

## Progress Report

<b>Title:</b>	<b>Vermont IPM Extension Implementation Program: 2017-2020</b>		
<b>Sponsoring Agency</b>	NIFA	<b>Project Status</b>	ACTIVE
<b>Funding Source</b>	Non Formula	<b>Reporting Frequency</b>	Annual
<b>Accession No.</b>	1013802	<b>Grants.gov No.</b>	
<b>Project No.</b>	VTN32287	<b>Award No.</b>	2017-70006-27143
<b>Project Start Date</b>	09/01/2017	<b>Proposal No.</b>	2017-04388
<b>Reporting Period Start Date</b>	09/01/2018	<b>Project End Date</b>	08/31/2021
<b>Submitted By</b>	Stephanie Albaugh	<b>Reporting Period End Date</b>	08/31/2019
		<b>Date Submitted to NIFA</b>	06/04/2019

**Program Code:** EIP**Program Name:** Extension Implementation Program**Project Director**

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**Non-Technical Summary**

The Vermont Extension Implementation Program includes specialists in plant pathology, entomology, horticulture, agronomy, pesticide education, weed science and community outreach. A program coordinator and an evaluation specialist also play critical roles, maximizing communication and cooperation among Priority area teams. The VT EIP team has strong relationships with stakeholders and addresses IPM needs in the following Primary Priority areas: Agronomic Crops; Specialty Crops; Communities and IPM for Pollinator Health. Secondary Priority areas of IPM Support for Pest Diagnostic Facilities and IPM Education for Pesticide Applicators serve as overarching resources for all Primary Priority areas. The goals of the VT EIP are to develop and promote effective education and outreach programs to improve IPM practices, reduce costs through those IPM practices, increase IPM adoption and reduce human and environmental risks for our commercial growers and communities.

**Accomplishments****Major goals of the project**

The overarching goals of the Vermont IPM program are to develop and promote effective education and outreach programs to improve IPM practices, reduce costs through those IPM practices, increase IPM adoption and reduce human and environmental risks for our commercial growers and communities. Specific goals of each priority area are:

**Agronomy**-Goals include identification of the disease and pests that challenge northeast growers. Farmers will learn to identify pests in their fields and learn if their seed sources are disease free. They will learn the best agronomic practices to minimize pest damage and we will promote the UVM PDC for help in identifying disease, insect and weed problems in farmers' fields. Our goal is to help farmers design robust local grain and hop systems that successfully address pertinent pest challenges to produce a diversity of food and feed grains for expanding local grain markets.

**Fruit**- Goals include timely delivery of IPM information to apple and grape growers; implementation of regional orchard and vineyard monitoring programs; and development of baseline data on pollinator diversity in commercial orchards (see Priority Area IPM for Pollinator Health). We will continue to highlight the Plant Diagnostic Clinic as a resource for insect, weed

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and disease diagnosis and IPM recommendations.

Greenhouse/high tunnel-Goals include addressing grower needs while improving environmental sustainability and profitability of the greenhouse industry in ME, NH and VT by reducing losses from arthropod pests and increasing growers' revenues through IPM strategies learned at workshops and individual site visits.

Communities-Goals include educating gardeners about pest identification and IPM strategies in the home garden and landscape through a course, a statewide Helpline and several outreach events.

IPM for Pollinators-Goals include educating growers and gardeners on the importance of pollinator protection through an orchard pollinator survey, through pilot habitats and through a home garden IPM short course.

Pest Diagnostics-Goals include providing timely, accurate and cost-effective diagnostics to Vermont stakeholders so they can make informed management decisions based on IPM strategies.

Pesticide Education-Goals include developing trainings on pollinator health to key stakeholders targeting pesticide applicators in apple orchards, in blueberries and for applicators in the nursery/greenhouse ornamentals industry

### What was accomplished under these goals?

Each facet of the VT EIP has accomplished goals toward increasing the adoption of IPM practices in a variety of crops and settings to reduce the amount of pesticides used and lower costs while protecting the environment and human health.

Growers at Agronomy Field Days & Winter Conferences plan to adopt proactive management including seedborne disease testing, reducing pest pressure, and scouting. Outreach efforts on hop production successfully increased understanding of the pest impacts of irrigation and how to scout and manage powdery mildew and viruses. Apple growers changed management to protect pollinators and reduce pesticide resistance. Increased orchard scouting improved pest management timing and reduced applications, providing a net economic benefit. "Scouting completely impacted our timing of pesticide application."

47% of Greenhouse/High Tunnel/Nursery Tri-State IPM participants reduced chemical pesticide use by >25%. IPM First growers all use plant-mediated IPM systems regularly to reduce chemical pesticide use. Master Gardener Course students gained an understanding of IPM practices that 91% intend adopt. Master Gardener Helpline saved an estimated average of \$218 per client by reducing pesticide use. Advanced Training provided new pest information to experienced Master Gardeners. "Current, comprehensive information which we can share more broadly with the public." The Plant Diagnostic Clinic provided critical IPM strategies to commercial operators, saving \$307 estimated average per client by reducing pesticide use. "Without resources like this, many farmers would have a much harder time growing sustainable food, employing Vermont residents and running sustainable businesses." Pesticide Applicator Education prepared students to take state certification exams. "Looking forward to testing and safer use of all products we use." Certified commercial applicators adopted new safe pesticide application practices.

Please see the following accomplishments for more details.

#### Agronomy Field Days & Winter Conferences

- Champlain Valley Hops Field Day
  - 70% better understood how to identify pests
  - 88% would be able to make more informed choices to reduce pest pressure
- 10th Annual Hops Conference
  - 56-78% helped to reduce pesticide applications
  - 96% allowed to better scout/identify/manage pests with IPM system
- 15th Annual Grain Growers Conference
  - 86% helped to test for mycotoxin, seedborne disease
  - 45% know how to identify environmental conditions/grain development stage to manage fusarium
  - 92% helped to better scout/identify/develop IPM strategies

#### Agronomy Extension Outreach Education

- Hop Power Hour
  - 100% have better understanding powdery mildew, irrigation systems/pest impact, virus ID, time harvest to min pest damage
  - 100% will change powdery mildew scouting/treatment; scouting/managing viruses
  - 82-89% will change early season practices; irrigation system
  - 69% will change harvest timing
- Hop goScout survey
  - 90% will implement scouting schedule; 67% will continue routine scouting
  - 60% will adjust irrigation practices; 42% will implement crowning/pruning to reduce downy mildew; 29% will adjust

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harvest timing; 18% will adjust training times

- 29-40% will adjust/reduce pesticide applications, minimize rates

**Orchard/Vineyard Scouting Network**

- 100% used scouting in pest management decision making, reduced/delayed sprays
- 88% had net economic benefit, reduce risks
- "Scouting allowed us to be more precise in our spray applications and reduce our pesticide use"
- "The amount of money saved was significant"

**Apple/Grape Extension Outreach Education**

- 2019 VT Tree Fruit Growers Assoc. annual meeting
  - 94-97% have moderate/considerable knowledge on Post-infection Fire Blight, Apple Scab Management (up to 199% increase)
  - "I learned of specific software applications that can be used for scab and fireblight tracking"
- 2018 VT Tree Fruit Growers Assoc. Annual Meeting
  - 55% changed management practices to protect bees (spray timing, habitat development) to improve confidence making pest management decisions
  - 35% changed trunk health management practices (pruning, spray timing, scouting, guard removal, mating disruption)
  - 14% changed cider orchard management practices (diversify cultivars, select pesticides to reduce resistance)
  - 48% changed scouting practices (increased scouting, better trap timing, reduced pesticide use) to improve confidence making pest management decisions
  - "Scouting completely impacted our timing of pesticide application"

**Greenhouse/High Tunnel/Nursery Tri-State IPM**

- 80% learned new techniques including sanitation, pH/EC; natural enemy management, plant mediated IPM, dip methods
- 89% changed management practices
- 47% reduced chemical pesticide use by >25%
- 67% used biological control
- 38% used plant-mediated IPM

**Greenhouse/High Tunnel/Nursery IPM First**

- 100% growers use plant-mediated IPM systems regularly
- 100% locations reduced chemical pesticides (2 by >75%)
- 100% use biological controls more effectively after 5 years

**Greenhouse/High Tunnel/Nursery Extension Outreach Education**

- 94% ranked "Plant-Mediated IPM Systems" webinnet usefulness 4/5

**Master Gardener Course**

- 2018 Master Gardener Course
  - 59% never/rarely/sometimes/not sure of using IPM before the course
  - 91% had/intend in the next six months to adopt IPM practices (43% increase)
  - "I learned a lot of useful and important information that I can directly apply to my gardening and property management techniques"

**Master Gardener Helpline**

- 78% clients used IPM to manage their pest problem
- 55% clients were able to reduce pesticides
- \$218 average per client estimated cost savings by reducing pesticide use
- "I don't know where else I would turn to if they weren't available"
- "I was able to start making helpful gardening changes right away, and have a plan for better prevention for next season"

**Master Gardener Advanced Training**

- 100% learned something that will reduce pesticide use in general, invasive species, tree care
- 69-100% moderate/considerable knowledge on Emerald Ash Borer; invasive plant ID/management; tree planting/assessment/abiotic/pests; vegetable pests/abiotic disorders (up to 100% increase)
- "I appreciate the opportunity to receive current, comprehensive information about an important subject which we can

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share more broadly with the public"

- "I learned what signs to look for in my garden to identify the pests that I have and how best to treat them"

**Greenhouse/High Tunnel/Nursery Pollinator Habitat Program**

- 100% continue to use habitat planting systems

**Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics**

- 86% clients used IPM to manage their pest problem
- 61% clients were able to reduce pesticides
- \$307 average per client estimated cost savings by reducing pesticide use
- "The diagnosis sometimes allowed me to not spray"
- "They have saved us tens of thousands of dollars in potentially lost crops over the years as well as strategies that improved yields moving forward"
- "Without resources like this, many farmers including myself would have a much harder time growing sustainable food, employing Vermont residents and running sustainable businesses"

**Pesticide Applicator Education**

- 2019 Initial Certification Meeting
  - 80% moderately/well prepared to take the state certification exam following training (110% increase)
  - "Looking forward to testing and safer use of all products we use"
- 2019 Commercial Applicator Meeting
  - 56-63% increased knowledge of IPM practices for management & beneficial/pollinator protection
  - 36% plan to adopt one new safe pesticide practice
  - 84-89% moderate/considerable knowledge of Neonicotinoid use; glyphosate's risk profile; development of cancer for pesticide applicators/handlers; precision agriculture; VT water sampling (up to 124% increase)
- 2018 Commercial Applicator Meeting
  - 17% adopted a new IPM practice
  - 33% adopted a new safe pesticide application practice

**What opportunities for training and professional development has the project provided?****Agronomy Field Days & Winter Conferences**

- Champlain Valley Hops Field Day, Starksboro VT 9/28/18 (40 attendees)
- 10th Annual Hops Conference, Burlington VT 2/21/19 (86 attendees + 10 via live broadcast)
- 15th Annual Grain Growers Conference, Essex VT 3/28/19 (113 attendees)
- Agendas/presentations: <http://go.uvm.edu/cqu7e>

**Agronomy Extension Outreach Education**

- Virtual Reality Scouting Tool for Hop Growers (VRScout Hops) completed; Presented at 2019 Hops Conf. (introduction, target audience, pests, user manual) <http://go.uvm.edu/3myft>
- eXtension Campus online course of 2019 Hops Conference <https://campus.extension.org/enrol/index.php?id=1687>
- 8 Hop Blog Posts <http://go.uvm.edu/5svb7>
- 6 Hop Power Hour webinars (Mastering spring activities, Powdery mildew, Decade: a farmer shares experiences, Irrigation systems, Harvest timing/effect on quality, Hop viruses/viroids) Apr-Oct 2018 (117 attendees, 621 views) <http://go.uvm.edu/9nezy>
- Hop goScout surveys (introductory survey, topic interest, training, crowning, scouting, irrigation, harvest timing) (83 participants)

**Orchard/Vineyard Scouting Network**

- 12 orchards scouted weekly, 2018 season; 11 orchards + 1 vineyard fruit assessed
- Third-party online reporting platform adopted

**Apple/Grape IPM Guideline Assessment**

- iPiPE IPM Elements platform adopted <https://elements.ipipe.org/>

**Apple/Grape Extension Outreach Education**

- 6376 page views of UVM Fruit: Tree Fruit & 1736 page views of UVM Fruit: Grapes
- 171 subscribed to [vtapplegrower@list.uvm.edu](mailto:vtapplegrower@list.uvm.edu) listserv; 277 subscribed to [vermontgrape@list.uvm.edu](mailto:vermontgrape@list.uvm.edu) listserv

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- 31 UVM Fruit blog posts promoting IPM tools, Network for Environmental & Weather Applications (NEWA), advertising IPM meetings <http://go.uvm.edu/ogreu>
- 74 grower consultations
- New England Tree Fruit Management Guide updates, Feb 2019 <https://netreefruit.org/>
- Session planning/presentations:
  - Vermont Tree Fruit Growers Assoc. Annual Meeting, Middlebury VT (Recap 2018 Season, Post-infection Fire Blight Management; RIMpro Apple Scab Management; 2018 Orchard Monitoring Project) 2/14/19 (72 attendees) <http://go.uvm.edu/de3ta>
  - Presentations (attendees):
    - Cider apple production: Constraints & Opportunities. Congrès Cidres, vins et alcools d'ici. St Hyacinthe PQ, Canada 3/28/19 (80)
    - Constraints & Opportunities in Producing Cider Apples. Montana Grape & Winery Assoc. Annual Conf. Helena MT 3/23/19 (20)
    - Orchard & Vineyard Practice that Improve Farm Sustainability. Montana Grape & Winery Assoc. Annual Conf. Helena MT 3/22/19 (75)
    - Pollinator Protection Efforts: UVM IPM Program & VT Pollinator Protection Committee. Lecture to Greater Cabot Working Landscape Committee. Cabot VT 01/24/19 (24)
    - Sustainability Practices Support Vermont Orchards/Vineyards. Atlantic Seed Assoc. Annual Conv. Burlington VT 10/8/18 (32)

**Greenhouse/High Tunnel/Nursery Tri-State IPM**

- Annual event held in ME NH VT (hand held microscopes/magnifiers for pest/natural enemy id, pH/EC meters, disease diagnosis flow chart) Jan 8-10, 2019 (140+ attendees) <http://go.uvm.edu/l6721>

**Greenhouse/High Tunnel/Nursery IPM First**

- 5 new operations enrolled for 2018; 2 new operations currently enrolled for 2019
- 50+ site visits were made to IPM First sites in 2018
- 1 scouting training session for greenhouse staff (10 attendees)

**Greenhouse/High Tunnel/Nursery Extension Outreach Education**

- 4,650 views on UVM greenhouse/high tunnel/landscape IPM webpages
- 4,050 followers on UVM Entomology Facebook page
- 440 subscribed to GreenGrower listserv
- 1 factsheet: Critical Questions to Consider to Help Manage Persistent Pest Problems <http://go.uvm.edu/a3idw>
- 1 webinet: Plant-Mediated IPM Systems 101 <http://go.uvm.edu/w5ixl>
- Presentations (attendees)
  - Identifying Good, Bad & Ugly; Lessons Learned from 5 years of Routine High Tunnel Scouting. High Tunnel Production Conf. Manchester NH Dec 3-4, 2018 (138) <http://go.uvm.edu/vu1z7>, <http://go.uvm.edu/noj08>
  - Plant-mediated IPM Systems for Thrips; A New Innovative Method for Western Flower Thrips Management using UV Light. Rionegro, Colombia 2018 (50)
  - Importance of scouting: tips for success. Success with Bio-control in High Tunnel Vegetables Twilight Meeting. Jericho Settlers Farm, Jericho VT 7/26/18 (40)
  - Greenhouse/Tomato Aphid Management & Habitat Plants for Natural Enemies. Intervale Community Farm, Burlington VT 5/30/18 (20)

**Master Gardener Course**

- Delivered through web platform. Plant Diagnostic Clinic Program Support Team lectures: entomology, plant pathology, turf care. Jan 18-May 10, 2019 (95 students)
  - 356 EMG volunteers, 131 projects/events, 12156 hours, 73467 contacts with public about pesticide reduction, pest identification, IPM strategies.
  - Television: Across the Fence <http://go.uvm.edu/lkjhi>

**Master Gardener Helpline**

- 1,002 questions answered by phone/email
- 90 specimens submitted for pest identification

**Master Gardener Advanced Training**

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- Spring Pest Webinar Apr 2018 (110 views)
- Helpline Volunteer Training Webinar Jun 2018 (15 views)
- Sneaky Forest Pest 8/15/18 (11 attendees)
- Vegetable Pest Walk 8/20/18 (19 attendees)
- Invasive Plant Walk 8/28/18 (11 attendees)
- Tree Pest Walk 9/4/18 (7 attendees)
- End of Season Pest Webinar Nov 2018 (22 views)

**Orchard Pollinator Survey**

- 2 orchards surveyed monthly, 2018 season; abundance, diversity catalogued <http://go.uvm.edu/e6g-h>

**Greenhouse/High Tunnel/Nursery Pollinator Habitat Program**

- 9 sites trained to establish pollinators through habitat plantings
- 300 habitat-planting brochures distributed to retail customers
- Presentations (attendees)
  - Bringing in Un-Bee-lievable Beneficials. VT Nursery Landscape Assoc. Winter Meeting 2/7/19 (30)

<http://go.uvm.edu/sf324>

- 1 training for international students on habitat plantings to establish beneficial insects (12)

**Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics**

- 600+ samples diagnosed, IPM information provided
- 150+ email pictures diagnosed, IPM information provided

**Plant Diagnostic Clinic Extension Outreach Education**

- Presentations (attendees)
    - Pests/Problems 2018 & What to Watch for 2019. Annual Garden & Landscape Symposium. Ticonderoga NY 4/6/19 (100)
    - Pests of Vermont gardens/landscapes. VNLA Flower Show. Essex Jct VT 3/1/19 (75)
    - What is wrong with my tree & when to call an arborist? Ecological Landscape Alliance Conf. Amherst MA 3/5/19 (100)
    - What is eating my trees? Ecological Landscape Alliance Conf. Amherst MA 3/6/19 (100)
    - Diseases of landscape trees/shrubs. NH Landscape Recertification Course. Concord NH 2/18/19 (50)
    - Looking back at 2018 season. VT Vegetable/Berry Growers Assoc. Annual Meeting. Fairlee VT 2/21/19 (200)
- <http://go.uvm.edu/063xi>
- Identifying/managing tomato diseases in high tunnels. NH High Tunnel Conf. Manchester NH 12/3/18 (200)
  - VT High Tunnel Workshop 5/30/19 (50)
  - Pest presentation. Newport VT Garden Club 4/10/18 (35)
  - Television: 5 programs on IPM/pests. Across the Fence. 6/28/18 <http://go.uvm.edu/w-5ye>, 8/3/18 <http://go.uvm.edu/2luoh>, 8/23/18 <http://go.uvm.edu/mq5zl>, 8/30/18 <http://go.uvm.edu/7y3bv>, 10/26/18 <http://go.uvm.edu/ws-9c>

## • Articles:

- VT Vegetable/Berry Newsletter biweekly column (650 farmers)
- The Dirt quarterly articles. VT Nursery Landscape Assoc. <https://greenworksvermont.org/news-events/the-dirt/> (350 subscribers)
- UMASS Vegetable Notes (contribute VT data) <https://ag.umass.edu/vegetable/newsletters> (2,128 subscribers)
- New England Vegetable Management Guide annual updates <https://nevegetable.org/>
- New England Small Fruit Management Guide annual updates <https://ag.umass.edu/fruit/publications/new-england-small-fruit-management-guide>

**Pesticide Applicator Education**

- Presentations (attendees)
  - Initial Certification Meeting, Burlington/White River Jct VT 4/25-26/18 (64)
  - Initial Certification Meeting, Burlington/White River Jct VT 4/23-24/19 (74)
  - Commercial Pesticide Applicator Meeting, Middlebury VT 4/5/19 (50)
- 3 Pesticide Applicator Report newsletters: Spring/Fall 2018, Spring 2019 (1300 subscribers)

**How have the results been disseminated to communities of interest?**

- Agronomy IPM information is distributed through field days, winter meetings, blogs, websites, webinars, Facebook posts,

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YouTube videos, phone calls, emails and social media. A live broadcast of the hops winter conference was made available and archived online. Information collected in Dry Bean Survey and Seed Quality Testing will remain confidential.

- Apple/Grape IPM information is distributed through newsletters, website, blog posts, factsheets, on-farm workshop, one-on-one consultations, and presentations at regional grower meetings. Information collected in Orchard and Vineyard Scouting Network and Apple/Grape IPM Guideline Assessment surveys will remain confidential.

- Greenhouse/High Tunnel IPM information is distributed through workshops, conferences, presentations, site visits, factsheets, websites, Facebook page and a listserv.

- Master Gardener IPM information is delivered through the Master Gardener Course, through the Master Gardener Helpline, EMG newsletter, state reports, website and emails.

- Plant Diagnostic Clinic IPM information is distributed through sample diagnosis, websites, meetings, presentations, webinars, newsletters, television, radio, factsheets, emails, and phone calls.

- Pesticide Applicator Online Education will be through webinars, factsheets and presentations.

**What do you plan to do during the next reporting period to accomplish the goals?****Agronomy Field Days and Winter Conferences**

- Continue programs

**Dry Bean Disease Survey**

- Continue programs

**Seed Quality Testing**

- Continue programs

**Agronomy Extension Outreach Education**

- Continue blogs, IPM briefs, IPM guide, website updates as well as implementation of the VR Scout Tool

**Orchard and Vineyard Scouting Network**

- Third-party online reporting platform adopted; operating in testing mode for 2019 season
- Weekly scouting, fruit sampling at harvest
- Annual survey for level of confidence in applying IPM practices (e.g. pest models, monitoring thresholds) for decision making for key pests

- The number of growers conducting pest monitoring will be collected and tracked in each year

- Annual pesticide applications to manage key monitored diseases and pest will be collected and tracked

**Apple/Grape IPM Guideline Assessment**

- Development/promotion of online self-assessment tool

- Assessment participants will obtain initial scores and identify practices to adopt

**Apple/Grape Extension Outreach Education**

- Continue newsletters, blog posts, integrate NEWA in communications, one-on-one consultations (as necessary)

- An on-farm apple/grape workshop will be held in 2019

- Planning and presentations at regional grower meetings (with evaluation of knowledge gained and adoption of IPM practices)

**Greenhouse/High Tunnel/Nursery Tri-State IPM**

- Hold the 23<sup>rd</sup> annual Tri-State Greenhouse workshops in ME, NH and VT.

**Greenhouse/High Tunnel/Nursery IPM First**

- Continue individualized training at site visits and visits to previous participants

**Greenhouse/High Tunnel/Nursery Extension Outreach Education**

- Update website with three new pages (webinettes, case studies, plant-mediated IPM systems)

- Continue sending messages via the Greengrower listserv and posts to facebook page

- Prepare factsheets relating to greenhouse IPM

- Prepare webinettes and case studies

**Master Gardener Course**

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- Offer EMG course in 2020
- Survey the 2019 students at the end of the season to assess if they adopted an IPM practice and reduced pesticide use
- Compile results of the 2018 student survey to assess if they adopted an IPM practice and reduced pesticide use

**Master Gardener Helpline**

- Survey 2019 clients at the end of the season to assess if they adopted an IPM practice that reduced pesticide use

**Master Gardener Advanced Training Webinars**

- Continue to offer webinars and hand-on summer workshops with IPM topics to be determined
- Factsheets will be developed to be used during the workshops as well as distributed to our 300 master gardeners after the course, and the general public at fairs, farmers markets and other community events around the state.

**Orchard Pollinator Survey**

- Pan traps in two orchards collected weekly; Identify and catalogue collected insects
- Apple growers will be surveyed annually to assess level of adoption of specific pollinator protection practices such as timing and choice of pesticides.

**Greenhouse/High Tunnel/Nursery Pollinator Habitat Program**

- Continue to establish and monitor habitat plantings; , work one-on-one with growers
- Produce and distribute consumer brochure and signs about protecting pollinators and beneficial insect identification
- Provide updates on websites and social media

**Master Gardener Pollinator Short Course**

- Currently developing the course syllabus, reaching out to potential experts to teach various modules, developing the course website and the course advertising materials, such as the flyers website, social media posts, press releases and setting up the pre and post course surveys

- Coordinate with Pesticide Applicator Online Education

**Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics**

- Continue timely and accurate diagnostics.

**Plant Diagnostic Clinic Extension Outreach Education**

- Continue offering workshops/presentations.

**Pesticide Applicator Online Education**

- Continue to develop webinar content and corresponding factsheets for apple, blueberry and nursery growers
- Coordinate with Master Gardener Pollinator Short Course
- Continue annual applicator training workshops

**Participants****Actual FTE's for this Reporting Period**

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Scientist	0.4	0	0	0	0.4
Professional	0.9	0	0	0	0.9
Technical	0.7	0	0	0	0.7
Administrative	1.5	0	0	0	1.5
Other	0	0	0	0	0
Computed Total	3.5	0	0	0	3.5



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**Student Count by Classification of Instructional Programs (CIP) Code**

{NO DATA ENTERED}

**Target Audience**

Target audiences include commercial agricultural operators and associated industry such as crop consultants, professional pest managers, extension educators, researchers and similar stakeholders. Commercial operators include: organic and conventional growers of specialty crops, field crops and forages, new and established grain/dry bean/hop farmers, apple growers, grape growers, blueberry growers, growers of greenhouse ornamentals/cut flowers/high tunnel vegetables, growers of landscape/perennial/nursery stock, and product end-users such as brewers, distillers, maltsters, chefs, bakers, and millers. Master Gardeners, home gardeners, owners of small acreage, general public, schools and communities are also target audiences for portions of this project.

**Products**

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2019	YES

**Citation**

Bradshaw, T. & S. Kingsley-Richards. 2018. UVM Fruit. <http://www.uvm.edu/~fruit/>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2019	NO

**Citation**

Darby, H. 2018. Northwest Crops and Soils Program. <https://www.uvm.edu/extension/nwcrops>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2019	YES

**Citation**

Hazelrigg, A. 2018. Plant Diagnostic Clinic. <https://www.uvm.edu/extension/pdc>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2019	YES

**Citation**

Hazelrigg, A. 2018. UVM Extension Master Gardener. <https://www.uvm.edu/extension/mastergardener>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2019	NO

**Citation**

Sullivan, C.E.F. and Skinner, M. 2018. Greenhouse Integrated Pest Management Website: <http://www.uvm.edu/~entlab/Greenhouse%20IPM/UVMGreenhouseIPM.html>

Type	Status	Year Published	NIFA Support Acknowledged
Conference Papers and	Published	2019	NO

**Citation**

Sanchez, E., C. Frank Sullivan & M. Skinner. 2019. Using Biocontrols to Manage Aphids in High Tunnels. New Jersey Agricultural Trade Show & Convention Proceedings, Feb. 5-9, 2019, Rutgers University, NJ.

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Type	Status	Year Published	NIFA Support Acknowledged
Book Chapters	Awaiting Publication	2019	NO

**Citation**

Skinner, M., B.L. Parker & C.F. Sullivan. 2019. Chapter 31. Integrated Pest Management in Greenhouse and Other Protected Cultivation Systems. In: Current and Future Developments in IPM; Eds: M. Kogan & L. Higley, Burleigh Dodds Science Publ. Cambridge, UK. In press.

Type	Status	Year Published	NIFA Support Acknowledged
Conference Papers and	Published	2019	NO

**Citation**

Sullivan, C.E.F. & M. Skinner. 2019. Attracting & Sustaining Aphid Natural Enemies in High Tunnels. Expand Your Tunnel Vision: High Tunnel Production Conference Manchester NH - Dec 3-4. 1p.

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2019	YES

**Citation**

Sullivan, C. Frank & Skinner, M. 2019. Bringing in Un-Bee-lievable Beneficials. The Dirt. Winter Issue Vol. 44(4):23-24.

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2019	YES

**Citation**

Sullivan, C. Frank & Skinner, M. 2019. Habitat Plantings Harbor Happy Beneficial Bugs. VT Vegetable & Berry Newsletter 3/12/19 <http://www.uvm.edu/vtvegandberry/Pubs/HabitatPlants.pdf>

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2018	YES

**Citation**

2018. Flower Power at the Hildene: <http://vermontnews-guide.com/flower-power-at-hildene/>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2019	YES

**Citation**

Hazelrigg, A. & S. Kingsley-Richards. 2018. Pesticide Safety Education Program. <https://www.uvm.edu/extension/psep>

**Other Products****Product Type**

Other

**Description**

Agronomy Field Days and Winter Conferences: highlighting grain, oilseed, beans and hops pest management trials, IPM scouting strategies, and pest identification tools; live-stream of winter conferences.

## Progress Report

Accession No. 1013802

Project No. VTN32287

**Product Type**

Data and Research Material

**Description**

Dry Bean Disease Survey: Northeast dry bean farms surveyed for seedborne and non-seedborne foliar diseases throughout the growing season with the information provided weekly to the grower.

**Product Type**

Data and Research Material

**Description**

Seed Quality Testing: farmers offered seed quality testing. Results with information on how to reduce pathogens in seed lots sent to the grower to promote certified seed use or cleaning of seed when disease is present.

**Product Type**

Other

**Description**

Agronomy Extension Outreach Education: conference proceedings and meeting videos , two IPM Briefs/year, blog , scouting info, identification and IPM strategies for a broad range of crops. A Dry Bean IPM guide, previous guides (hops, oilseeds, cereal grains) updated, goScout Action Survey-hop growers surveys, ID Hour, Virtual Reality (VR) video environments.

**Product Type**

Data and Research Material

**Description**

Orchard and Vineyard Scouting Network: weekly coordinated orchard pest monitoring. Weekly results communicated to participating orchards to guide pest management decisions. Online reporting platform developed to track state-wide trap captures. Two vineyards will be evaluated at veraison and harvest for incidence of disease and insect pest damage.

**Product Type**

Educational Aids or Curricula

**Description**

Apple/Grape IPM Guideline Assessment: develop a self-assessment of crop-specific IPM practices tailored to Vermont growers. The assessment available as an online tool to facilitate IPM education and assist grower decision-making.

**Product Type**

Other

**Description**

Apple/Grape Extension Outreach Education: newsletters, blog posts, and/or factsheets containing time- and crop-sensitive IPM information integrating weather and pest models, on-farm workshop to demonstrate IPM practices, one-on-one consultations, revisions of the New England Tree Fruit Management Guide, planning and presentations at regional grower meetings.

**Product Type**

Other

**Description**

Greenhouse/High Tunnel/Nursery Tri-State IPM: presentations on insect and disease-related IPM topics. Attendees take part in hands-on demonstrations and receive information packets on current IPM topics.

## Progress Report

Accession No. 1013802

Project No. VTN32287

**Product Type**

Educational Aids or Curricula

**Description**

Greenhouse/High Tunnel/Nursery IPM First: five specialty crop operations enrolled annually, receiving on-site visits by specialists over the growing season to improve IPM skills.

**Product Type**

Other

**Description**

Greenhouse/High Tunnel/Nursery Extension Outreach Education: webinets (10-minute narrated, web-based presentations), IPM factsheets for workshops, advanced IPM topics, case studies on IPM adoption based on grower experiences, IPM Facebook posts, and northeast region Greengrower listserv.

**Product Type**

Other

**Description**

Master Gardener Course: a 13 week course with 120 students offered through a web-based platform; including three lectures on IPM topics.

**Product Type**

Other

**Description**

Master Gardener Helpline: popular statewide toll-free service staffed with trained volunteers to answer questions on insect, weed and disease problems and their management.

**Product Type**

Other

**Description**

Master Gardener Advanced Training: for Master Gardener volunteers addressing recent inquiries from the public. Factsheets developed on these topics posted on the website.

**Product Type**

Data and Research Material

**Description**

Orchard Pollinator Survey: orchard pollinator community composition assessed in two orchards using pan traps to collect pollinators weekly throughout the growing season. Collected insects identified to develop baseline data for use in developing or assessing IPM programs protective of pollinators in orchard systems.

**Product Type**

Educational Aids or Curricula

**Description**

Pollinator Habitat Program for ornamentals/vegetables in greenhouses/high tunnels and nursery settings: operations enrolled to encourage conservation of pollinators. Habitat plantings at each site established with annual and native perennial plant varieties useable for sale as cut flowers, providing continual floral resources to attract the pollinators and beneficials that provide pest management. Beneficial insects (pollinators, predators and parasitoids) surveyed at the three habitat plantings monthly from May-September.

**Progress Report**

**Accession No. 1013802**

**Project No. VTN32287**

**Product Type**

Other

**Description**

Master Gardener Pollinator Short Course : “Living on the Land: Encouraging small land owners to use IPM to attract pollinators and reduce pesticide use” course offered using an interactive online webinar platform.

**Product Type**

Other

**Description**

Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics: provide new and established stakeholders with rapid and accurate diagnosis and current IPM recommendations. Clients include commercial growers, Master Gardener Helpline volunteers, the gardening public and urban consumers.

**Product Type**

Other

**Description**

Plant Diagnostic Clinic Extension Outreach Education: present IPM information addressing current and emerging insect, weed and diseases using IPM tactics in talks/workshops, newsletter columns, television programs, blogs, websites, webinars, press releases, and articles.

**Product Type**

Other

**Description**

Pesticide Applicator Online Education: online platform determined for trainings address IPM and pollinator health targeted for pesticide applicators in apple orchards, in blueberries and for applicators in the nursery/greenhouse ornamentals industry.

**Changes/Problems**

- Target enrollment for the Master Gardener Course was 120 students. 2019 enrollment was 95 students.
- No changes/problems of note for other project programs.