollen/nectar) to pollinators. Our hope is to be able to create additional signage for our various pollinator gardens on campus in the coming years.







This sign indicates the nesting "houses" suitable for native, solitary bees.



Pictured are Sarah Salatino (L) who helped to install the Pollinator Garden at the UVM Horticulture Research and Education Center with Hannah Brill (R) a Sustainable Landscape Horticulture Student intern who helped to create the interpretive signage for the gardens. The signage indicates the seasons that each plant species provides flowers (nectar/pollen) to pollinators.

## Policies & Practices

IPM is a comprehensive, ecosystem-based strategy that focuses on long-term prevention of pests or their damage, through a combination of properly timed techniques such as biological control, habitat manipulation, and modification of cultural practices and use of resistant varieties. This strategy also uses small amounts of organic and/or approved pesticides to minimized pest quantities only after monitoring indicates they are needed. Treatments are undertaken with the goal of controlling only target organisms to an acceptable level in specific areas. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial non-targeted organisms and the environment while



protecting landscape aesthetics preventing economic losses. 1. We base our pest management program on preventative, non-chemical and cultural measures for control. These controls begin with selecting healthy, zone hardy, pest resistant species with a focus on proper planting techniques and maintenance practices. 2. When applicable, physical barriers are placed to prevent plant pests from doing repeated damage. Examples include bands around trees to discourage gypsy moth defoliation, wraps around trunks of young trees to prevent damage from rodents or other animals, and boulders or planting beds for turf protection. 3. UVM Grounds staff monitor for pests as they patrol and work on campus, reporting pest activity to Grounds Management. Environmentally friendly or target specific materials are chosen to bring the amount of pest to an acceptable level. 4. Dormant horticultural oils or insecticidal soaps may be applied to manage insects on ornamental plantings when the level of damage threatens plant health or aesthetics. 5. Trees and shrubs are mulched annually with cedar bark, which aids in water retention, blocks weeds, and acts as an insect repellent (through the natural oil and strong fragrance). Most weeds in tree and plant beds are manually pulled and discarded. 6. High quality lawns and athletic fields are aerated to relieve compaction with over seeding and mowing at their optimal heights to ensure health and vigor. Soil nutrient balance is maintained through the use of non-phosphorus, organic fertilizers. Irrigation is used in limited areas and monitored for correct water usage. Healthy turf lessens erosion and storm runoff. 7. Many annual flowerbeds are being replaced over time by more sustainable mulched perennial flower beds. 8. UVM maintains an inventory of all campus trees. This inventory, together with our knowledge of the University landscape is used to monitor for insects, disease and environmental stresses and aids us in our maintenance efforts.

#### **Integrated Pest Management Plan:**

#### **Recommended Native Plant List:**

#### **Recommended Native Plant Supplier List:**







Pollinator-friendly perennials are being used in border gardens on campus.

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[Learn More](#)

