

**Vermont IPM Extension Implementation Program: 2017-2020
2019-2020 Annual Report**

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Primary Priority Area: IPM Implementation in Agronomic Crops-Heather Darby

Field Days & Winter Conferences

- 11th Annual Hops Conference, Burlington VT 2/28/20 (66 attendees + 10 via live broadcast)
IMPACTS:
 - 35% selecting lowest impact pesticides.
 - 95% allowed to better scout/identify/manage pests with IPM system
- 16th Annual Grain Growers Conference, 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 and 2019 for diseases and insect pests (Alburgh, Cambridge, Danby, and Glover, VT and Northfield, MA)
- Farmers invited to participate and assisted with scouting 75% of the time
IMPACTS:
 - 95% indicated learning how to better identify disease and pests.
 - 100% helped to develop IPM strategies
 - 60% helped to test seed quality

Seed Quality Testing

- 179 samples in 2018; 143 samples in 2019; analyzed for disease, mycotoxins, germination (small grains, dry beans)
IMPACTS:
 - As a result of outreach and farmer education, seed quality submissions to the lab has 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.

Extension Outreach Education

- Virtual Reality Scouting Tool for Hop Growers (VRScout Hops) completed 2019 <http://go.uvm.edu/3myft>
- eXtension Campus online course of 2020 Hops Conference <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>
- **Hop goScout surveys** (completed April-August 2018)

Next Round of Funding: we will continue extension outreach education through winter conferences, blogs, IPM briefs, IPM guide, summer field days, website updates as well as implementation of the VR Scout Tool. We will continue surveying for IPM impacts.

Primary Priority Area: IPM Implementation in Specialty Crops: Apples and Grapes-Terry Bradshaw

Orchard/Vineyard Scouting Network

- 11 orchards scouted weekly, 2019 season; 6 orchards + 1 vineyard fruit assessed
- Third-party online reporting platform adopted.
IMPACTS:
 - 100% used scouting in pest management decision making, reduced/delayed sprays
 - 60% had net economic benefit
 - “With weather and temperature swings increasing threats, scouting is critical. We can't just follow a usual plan.”
 - “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 IPM Guideline Assessment

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

Extension Outreach Education

- 7727 page views of UVM Fruit: Tree Fruit & 1721 page views of UVM Fruit: Grapes
- 148 subscribed to vtapplegrower@list.uvm.edu listserv; 285 subscribed to vermontgrape@list.uvm.edu listserv
- 46 UVM Fruit blog posts promoting IPM tools, Network for Environmental & Weather Applications (NEWA), advertising IPM meetings <http://go.uvm.edu/ogreu>
- 49 grower consultations
- New England Tree Fruit Management Guide updates, January 2020 <https://netreefruit.org/>
- Session planning/presentations:
 - Hard Cider Session (Seven speakers, 2.5 hrs), 2019 New England Vegetable and Fruit Meetings. 12/11/2019. Manchester, NH. (108 attendees)
 - 2020 Vermont Tree Fruit Growers Assoc. Annual Meeting, Middlebury VT (Recap 2020 Season, Developing an Integrated Pest & Pollinator Management Plan, IPM Decision Support Systems, Old and New Insect Pests) 2/13/20 (72 attendees) <http://go.uvm.edu/de3ta>
IMPACTS:
 - 94% have moderate/considerable knowledge on Developing an Integrated Pest & Pollinator Management Plan (50% increase)
 - 88-94% have moderate/considerable knowledge on IPM Decision Support Systems, Old and New Insect pests (up to 67% increase)
 - “Learned about the opportunities and further information about bees and pollinators.”
 - “Expanded info about protecting pollinators which is an ongoing, growing concern.”
 - “Always impressed with the amount of information and how you tailor it to the widest level of understanding.”
 - 2019 Vermont Tree Fruit Growers Assoc. Annual Meeting, Middlebury VT (Post-infection Fire Blight Management; RIMpro Apple Scab Management).
IMPACTS:
 - 40-60% changed post-infection fire blight management to decrease pesticide use and 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.
 - 57% changed apple scab management to improve crop quality and improve harvested crop yield.
 - “Did scab management per NEWA.”

- Scouting Workshop 5/16/19 (17 attendees)
 - 43-69% became comfortable/very comfortable with scouting protocols for specific pests (up to 1175% increase)
 - 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.”
 - “Realized that I needed a tighter management program for borers.”
 - “Learned to do more scouting with traps.”
 - “I feel ready to implement the techniques taught in my orchard!”
 - “It makes a huge difference in seeing real life examples and orchard practices.”
- Midsummer Vineyard/Veraison Management Workshop (8/6/19 (28)
 - 94% have moderate/considerable knowledge of pre-harvest vineyard management (200% increase)
 - 57% plan to adopt at least one new management practice
 - “It was useful to get information on different varieties in Vermont and how they deal with disease.”
 - “Gained information on identifying different diseases and hardiness/disease resistance of different varieties.”
- Presentations (attendees):
 - Introducing the New England Cider Apple Project. 2019 New England Vegetable & Fruit Conference. Manchester, NH. 12/11/2019. (100)
 - New England Cider Apples: What are they, where are we, and how do we support growers and cidermakers? New York Agriculture Experiment Station / Cornell University Plant Pathology Seminar. Geneva, NY. 11/15/2019. (38)
 - Rootstocks, organic disease management, unique tree training systems, and...cider apples: Current research projects from the UVM Apple Program. UVM Horticulture Research & Education Center Research Open House. South Burlington, VT. 8/6/2019 (16)
- Media
 - New England Cider Apple Project. Across the Fence Television Segment, WCAX TV, Burlington, VT. 10/16/2018.
 - UVM Horticulture Farm and Integrated Pest Management. WGDR Radio. 5/5/2019

Next Round of Funding: 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. Promotion of online IPM Guideline Assessment self-assessment tool. Assessment participants will obtain initial scores and identify practices to adopt. Continue newsletters, blog posts, integrate NEWA in communications, one-on-one consultations (as necessary). An on-farm apple/grape workshop will be planned for 2020. Planning and presentations at regional grower meetings (with evaluation of knowledge gained and adoption of IPM practices)

Primary Priority Area: IPM Implementation in Specialty Crops: Ornamentals/vegetables in greenhouses/high tunnels and nursery settings-Margaret Skinner

Tri-State IPM Workshop

- The 23rd annual event held in ME NH VT (new natural enemies, effective biocontrol, hand-on quality control of product shipments, disease management, use of Agdia ImmunoStrip® pathogen tests, greenhouse lighting and a sprayer calibration demo, grower discussion how IPM works in their operation) Jan 7-9, 2020 (125+ attendees)
<https://www.uvm.edu/~entlab/Greenhouse%20IPM/Workshops/2020/IPMWorkshop2020.html>

IMPACTS:

- 62% of the attendees were new to our workshop series this year or did not attend the event last year; 78% of attendees had attended one of IPM workshops in the past
- 93% learned new techniques they intend to use this year (spray techniques, beneficial release strategies, monitoring methods (indicator plants and sticky card placement), natural enemy quality control and efficient lighting strategies)
- 69% used biological control in the past year, similar to the past 2 years.
- 56% of the attendees indicated they used some form of a plant mediated IPM system in their production. This is 15% greater use than the previous 2 years.
- 2019 Tri-State IPM Workshop (hand held microscopes/magnifiers for pest/natural enemy id, pH/EC meters, disease diagnosis flow chart)
IMPACTS:
 - 89% increased biological control use, increased plant mediated IPM system use, decreased pesticide use and improved scouting, insect and disease ID and nutrient management.
 - 64% indicated this event gave them resources to apply less chemical pesticides and adopt more IPM strategies (biopesticides, natural enemies, banker, trap or habitat plant use).
 - 51% reduced the amount of chemical pesticide by >50%

IPM First

- 4 new operations enrolled for 2019; 2 new operations currently enrolled for 2020
- 21 locations received visits in 2019
- 50+ site visits were made in 2019
- 80+ individuals contacts regarding IPM
- 1 educational tour at participating grower's greenhouses (Monitoring, use of biocontrols and other IPM strategies for greenhouse and high tunnel pest control) June 10, 2019 (40 attendees)
- 2 presentations to students enrolled in greenhouse production program at local tech high school (Integrated Pest Management & Biocontrol, Battle the Bad Bugs with Biocontrol). The Center for Technology, Essex, VT. October 15, 2019; April 5, 2019 (40 attendees)
IMPACTS:
 - 100% use IPM strategies (i.e., biopesticides, natural enemies, scouting, trap or habitat plant use, etc.) to manage pests
 - 100% regularly scout for pest problems
 - 67% used plant mediated IPM systems
 - 76% use sticky cards for monitoring
 - 100% rely on the use of biocontrols as chemical pesticide alternatives
 - 69% indicated it was a high priority to protect pollinators and other beneficial insects in greenhouse, nursery and landscape settings.
 - 88% intend to provide habitat plantings to help attract and sustain pollinators
IMPACTS 2010-2017:
 - 100% indicated we provided the resources that allowed them to apply less chemical pesticides and adopt more IPM strategies (i.e., biopesticides, natural enemies, scouting, trap or habitat plant use, etc.).

- 91% of past participants increased use of biological controls
- 73% increased use of plant mediated IPM systems
- 73% decreased use of chemical pesticides
- 55% increased use of bio-pesticides
- 100% indicated an increased scouting and monitoring frequency and the ability to ID insect and biocontrols
- 82% increased their prevention of pest problems through cultural controls.
- 64% use of biological controls (predators, parasites, pathogens)
- 82% use of plant mediated IPM systems (trap, banker, habitat plants)
- 27% use of bio-pesticides as chemical pesticide alternatives
- 27% use of less toxic chemical pesticides
- 91% id pests prior to treating
- 82% use of sticky cards for monitoring
- 64% inspect incoming plant shipments for pests
- 73% inspect plants by tapping on white surface
- 64% routine crop scouting/monitoring
- 45% weed removal
- 73% use University insect/disease clinics
- 55% attend Tri-State Greenhouse IPM workshop
- 72% reduced the amount of chemical pesticide by >25%

Presentations:

- Skinner, M., C.F. Sullivan & E. Sanchez. 2020. Habitat plants to support beneficials in high tunnels: The best things in life are free. Mid-Atlantic Fruit & Vegetable Conference, 28-30 Jan. Hersey, PA.
- Skinner, M. & C. F. Sullivan. 2019. IPM for High Tunnel Vegetables: Practical Pathways for Organic Crop Protection. Farmer-to-Farmer Conf., Maine Organic Farmers & Gardeners Assoc. 4 Nov. Northport, ME. (20 attendees)
- Sánchez, E., C.E.F Sullivan, M. Skinner and C. Glenister. 2019. Habitat plants to attract natural enemies into high tunnel crops. Penn State University Ag Progress Days, August 13-15, 2019, Pennsylvania Furnace, PA. (6 sessions) (126 attendees) <https://agsci.psu.edu/apd>
- Sullivan, C.E.F. 2019. Monitoring, use of biocontrols and other IPM strategies for high tunnel pest control. On-Farm Workshops for Commercial Vegetable and Berry Growers. UVM Extension & Vermont Vegetable and Berry Growers. Intervale Community Farm, Burlington, VT, July 10, 2019 (30 attendees)

Factsheets & Articles:

- 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.
- 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.
- 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>
- 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>

- 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>
- Sullivan, C.E.F. & M. Skinner. 2019. Habitat Harbors Happiness. Habitat planting awareness sign for high tunnel production. 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%20Harbors%20Happiness%20Awareness%20Sign%20Habitat%20Plants%202019%20UVM.pdf>

Next Round of Funding: Hold the 24th annual Tri-State Greenhouse workshops in ME, NH and VT. Continue individualized training at IPM First site visits and visits to previous participants. Prepare case studies and continue to update website with resources, sending messages and resources via the Greengrower listserv and posts to social media.

Primary Priority Area: IPM Implementation in Communities-Ann Hazelrigg and Beret Halverson

Master Gardener Course

- Delivered through web platform. Plant Diagnostic Clinic Program Support Team lectures: entomology, plant pathology, turf care. Jan 17-May 22, 2020 (110 students)
- 326 EMG volunteers, 91 projects/events, 23,380 hours, 1,319,515 contacts with public about pesticide reduction, pest identification, IPM strategies (2019).
- Television: Across the Fence <https://www.youtube.com/watch?v=lcZqYkL5POA>
- 2019 Master Gardener Course
 - IMPACTS:**
 - 97.84 % never/rarely/sometimes/not sure of using IPM before the course
 - 95.24% agree or strongly agree that the course gave them a better understanding of how to apply integrated pest management
 - 82.62% 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 honest, science-based information to help me garden and reduce the use of pesticides and herbicides. Thank you for the service you provide.”

Master Gardener Helpline

- 999 questions answered by phone/email
- 75 specimens submitted for pest identification
 - IMPACTS:**
 - 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 doesn’t just help with pest and disease problems. They helped me decide on the correct species of trees to plant for my particular situation.”
 - “The Helpline is an important resource that I hope continues for generations to come.”
 - “I feel so lucky to have our extension service available to the public for many different types of information. I believe it will be more critical going forward as we see climate change increasing and we will all need updated information about species in Vermont which will affect us daily.”

Master Gardener Advanced Training

Workshops

- Forest Pests 07/29/2019 (12 attendees)

IMPACTS:

- 100% of participants indicated moderate/considerable general knowledge following presentation on Emerald Ash Borer Habitat, Life Cycle, Detection (signs and symptoms), Management strategies, and How to report
- 20% of participants learned something that will reduce use of pesticides.
- "This was a very informative workshop! This information will be very valuable to me and to whom I pass it on to!"
- "I look forward to more workshops like this. The information is to-the-point, I appreciate that."

- Choosing Vegetable Varieties for Disease Resistance 8/22/19 (17 attendees)

IMPACTS:

- 100% of participants indicated moderate/considerable general knowledge following presentation on choosing disease resistant vegetable varieties, research plants before buying and planting them, timing of planting to avoid pest pressure, inspect and select only healthy seedlings/plants prior to planting, regularly inspect plants to detect possible problems early, positive identification of insect pest, or disease, choice of a biological control instead of a pesticide, choice of a less toxic pesticide to manage an insect pest, weed or disease, physical removing insect pests, staking or caging to keep blossoms or fruit from coming in contact with the ground, proper watering practices to reduce period of leaf wetness, use of mulch to retain soil moisture, or reduce water splashing, rotation of crop families in the garden, rotation of crop families in the garden, keeping record of what management strategies have worked in the past.
- 28.57% of participants learned something that will reduce use of pesticides.
- "A great hands-on and up-close opportunity to identify pests and diseases."
- "This workshop was very useful. I learned some tricks about pest management to optimize my crops and reduce damage by pests without resorting to pesticides."
- "It was a handy reminder of ways to minimize pest and disease effects on vegetables and flowers in your gardens. Listening to the experts and seeing the effects of insect and pest damage in real time reinforces your learning. Thanks for offering this workshop."

- Home Fruit Tree problems 08/08/2019 (16 attendees)

IMPACTS:

- 90% of participants indicated moderate/considerable general knowledge following presentation on regularly inspecting fruit trees to detect possible problems early, understanding the use of traps or sticky cards to monitor insect populations near fruit trees, understand fruit tree pest biology, positive identification of insect pests and disease, understanding of pesticides used to treat fruit trees, choosing a less toxic pesticide to manage an insect pest on fruit trees, choosing and planting resistant fruit tree varieties, more thorough understanding of pesticide labels, proper pruning of fruit trees to allow more light and air to lessen disease, removal of overripe, dropped or damaged produce to reduce attraction of insects.
- 50% learned something that will reduce their use of pesticides
- "Learned more about IPM than I have by just reading on your and others web pages. It was good to find out that I'm doing a good job with IPM now and some ways to try to improve for next season."

- Insect Identification 7/12/2019 (36 attendees)

IMPACTS:

- 94.44% of participants indicated moderate/considerable general knowledge following presentation on timing of planting to avoid pest pressure, regularly inspect plants to detect possible problems early, use of traps or sticky cards to monitor insect, pest, weed or disease, proper weed control strategies, choice of biological control instead of pesticide, choice of a less toxic pesticide to manage an insect pest, weed or disease, physically removing insect pests, keeping record of what management strategies have worked in the past.
- 28.57% learned something that will reduce their use of pesticides
- "It's always helpful to walk through an actual, local garden or farm and talk with an expert in real time - and even see some of the insects about which we were talking! This type of learning really helps to cement information that one might gain by reading or lectures."

Next Round of Funding: In March of 2021 the 2018-2020 Master Gardener Course students will be surveyed to assess if they adopted an IPM practice and reduced their use of pesticides. We will survey 2020 Master Gardener Helpline clients at the end of the season to see if they adopted an IPM practice that reduced pesticide use. Offer EMG course in 2021. Factsheets will be developed to be used during future workshops.

Primary Priority Area: IPM for Pollinator Health

Orchard Pollinator Survey

- 2 orchards surveyed monthly, 2019 season; abundance, diversity catalogued
<http://www.uvm.edu/%7Efruit/pubs/2019pollinatorassessment.pdf>

Next Round of Funding: Pan traps in two orchard blocks collected monthly; 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

- 10 sites trained to establish pollinators through habitat plantings

IMPACTS:

- 75% of growers indicated the plantings attracted public attention
- 100% provided education to customers about their importance
- 88% did not provide habitat plantings prior to taking part in this program.
- 100% will continue to establish these plantings after the end of the project.
- 63% gained considerable knowledge of beneficial insect id
- 88% gained moderate to considerable knowledge of beneficial life cycles
- 88% gained considerable knowledge of the types of plants used to attract beneficials
- 300 habitat-mix seed packets distributed at habitat demos and conference presentations.
- 350 updated habitat-planting brochures distributed to retail customers (Bringing In Un-Bee-lievable Beneficials)
<https://www.uvm.edu/~entlab/High%20Tunnel%20IPM/Factsheets/UnBeelievableBeneficials%20Brochure%20UVM%20updated%202019%20-%20online.pdf>
- 1 updated educational sign (Un-BEE-lievable Beneficials)
<https://www.uvm.edu/~entlab/Landscape%20IPM/PollinatorAwarenessSignUVM2019.pdf>

- Presentations & Factsheets
 - Attract & recognize your pest-fighting pollinators & other beneficial insects. Vermont Greenscape Association 27th Annual Turfgrass Conference & Trade Show. West Lebanon, NH. December 3, 2019 (>100 attendees)
<https://www.uvm.edu/~entlab/Landscape%20IPM/Powerpoints/VT%20Greenscape%20Attracting%20Natural%20Enemies%20Cheryl%20Sullivan%20Dec2019.pdf>
 - Skinner, M. & C.F. Sullivan. 2019. Native Solitary Bees and How to Support Them. Univ. of VT, Entomology Research Laboratory, Burlington, VT. 2 pp.

Next Round of Funding: Continue to establish and monitor habitat plantings, work one-on-one with growers, distribute consumer brochures and erect signs at participating sites about protecting beneficial insects and provide updates on websites and social media.

Master Gardener Pollinator Short Course

- Currently under development to launch in May of 2020 on eXtension course website.

Next Round of Funding: We are currently 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.

Secondary Priority Area: IPM Implementation in Pest Diagnostic Facilities-Hazelrigg

Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics

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

IMPACTS:

- 96% commercial clients used IPM to manage their pest problem
- 75% commercial clients were able to reduce pesticides
- “I got positive ID of specific pathogens and consult about how to deal with them”.
- “It is a vital resource for farmers in VT.”

Extension Outreach Education

- **Presentations (>1000 attendees)**
 - NE Vegetable and Berry Conference. High Tunnel Tomato Diseases. Manchester, NH. 12.12.19
 - NE Vegetable and Berry Conference. Diseases and Pest Roundtable. Manchester, NH. 12.11.19
 - NH Certified Crop Advisor Conference. Portsmouth NH. 1.30.20
 - VT Vegetable and Berry Annual Conference Fairlee, VT. 1.28.20
 - UVM Master Gardener (MG) State Conference. Diseases and Climate Change. Shelburne, VT. 11.2.19
 - NH Supervisory Pesticide Training. Diseases of Trees and Shrubs. Goffstown, NH. 9.19.19
 - UVM Master Gardener Advanced Training on vegetable diseases. Burlington, VT. 8.22.19
 - Vegetable IPM Farm Workshop Series. Sunshine Valley Farm, Rochester, VT. 8.12.19
 - UVM Farmer Training Program Disease Field workshop. Burlington, VT. 7.26.19
 - Vegetable IPM Farm Workshop Series. Intervale Farm, Burlington, VT. 7.10.19.19
 - Vegetable IPM Farm Workshop Series. 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)
 - Eighth Annual Garden & Landscape Symposium. Pests and Problems in 2018 and What to Watch for in 2019. Ft Ticonderoga, NY. Pests 4.6.19
 - Commercial Pesticide Applicators Meeting. Middlebury, VT. 4.5.19 (60)

- **Articles/Factsheets/Newsletters/Listserve/Guides:**
 - Hazelrigg, A. and G. Maia. 2019. Brassica Diseases.
 - Hazelrigg, A. and G. Maia. 2019. High Tunnel Tomato Diseases.
 - 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>
- **Poster:** 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, IND. 4.15.19.
- **Television:** 7 programs on IPM/pests. Across the Fence.

Secondary Priority Area: IPM Education for Pesticide Applicators-Ann Hazelrigg and Sarah Kingsley Richards

Pesticide Applicator Education

- Presentations (attendees)
 - 2020 Initial Certification Meeting, Burlington/White River Jct VT
 - Cancelled due to COVID-19
 - 2020 Commercial Pesticide Applicator Meeting, Middlebury VT
 - Cancelled due to COVID-19
 - 2019 Commercial Applicator Meeting
- 2 Pesticide Applicator Report newsletters: Fall 2019, Spring 2020 (1300 subscribers)

IMPACTS:

 - 198 quizzes submitted: Fall 2019 (each quiz worth 2 recert credits)
 - 108 quizzes submitted: Spring 2019
 - 203 quizzes submitted: Fall 2018-
 - 296 quizzes submitted: Spring 2018
 - “We seem to have less exam ‘re-takers’ because of the option to more easily accumulate recertification credits.”
- On-line training (participants)
 - Vermont Pesticide Safety Education: CORE Manual Review (no credit) (16)

IMPACTS:

 - 100% moderately/very prepared to take the exam (100% increase)
 - 100% moderately/very likely to apply and use pesticides more safely & adopt at least one new IPM practice
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #1 (1 credit) (1)

IMPACTS:

 - 100% very comfortable with the manual information
 - 100% moderately likely to apply and use pesticides more safely & adopt at least one new IPM practice
 - “This was very helpful”
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #2 (1 credit) (2)

IMPACTS:

 - 100% moderately/very comfortable with the manual information
 - 100% very likely to apply and use pesticides more safely & adopt at least one new IPM practice
 - “Great course!”
 - “I had fun!!”
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #3 (1 credit) (1)

IMPACTS:

 - 100% moderately comfortable with the manual information
 - 100% moderately/very likely to apply and use pesticides more safely & adopt at least one new IPM practice
 - “Calibration was a big help.”

- Vermont Pesticide Safety Education: CORE Manual Review, Unit #4 (1 credit) (2)
 - IMPACTS:**
 - 100% moderately/very comfortable with the manual information
 - 100% very likely to apply and use pesticides more safely & adopt at least one new IPM practice
 - “Presentations were clear, pleasant and a good summary of the manual.”
 - “I appreciate the highlights and emphasis given to the most critical content.”
- Vermont Pesticide Education: Category 7A Manual Review (no credit) (new)
- Online pollinator health training
 - Currently in the process of developing 3 online short courses for Pollinator Health for Blueberry, Apple and Nursery growers and accompanying factsheets. Course will be launched summer 2020