

## 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>	
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<b>Submitted By</b>	Stephanie Albaugh	<b>Reporting Period End Date</b>	08/31/2020
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**Program Code:** EIP**Program Name:** Extension Implementation Program**Project Director**

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**Recipient Organization**

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**Co-Project Directors**

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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

## Progress Report

Accession No. 1013802

Project No. VTN32287

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 are selecting lowest impact pesticides. Dry bean producers are learning how to better identify pests. Seed quality testing has increased by 30% since 2014. Apple growers are using scouting to reduce or delay pesticide application for net economic benefits. "I am certain that my fruit quality and tree health improved due to scouting." Apple scab and fireblight management changed to improve timing of pest management and confidence in making pest management decisions, utilizing NEWA models. 89% of Greenhouse/High Tunnel/Nursery Tri-State IPM participants increased biological control, plant-mediated IPM, scouting, identification, and decreased pesticide use. 72% of long-term IPM First growers reduced chemical pesticide use by >25%. Master Gardener Course students gained an understanding of IPM practices that 83% intend adopt. "I appreciate learning about science-based information to help me garden and reduce the use of pesticides." Master Gardener Helpline saved \$190 estimated average per client by reducing pesticide use. Advanced Training provided new pest information to experienced Master Gardeners. "This type of learning really helps to cement information that one might gain by reading or lectures." All participants of the Pollinator Habitat Program plan to continue using habitat planting systems. The Plant Diagnostic Clinic provided critical IPM strategies to commercial growers, saving \$635 estimated average per client by reducing pesticide use. "It is a vital resource for farmers in VT." Please see the following accomplishments for more details.

#### Agronomy Field Days & Winter Conferences

- 11th Annual Hops Conference
- 35% selecting lowest impact pesticides.
- 95% better at scout/identify/manage pests with IPM system

#### Dry Bean Disease Survey

- 95% indicated learning how to better identify pests
- 100% developed IPM strategies
- 60% tested seed quality

#### Seed Quality Testing

- Seed quality submissions to the lab have increased by 30% since 2014
- 3 farmers have reported less issues with bean diseases as a result of testing seed for seedborne diseases prior to planting

#### Orchard/Vineyard Scouting Network

- 100% used scouting in pest management decision making, reduced/delayed sprays
- 60% had net economic benefit
- "We are feeling more comfortable relying on sampling numbers to indicate level of risk"
- "I am certain that my fruit quality and tree health improved due to scouting"

#### Apple/Grape Extension Outreach Education

- 2020 Vermont Tree Fruit Growers Assoc Annual Meeting
  - 88-94% gained moderate/considerable knowledge on Developing Integrated Pest & Pollinator Management Plan, IPM Decision Support Systems, Old/New Insect Pests

Decision Support Systems, Old/New Insect Pests

**Progress Report****Accession No. 1013802****Project No. VTN32287**

- "Learned about the opportunities and further information about bees and pollinators"
- "Expanded info about protecting pollinators which is an ongoing, growing concern"
- 2019 Vermont Tree Fruit Growers Assoc Annual Meeting
  - 40-60% changed post-infection fire blight management to decrease pesticide use, reduce use of broad-spectrum pesticides, improve timing of pest management, and improve confidence in making pest management decisions
  - 43% changed apple scab management to improve timing of pest management, improve confidence in making pest management decisions, and increase profitability
  - "Did scab management per NEWA"
- Scouting Workshop
  - 43-69% became comfortable/very comfortable with scouting protocols for specific pests
  - 88% plan to adopt at least one new management practice
  - "Learned how to scout and some sense of when to get concerned about level of pests"
  - "I feel ready to implement the techniques taught in my orchard!"
- Midsummer Vineyard Management Workshop
  - 94% have moderate/considerable knowledge of pre-harvest vineyard management
  - 57% plan to adopt at least one new management practice
  - "Gained information on identifying different diseases and hardiness/disease resistance of different varieties"

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

- 93% learned new techniques (beneficials, monitoring with indicator plants/sticky cards, lighting)
- 89% increased biological control, plant-mediated IPM, scouting, identification, nutrient management, decreased pesticide use
- 64% adopt more IPM strategies and apply less chemical pesticides; 51% reduced chemical pesticides by >50%

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

- 67% use plant mediated IPM systems
- 100% use biocontrols as chemical pesticide alternatives
- 69% indicated high priority to protect pollinators/beneficials
- 88% intend to provide habitat plantings to attract/sustain pollinators
- IMPACTS 2010-2017:
  - 91% increased biological controls (predators, parasites, pathogens)
  - 73% increased plant mediated IPM systems (trap, banker, habitat plants)
  - 82% increased cultural controls.
  - 64% routine crop scouting
  - 91% id pests prior to treating
  - 55% increased biopesticides
  - 73% decreased chemical pesticides, 72% reduced chemical pesticides by >25%
  - 73% use University insect/disease clinics

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

- 100% of webinet viewers indicated the style of learning tool was useful to increase grower's knowledge on the biology and identification of IPM practices

**Master Gardener Course**

- 98 % never/rarely/sometimes/not sure of using IPM before the course
- 95% agree/strongly agree that the course gave them a better understanding of how to apply IPM
- 83% had/intend in the next six months to adopt IPM practices
- "The Master Gardener program has been very helpful and valuable in helping me identify issues and address problems in my arboretum"
- "I appreciate learning about science-based information to help me garden and reduce the use of pesticides"

**Master Gardener Helpline**

- 39% clients used IPM to manage their pest problem
- 24% clients were able to reduce pesticides
- \$190 average per client estimated cost savings by reducing pesticide use
- "The Helpline is an important resource that I hope continues for generations to come"
- "I feel so lucky to have our extension service available. I believe it will be more critical going forward as we see climate

**Progress Report****Accession No. 1013802****Project No. VTN32287**

change increasing and we will all need updated information about species in Vermont"

**Master Gardener Advanced Training**

- 86-100% moderate/considerable knowledge on Emerald Ash Borer, lawn grubs, disease resistant varieties, planting timing, scouting/trapping, pest identification/lifecycles, choice of biological/less toxic pesticide, understanding labels, proper pruning/staking/watering/mulching, crop rotation, record keeping
- 20-50% learned something that will reduce use of pesticides
- "I learned some tricks about pest management to optimize my crops and reduce damage by pests without resorting to pesticides"
- "This type of learning really helps to cement information that one might gain by reading or lectures"

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

- 88% did not use habitat plantings prior to program
- 100% continue to use habitat planting systems
- 63-88% moderate/considerable knowledge of beneficial id/life cycles, plants to attract beneficials
- 75% attracted public attention

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

- 96% commercial clients used IPM to manage their pest problem
- 75% commercial clients were able to reduce pesticides
- \$635 average per client estimated cost savings by reducing pesticide use
- "I got positive ID of specific pathogens and consult about how to deal with them"
- "It is a vital resource for farmers in VT"

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

- 11th Annual Hops Conf, Burlington VT 2/28/20 (66 attendees + 10 via live broadcast)
- 16th Annual Grain Growers Conf, Essex VT 3/24/20 (Cancelled due to COVID-19)
- Agendas/presentations: <http://go.uvm.edu/cqu7e>

**Dry Bean Disease Survey**

- 5 farms (75 acres total) surveyed twice during the season in 2018 & 2019 for disease/insect pests (Alburgh, Cambridge, Danby, Glover VT and Northfield MA)
- Farmers invited to participate, assisted with scouting 75% of the time

**Seed Quality Testing**

- 179 samples in 2018; 143 samples in 2019; analyzed for disease, mycotoxins, germination (small grains, dry beans)

**Agronomy Extension Outreach Education**

- Virtual Reality Scouting Tool for Hop Growers (VRScout Hops) completed 2019 <http://go.uvm.edu/3myft>
- Online course of 2020 Hops Conf <https://campus.extension.org/enrol/index.php?id=1784>
- 4 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) (110 new views) <http://go.uvm.edu/9nezy>

**Orchard/Vineyard Scouting Network**

- 11 orchards scouted weekly, 2019 season; 6 orchards + 1 vineyard fruit assessed
- Third-party online reporting platform trialed

**Apple/Grape IPM Guideline Assessment**

- Assessments developed on iPIPE IPM Elements platform <https://elements.ipipe.org/>

**Apple/Grape Extension Outreach Education**

- 7727 page views of UVM Fruit: Tree Fruit & 1721 page views of UVM Fruit: Grapes
- 148 subscribed to vtapplegrower listserv; 285 subscribed to vermontgrape listserv
- 46 UVM Fruit blog IPM posts <http://go.uvm.edu/ogreu>
- 49 grower consultations

**Progress Report****Accession No. 1013802****Project No. VTN32287**

- New England Tree Fruit Management Guide updates, 2020 <https://netreefruit.org/>
- Radio: UVM Horticulture Farm & IPM, WGDR 5/5/19
- Session planning/presentations:
  - Hard Cider Session (New England Cider Apple Project), New England Veg & Fruit Conf, Manchester NH 12/11/19 (108 attendees)
  - Vermont Tree Fruit Growers Assoc Annual Meeting, Middlebury VT (Developing Integrated Pest & Pollinator Management Plan, IPM Decision Support Systems, Old/New Insect Pests) 2/13/20 (72 attendees) <http://go.uvm.edu/de3ta>
  - Scouting Workshop, UVM HREC, S Burlington, VT 5/16/19 (17 attendees)
  - Midsummer Vineyard Management Workshop, UVM HREC, S Burlington, VT 8/6/19 (28 attendees)
- Presentations:
  - New England Cider Apples, NY Agriculture Experiment Station/Cornell University Plant Pathology Seminar, Geneva, NY 11/15/19 (38 attendees)
  - Current research projects from the UVM Apple Program, UVM HREC Research Open House, S Burlington, VT 8/6/19 (16 attendees)

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

- 23rd annual event held in ME NH VT (natural enemies, biocontrol, quality control of product shipments, disease management, pathogen tests, greenhouse lighting, sprayer calibration, pest/natural enemy id, pH/EC meters, disease diagnosis flow chart, grower discussion) 17-9/20 (125+ attendees) <http://go.uvm.edu/ju2ri>

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

- 4 new operations enrolled in 2019; 2 new operations currently enrolled for 2020
- 50+ site visits, 21 locations, 80+ contacts
- 1 educational tour at participating greenhouses (monitoring, biocontrols, IPM strategies) 6/10/19 (40 attendees)
- 2 presentations to tech school students enrolled in greenhouse production program (IPM & Biocontrol, Battle the Bad Bugs with Biocontrol) Center for Technology, Essex VT 10/15/19 & 4/5/19 (40 attendees)

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

- 2,000+ views on UVM greenhouse/high tunnel/landscape IPM webpages
- 4,100 followers on UVM Entomology & Saffron Facebook page
- 460 subscribed to GreenGrower listserv
- 2 webinars (How to Create Pollinator Friendly Landscapes: Pollination & How to Support Pollinators) for Master Gardener Pollinator Short Course
  - 1 webinet (Benefits for Beneficials) January 2020
  - 6 Factsheets & Articles
- Presentations:
  - Habitat plants to support beneficials in high tunnels, Mid-Atlantic Fruit & Veg Conf, Hershey, PA 1/28-30/20
  - IPM for High Tunnel Vegetables, Farmer-to-Farmer Conf, ME Organic Farmers & Gardeners Assoc, Northport, ME 11/4/19 (20 attendees)
  - Habitat plants to attract natural enemies into high tunnel crops (6 sessions), Penn State University Ag Progress Days, Pennsylvania Furnace, PA 8/13-15/19 (126 attendees) <https://agsci.psu.edu/apd>
  - Monitoring, use of biocontrols, other IPM strategies for high tunnel, On-Farm Workshops for Commercial Growers, UVM Extension & VT Veg & Berry Growers, Intervale Community Farm, Burlington VT 7/10/19 (30 attendees)

**Master Gardener Course**

- Delivered through web platform 1/17-5/22/20 (110 students); Plant Diagnostic Clinic Support lectures: entomology, plant pathology, turf care
  - 326 EMG volunteers, 91 projects/events, 23,380 hours, 1,319,515 contacts with public about pesticide reduction, pest identification, IPM strategies
  - Television: Across the Fence <https://www.youtube.com/watch?v=lcZqYkL5POA>

**Master Gardener Helpline**

- 999 questions answered by phone/email
- 75 specimens submitted for pest identification

**Master Gardener Advanced Training**

- Turfgrass Management 4/10/19 (20 attendees)

## Progress Report

Accession No. 1013802

Project No. VTN32287

- Forest Pests 7/29/19 (12 attendees)
- Choosing Vegetable Varieties for Disease Resistance 8/22/19 (17 attendees)
- Home Fruit Tree problems 8/8/19 (16 attendees)
- Insect Identification 7/12/19 (36 attendees)

**Orchard Pollinator Survey**

- 2 orchards surveyed monthly, 2019 season; abundance, diversity catalogued <http://go.uvm.edu/hfd0m>

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

- 10 sites trained to establish pollinators through habitat plantings
- 300 habitat-mix seed packets distributed
- 350 updated habitat-planting brochures distributed <http://go.uvm.edu/jrypww>
- 1 updated educational sign <http://go.uvm.edu/poi4r>
- Presentation: Attract & recognize your pest-fighting pollinators & other beneficial insects, VT Greenscape Assoc Turfgrass Conf & Trade Show, W Lebanon NH 12/3/19 (100+ attendees) <http://go.uvm.edu/a4ke0>

**Master Gardener Pollinator Short Course**

- Under development to launch in May of 2020 on eXtension course website

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

- 500+ samples diagnosed, IPM information provided
- 100+ email pictures diagnosed, IPM information provided

**Plant Diagnostic Clinic Extension Outreach Education**

- 2 Factsheets + Poster
- New England Vegetable Management Guide updates <https://nevegetable.org/>
- New England Small Fruit Management Guide updates <https://ag.umass.edu/fruit/publications/new-england-small-fruit-management-guide>
- Presentations (1000+ attendees)
  - High Tunnel Tomato Diseases + Diseases and Pest Roundtable, NE Veg & Berry Conf, Manchester NH 12/12/19
  - NH Certified Crop Advisor Conf, Portsmouth NH 1/30/20
  - VT Veg & Berry Annual Conf Fairlee VT 1/28/20
  - Diseases and Climate Change, UVM Master Gardener State Conf, Shelburne VT 11/2/19
  - Diseases of Trees and Shrubs, NH Supervisory Pesticide Training, Goffstown NH 9/19/19
  - Vegetable Diseases UVM Master Gardener Advanced Training, Burlington VT 8/22/19
  - UVM Farmer Training Program Disease Workshop, Burlington VT 7/26/19
  - Vegetable IPM Farm Workshop Series: Sunshine Valley Farm Rochester VT 8/12/19, Intervale Farm Burlington VT 7/10/19, Sam Mazza Farm, Colchester VT 6/10/19
  - UVM Farmer Training Plant Pathology lecture, Burlington VT 6/5/19
  - UVM Master Gardener Spring Training, Burlington VT 4/10/19 (25 attendees)
  - Commercial Pesticide Applicators Meeting, Middlebury VT 4/5/19 (60)
  - Pests and Problems in 2018 & What to Watch for in 2019, Eighth Annual Garden & Landscape Symposium, Ft Ticonderoga NY 4/6/19
  - Commercial Pesticide Applicators Meeting, Middlebury VT 4/5/19 (60)
- Television: 7 programs on IPM/pests. Across the Fence <http://go.uvm.edu/8cuvs>

**Pesticide Applicator Education**

- In process developing 3 online short courses for blueberry, apple, nursery growers + factsheets. Course will be launched summer 2020 on eXtension course website

**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, 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.

## Progress Report

Accession No. 1013802

Project No. VTN32287

- **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?****Continuation of ongoing objectives:**

- **Agronomy Field Days and Winter Conferences:** Annual Grain Growers Conference; Annual Hops Conference; Field Day.
- **Dry Bean Disease Survey:** completed
- **Seed Quality Testing:** Farmers will be offered seed quality testing.
- **Agronomy Extension Outreach Education:** UVM Northwest Crops website, Hop Blog Posts; Hop Power Hour webinars; Presentations at local and regional conferences.
- **Orchard/Vineyard Scouting Network:** 1 orchard scouted weekly; 1 orchard/1 vineyard fruit assessed, results reported.
- **Apple/Grape IPM Guideline Assessment:** Change web platform; Grower trial/evaluation
- **Apple/Grape Extension Outreach Education:** UVM Fruit website, listservs, blog posts; grower consultations; On-farm workshop; presentations at local and national .
- **Greenhouse/High Tunnel/Nursery Tri-State IPM:** Annual event held in ME, NH, VT.
- **Greenhouse/High Tunnel/Nursery IPM First:** New operations enrolled; site visits.
- **Greenhouse/High Tunnel/Nursery Extension Outreach Education:** UVM greenhouse/high tunnel/landscape IPM webpages; UVM Entomology & Saffron Facebook page; GreenGrower listserv; factsheets; articles, webinars, webinets; presentations at local/national conferences.
- **Master Gardener Course:** Annual 13-week course delivered online; Students of 2018-2020 courses will be surveyed to assess whether they have adopted specific IPM tactics.
- **Master Gardener Helpline:** Trained volunteers answer questions by phone/email; Helpline clients will be surveyed to assess whether they have adopted specific IPM tactics.
- **Master Gardener Advanced Training:** Workshops in cooperation with the UVM PDC.
- **Orchard Pollinator Survey:** 2 orchards surveyed monthly; abundance, diversity catalogued, reported; Findings presented at annual meetings.
- **Greenhouse/High Tunnel/Nursery Pollinator Habitat Program:** Enrolled sites trained to establish pollinator habitat plantings; presentations at local/regional conferences.
- **Master Gardener Pollinator Short Course:** Currently under development to launch in in June of 2020 to reach private landowners and gardeners.
- **Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics:** Sample diagnosis and IPM recommendations; ; PDC clients will be surveyed to assess whether they have adopted specific IPM tactics.
- **Plant Diagnostic Clinic Extension Outreach Education:** UVM PDC webpage; presentations at local/regional conferences; TV programs; biweekly/quarterly articles in local industry newsletters.
- **Plant Diagnostic Clinic Program Support for IPM Communities (Master Gardener):** Provide 3 IPM lectures for the MG Course; Adv. Training webinars, and diagnostic backup for the Helpline
- **Pesticide Applicator Online Education:** 3 online short courses with factsheets currently under development to launch in summer of 2020 to reach commercial Blueberry, Apple, and Nursery growers.

**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

## Progress Report

Accession No. 1013802

Project No. VTN32287

## Actual FTE's for this Reporting Period

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Administrative	1.5	0	0	0	1.5
Other	0	0	0	0	0
Computed Total	3.5	0	0	0	3.5

## 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	2020	YES

## Citation

Bradshaw, T. & S. Kingsley-Richards. 2020. UVM Fruit. <http://www.uvm.edu/~fruit/>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2020	NO

## Citation

Darby, H. 2020. Northwest Crops and Soils Program. <https://www.uvm.edu/extension/nwcrops>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2020	YES

## Citation

Hazelrigg, A. & S. Kingsley-Richards. 2020. Pesticide Safety Education Program. <https://www.uvm.edu/extension/psep>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2020	YES

## Citation

Hazelrigg, A. 2020. Plant Diagnostic Clinic. <https://www.uvm.edu/extension/pdc>



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Progress Report

<b>Accession No. 1013802</b>	<b>Project No. VTN32287</b>
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Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2019	NO

**Citation**

Hazelrigg, A. and G. Maia. 2019. Brassica Diseases. <http://go.uvm.edu/whl4v>

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2019	NO

**Citation**

Hazelrigg, A. and G. Maia. 2019. High Tunnel Tomato Diseases. <http://go.uvm.edu/li5nf>

Type	Status	Year Published	NIFA Support Acknowledged
Conference Papers and	Other	2019	YES

**Citation**

Hazelrigg, A. and G.S Maia. 2019. Weather and Climate Impacts on Plant Disease in Vermont in Summer 2018. National Plant Diagnostic Network Meeting, Indianapolis, IN.

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2020	YES

**Citation**

Hazelrigg, A. 2020. UVM Extension Master Gardener. <https://www.uvm.edu/extension/mastergardener>

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2020	YES

**Citation**

Sullivan, C.E.F. and Skinner, M. 2020. 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	2020	NO

**Citation**

Skinner, M., C.F. Sullivan & E. Sanchez. 2020. Habitat plants to support beneficials in high tunnels: The best things in life are free. In: Proc. Mid-Atlantic Fruit & Vegetable Convention, 28-30 Jan. Hersey, PA. PA Veg. Growers Assoc. pp: 78-79.

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2019	YES

**Citation**

Skinner, M. & C.F. Sullivan. 2019. Native Solitary Bees and How to Support Them. Univ. of VT, Entomology Research Laboratory, Burlington VT. 2 pp.

## Progress Report

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Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2020	YES

**Citation**

Sullivan, C.F., A. Davari, B.L. Parker & M. Skinner. 2020. Marigold Guardian Plant Production Guidelines. Entomology Research Laboratory. Tri-State Greenhouse IPM Workshops. Manchester, ME., Durham, NH & Burlington, VT. 2020.

Type	Status	Year Published	NIFA Support Acknowledged
Conference Papers and	Published	2019	YES

**Citation**

Sullivan, C.E.F. & M. Skinner. 2019. Attracting & Sustaining Aphid Natural Enemies in High Tunnels. Univ. of VT Entomology Research Laboratory. PennState Ag Progress Days, Rock Springs, PA. August 13-15, 2019.  
<https://www.uvm.edu/~entlab/High%20Tunnel%20IPM/Factsheets/Habitat%20Plants%20in%20High%20Tunnels%20Natural%20Enemies%202019%20version.pdf>

Type	Status	Year Published	NIFA Support Acknowledged
Conference Papers and	Published	2019	YES

**Citation**

Sullivan, C.E.F. & M. Skinner. 2019. Critical Questions to Consider to Help Manage Persistent Pest Problems. Univ. of VT Entomology Research Laboratory. PennState Ag Progress Days, Rock Springs, PA. August 13-15, 2019.  
<https://www.uvm.edu/~entlab/High%20Tunnel%20IPM/Factsheets/Critical%20Questions%20to%20Manage%20Persistent%20Pest%20Problems%20Aug%202019.pdf>

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

**Citation**

Sullivan, C.E.F., M. Skinner & E. Sanchez. 2019. Guidelines & Tips for Scouting High Tunnel Crops. Univ. of VT Entomology Research Laboratory. PennState Ag Progress Days, Rock Springs, PA. August 13-15, 2019.  
<https://www.uvm.edu/~entlab/High%20Tunnel%20IPM/Factsheets/Scouting%20Guidelines%20High%20Tunnel%20Pests%20Natural%20Enemies%20Aug%202019%20UVM.pdf>

**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.

**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.

**Progress Report**

**Accession No. 1013802**

**Project No. VTN32287**

**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.

**Changes/Problems**

{Nothing to report}