United States Department of Agriculture

Final Report

Title:	**The Multidisciplinary Vermont Extension Implementation Program Addressing Stakeholder Priorities and Needs for 2014-2017**

Sponsoring Agency	NIFA	**Project Status**	COMPLETE
Funding Source	Non Formula	**Reporting Frequency**	Final
Accession No.	1004998	**Grants.gov No.**	
		Award No.	2014-70006-22577
Project No.	VTN29202	**Proposal No.**	2014-07605
Project Start Date	09/01/2014	**Project End Date**	08/31/2018
Reporting Period Start Date	09/01/2014	**Reporting Period End Date**	08/31/2018
Submitted By		**Date Submitted to NIFA**	

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

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Recipient Organization

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Non-Technical Summary

The VT EIP uses a multi-disciplinary approach to address IPM priorities and needs identified by local and regional stakeholders. The focus of the program includes forages, grains and field crops, greenhouse and landscape operations, apples and grapes, communities, gardens and plant diagnostics for vegetable and berry growers and others. The priority of the program is to develop and promote diverse alternative pest managment tactics that will help growers produce high quality crops, produce, ornamentals or landscapes while miminimzing input costs and impacts to health and the environment. The VT EIP team includes a plant pathologist, horticulturist, agronomist, weed specialist, entomologist and a community outreach professional.

Accomplishments

Major goals of the project

The major goals of the project are to increase the adoption of IPM practices in a variety of crops and settings to reduce the amount of pesticides used and to lower costs while protecting the environment and human health.

What was accomplished under these goals?

Highlights: September 2014 - August 2017
Agronomy Field Days

- 67-79% improved grain quality, improved economics/viability
- 31% developed, implemented a scouting program
- "I was able to identify Potato leafhoppers in a client's field"
- "I have implemented a better management system with wheat to reduce diseases"

Agronomy Winter Conferences

- Annual Grain Growers Conferences
  - 39-48% improved grain quality (proper cultivar selection, better rotations, timely harvest)
  - 33% improved weed control strategies
  - "I need to plan in advance on how I will watch for disease, learn what to look for, how to test, minimize risk"
  - "It is so remarkable that such a good event is devoted to such a fringe agricultural endeavor"
  - "Excellent discussion with practical applications"
- Annual Hops Conferences
  - 56-85% improved scouting skills
  - 63% implemented crowning to control downy mildew
  - 47% improved hop quality
  - "I was very impressed with the conference. I got all the info I needed to get started"

Grain Disease Survey

- Identified pests not previously identified in the fields. Farmers learned how to identify the pests
- Worked with one farm on identification/management of long term bacterial bean blight problem
- Two farms unknowingly planted anthracnose-contaminated seed, leading to 80-100% loss. Pathogen identified by Plant Diagnostic Clinic, seed seller notified
- Scouted farms have minimized pesticide application or adopted new pest control strategies

Loose Smut Seed Lot Testing

- Farmers are able to identify Loose smut in field, know not to save seed from infected fields for planting
- Only one of four contaminated lots tested positive, indicating current methods for determining infection in small grains are not reliable, better testing methods need to be developed.

Apple Extension, Outreach, Education

- VT Tree Fruit Growers Association annual meetings
  - 63% changed Fire Blight management (canker identification/removal, management models, timing); 30% used NEWA as decision tool for streptomycin use
  - 29% changed Apple Scab management (pesticide selection); 33% changed SDHI fungicide use (alternating different chemistries)
  - 20% changed Apple Replant Disease management
  - 57% changed Lepidopteran management (mating disruption, timing)
  - Changes most often made to improve pest management confidence, decrease pesticide use, reduce use of broad spectrum pesticides, improve crop quality
  - "I found I was not placing some of my insect traps correctly"
  - "Learned more about need to monitor BMSB before treating"
  - "Great discussions of current issues for our orchards"

Apple IPM Guideline Assessment

- 4% increase in average scores upon follow-up assessment (improved pest monitoring, insect management, vertebrate management; decreased disease management, weather/crop monitoring)

Grape Extension, Outreach, Education

- VT Grape & Wine Council annual meeting
  - Increased knowledge of FRAC/IRAC codes for resistance management (38%), Pesticide Signal Words (42%); symptoms for diseases (30-67%)
  - "Broadened my grape growing knowledge, provided specific examples of IPM practices"
- NY & VT Winter Grape School
  - 55% improved attention to disease management
  - "I finally identified anthracnose, will spray accordingly"
  - "Your spray reminder/updates are critical to my success. Thank you so much for sending these out. I do my best, but your insight/reminders are so helpful"

Grape IPM Guideline Assessment

- 41% increase in average scores in all IPM areas upon follow-up assessment

IPM First for Greenhouse Ornamentals

- 68% of sites enrolled in IPM First continue to use plant-mediated IPM (trap, habitat, banker plants)
- One participating site reduced chemical pesticide use over 50% by incorporating routine scouting, rotation of chemistries (had previously relied solely on prophylactic chemical applications)
- Past participants host biological control tours for growers, public; One works with a school to produce aphid banker plants for production houses

Tri-State Greenhouse IPM Workshops

- 81% improved pest identification skills, used biological control agents
- 75% adopted plant-mediated IPM, improved natural enemy identification
- 63% switched from chemical to integrated/biocontrol management
- 70% reduced pesticide applications by >50%,
- "Wonderfully informative, continually helpful in our IPM program, successful reduction of pesticides"
- "They give us confidence to implement (IPM) into a program"
- "Very valuable course, changed our pest approach radically over the years, reduced spraying by 90%"

Green Industry IPM ambassadors

- 45% used habitat plantings to bring beneficial insects (natural enemies, pollinators) to production areas
- 82% adopted an IPM practice (78% used biocontrols, 28% used plant-mediated IPM, 17% scouted pests more frequently)
- 36% applied pesticides less frequently, 51% fewer pesticides applied on average
- 14% switched to reduced risk chemistries
- 29% used Plant Diagnostic Clinic, 66% used >2x per season

Regional IPM Workshops for Landscapers

- 87% learned techniques they intend to use (predatory midges/mites)
- 1 professional arborist using predatory midges on street trees to reduce complaints of aphid honeydew

Master Gardener Course IPM Lectures

- 89-100% gained better understanding of how to apply IPM practices, confidence to accurately explain principles of IPM (28-44% increase from being unfamiliar with IPM prior to class)
- 92-95% were able to name a specific IPM practice for managing white grub in lawns, tomato late blight
- 79-89% changed specific garden practices to incorporate IPM
- "I really enjoyed span of information provided in this course. I am eager to put some of my new knowledge into practice in the community"
- "Inspired me to want to continue learning in more detail"

Master Gardener Advanced Training IPM Webinars

- 92% able to name specific IPM practices for managing white grubs, weeds in turf, late blight of tomato
- "Being able to see existing problems up close/personal has so many useful benefits""

Master Gardener Helpline

- 89-94% of clients used IPM (cultural practices, use of least toxic pesticides) to manage pests
- 68-85% of clients reduced use of pesticides

- "Your research/information helps me avoid experimental/chemical/pruning solutions that might inflict harm"
- "I might have tried to use pesticides without the information. Instead took advantage of life cycle to reduce population through timing"
- "This information lets us know when to address a problem quickly, when to let things go that aren't really problems"
- "I got information about graduated steps to try before pesticides, then graduated types of pesticides"

Plant Diagnostic Clinic disease/insect/weed diagnostics

- 93-100% of clients used IPM (cultural practices, use of least toxic pesticides) to manage pest
- 71-87% of clients reduced use of pesticides

- $3500 estimated yield gain ($300 input savings) by one client

• "The PDC directly influences amount of pesticide we use. When you have a diagnosis then you can correctly treat the problem, not have to guess/try multiple products"
• "PDC have identified several new pests not yet seen in VT. This has helped us make management plans, but also provided an early warning to the produce industry"
• "In course of helping with a diagnosis, PDC contacted experts throughout the northeast. PDC is a real diagnostic multiplier "
• "As a result of PDC identification, we have shifted our approach to managing several crop diseases through cultural practices"

Targeted stakeholder groups

• 92% of VT Grape & Wine Council members learned of PDC services (71% increase)
• 56% increase in apple growers, 9% increase in grape growers, 13% decrease in landscapers submitting samples

• 92% of targeted stakeholders indicated they had adopted an IPM practice

Plant Diagnostic Clinic Extension presentations/workshops

• Field & Forage Disease IPM annual workshops
  • 54-70% adopted a new IPM practice that reduced pesticide use
• VT Vegetable & Berry Growers annual meetings
  • 94% adopted a new IPM practice that reduced pesticide use

What opportunities for training and professional development has the project provided?

Summary: September 2014 - August 2017 http://go.uvm.edu/qc8z6
Agronomy Field Days

• **13 events, 1104 attendees:** Annual Crops and Soils Field Days, Annual Grain Research Tours, Growing Dry Beans in VT, Hop Harvesting Field Day, Hopping and Milling, Successfully Starting a Hop Yard, Getting Started with Grains, Organic Wheat Production and Processing, Harvesting and Malting Barley

Agronomy Winter Conferences

• **6 events, 904 attendees:** Annual Hops Conferences, Annual Grain Growers Conferences

Agronomy Web Resources

• 82 annual research reports on grains, hops, oilseeds, dry beans from trials posted on website www.uvm.edu/extension/cropsoil/research
• 7 grains, oilseeds pest management blog posts http://blog.uvm.edu/outcropn/
• 26 Hop Blog Posts http://blog.uvm.edu/hoppenin/

• 8 YouTube videos, 14,473 views: VT Hops Power Hours; Trials and Tribulations from Your Barley Field; Developing Barley for Food, Feed, and Malt; 2015 Grain Growers Conference Keynote; Getting Started with Growing Hops https://www.youtube.com/channel/UC7sh59UG2pKqfmPMfaVxpbA

• 50 hops, grains, beans, oilseeds facebook posts https://www.facebook.com/uvmcropsoil/

Grain Disease Survey

• Annual scouting of winter/spring wheat, barley, hops, dry beans in fifteen VT towns; Northfield, MA; Essex, NY
• Identified pathogens with help from UVM Plant Diagnostic Clinic
• Scouting reports, "cheat sheets" for grains, hops, dry beans created (see research reports)

Loose Smut Seed Lot Testing

• Farms identified for seed lot testing, grain samples submitted for testing after harvesting
• Four contaminated seed lots sent for testing using embryo count method

Guides of Pests in New England for oilseeds, grains, and hops

• "Growing Organic Cereal Grains in New England" created, updated https://extension.umaine.edu/publications/2207e/
• "What Hops in a Hop Yard?" created, updated http://go.uvm.edu/wn5eu
• "Oilseed Production in the Northeast" created, updated http://go.uvm.edu/h7jc1
• "Northeast Dry Bean Production Guide" created, updated http://go.uvm.edu/tfm2q

- USDA ARS "Field Guide for Integrated Pest Management in Hops" update on potato leafhopper https://www.ars.usda.gov/ARSUserFiles/37109/hophandbook2010.pdf

Apple Extension, Outreach, Education

- **12 events, 574 attendees:** Planning/presentations at VT Tree Fruit Growers Association annual meetings and New England Vegetable & Fruit Conference; Two on-farm workshop tours, Northeastern NY Commercial Tree Fruit School, Effective Orchard Spraying, Eastern NY Commercial Horticulture Program Champlain Valley Petal Fall Meeting, US Association of Cider Makers Conference: Advanced Cider Orchard Production Workshop, Non-Chemical Weed Management in Northeast Apple Orchards

Apple Extension, Outreach, Education

- 21,948 page views of UVM Fruit: Tree Fruit http://www.uvm.edu/~fruit/?Page=treefruit/tf_home.html&SM=tf_submenu.html
- 158 email addresses subscribed vtapplegrower@list.uvm.edu.
- 125 IPM blog posts http://blog.uvm.edu/fruit/
- 1 post to eXtension
- 192 one-on-one consultations
- Annual revisions of New England Tree Fruit Management Guide https://ag.umass.edu/fruit/publications/new-england-tree-fruit-management-guide
- 1 American Society of Horticultural Science HortIM fact sheet http://hortim.ashsmedia.org/items/show/52

Apple IPM Guideline Assessment

- "Integrated Pest Management (IPM) Assessment for Apples and Wine Grapes, Pilot Program 2016-2017" http://go.uvm.edu/bg6l3

Grape Extension, Outreach, Education

- **3 events, 183 attendees:** Planning/presentations VT Grape and Wine Council annual meeting, New England Vegetable & Fruit Conference; NY & VT Winter Grape School

Grape Extension, Outreach, Education

- 5,973 page views of UVM Fruit: Grapes http://www.uvm.edu/~fruit/?Page=grapes/gr_home.html&SM=gr_submenu.html
- 273 email addresses subscribed vermontgrape@list.uvm.edu
- 90 IPM blog posts
- 58 one-on-one consultations
- 2 American Society of Horticultural Science HortIM fact sheets http://hortim.ashsmedia.org/items/show/48, http://hortim.ashsmedia.org/items/show/49

Grape IPM Guideline Assessment

- "Integrated Pest Management (IPM) Assessment for Apples and Wine Grapes, Pilot Program 2016-2017" http://go.uvm.edu/bg6l3

IPM First for Greenhouse Ornamentals

- 28 greenhouse ornamental operations (70+ growers) received individualized training to increase IPM adoption
- 180+ individual site visits
- **24 events, 540+ attendees:** New England Greenhouse Conference, high school tech center, regional workshops, IPM tours, presentations given by an IPM First grower at Tri-State Greenhouse IPM Workshops, news segment on local TV, national conference presentation
- Technical school advisory committee developing IPM curriculum for greenhouse production courses
- IPM for ornamentals educational display, brochure for general public at Champlain Valley Fair Garden Center

Tri-State Greenhouse IPM Workshops

- **3 events, 480 attendees:** annual Tri-State Greenhouse IPM Workshops

Green Industry IPM ambassadors

- 10 garden centers/nurseries (30+ growers/staff) received individualized support to expand IPM adoption and to serve as Green Industry ambassadors
- 55+ individual site visits

- **8 events, 8+ attendees:** habitat planting demonstration, establishment of natural enemies/habitat plantings in landscapes conference, Tri-State Greenhouse IPM Workshop presentations, presentations for nurseries on reducing invasive earthworm movement
- Customer education display about providing habitat for natural enemies in landscapes
- "Identification & Management of White Grubs in Vermont's Greenscapes" factsheet, disseminated to landscape professionals http://go.uvm.edu/vr5s2

Regional IPM Workshops for Landscapers

- **2 events, 35 attendees:** half-day seminar on biological control for landscapes at Northern New England Chapter of Assoc. of Physical Plant Administrators meeting

Development of Landscape IPM webpage

- http://www.uvm.edu/~entlab/Landscape%20IPM/LandscapeIPM.html

Master Gardener Course IPM Lectures

- **9 events, 357 students:** in annual classes on Plant Disease and IPM, Healthy Lawn Management, and Entomology
- Over 550 certified Master Gardener volunteers (former students) logged over 30,500 hours educating the public about home gardening, pesticide reduction, water quality, sustainable landscapes, local food production

Master Gardener Helpline

- **2777 home gardener questions answered/IPM information provided**

Master Gardener Advanced Training IPM Webinars

- **6 events, 123 attendees:** IPM for Weed & Turf Management, IPM for Fungal Diseases of Tomato, Tree & Shrub Pest and Disease Walk, annual Helpline Training

Master Gardener IPM Factsheets

- 3 factsheets: Tomato Problems in the Home Garden, Identification & Management of White Grubs in Vermont's Greenscapes, Maple Problems https://www.uvm.edu/extension/mastergardener/gardening-resources

Plant Diagnostic Clinic disease/insect/weed diagnostics

- **1065 samples processed:** diagnosis/IPM information provided to commercial growers, Master Gardeners, general public

Plant Diagnostic Clinic Targeted stakeholder groups

- Advertised to VT Tree Fruit Growers Association in annual newsletters, meetings
- Annual articles "Current Disease Issues and IPM" in VT Nursery and Landscape Association newsletter

Plant Diagnostic Clinic Extension presentations/workshops

- **36 events, 2085 attendees:** field crop and forage growers, UVM Farmer Training Program students, a VT Grape and Wine Council annual meeting, VT Vegetable and Berry Growers association meetings, NOFA-VT organic association meetings, New England Vegetable & Fruit Conference
- 21 Across the Fence Extension Television programs on IPM https://www.uvm.edu/extension/atfence/
- Annual columns on current/emerging pests in bi-weekly VT Vegetable and Berry Newsletter; 750 New England growers https://www.uvm.edu/vtvegandberry/newsletter/datenavbar.htm
- Regular "From the Plant Diagnostic Clinic" column in monthly VT Agency of Agriculture newsletter; 450 VT & New England growers, companies, universities, agencies http://agriculture.vermont.gov/news_media/agriview

How have the results been disseminated to communities of interest?

- Agronomy IPM information is distributed through field days, winter meetings, blogs, websites, webinars, YouTube videos, phone calls, emails and social media. A live broadcast of the hops winter conference and the grain growers' conference are made available and archived online. Scouting reports and "cheat sheets" are also distributed as hard copies. Information collected in Loose Smut Seed Lot Testing will remain confidential.
- Apple and Grape IPM information is distributed through newsletters, website, IPM alerts, winter and summer meetings, conferences, site visits, emails and phone calls. Information collected in assessment surveys will remain confidential.
- Greenhouse and Landscape IPM information is distributed through workshops, conferences, presentations, site visits,

phone calls, emails, factsheets, websites, and social media.

• IPM information is delivered through the UVM Master Gardener course, through the UVM Master Gardener Helpline, through factsheets, and statewide projects.

• Plant Diagnostic Clinic IPM information is distributed through sample diagnosis, websites, newsletters, television, presentations, workshops, emails, and phone calls.

What do you plan to do during the next reporting period to accomplish the goals?

{Nothing to report}

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	0.3	0	0	0	0.3
Technical	0.5	0	0	0	0.5
Administrative	0.3	0	0	0	0.3
Other	0	0	0	0	0
Computed Total	1.5	0	0	0	1.5

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: new and established grain/dry bean/hop farmers, apple growers, grape growers, greenhouse ornamentals/cut flowers/vegetable growers, landscape/perennial/nursery stock growers, landscape managers/groundskeepers, and product end-users such as brewers, bakers, or millers. Master Gardeners, home gardeners, general public, schools and communities are also target audiences for portions of this project

Products

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

Bradshaw, T., Kingsley-Richards, S. UVM Fruit Grape Website: http://www.uvm.edu/~fruit/?Page=grapes/gr_home.html&SM=gr_submenu.html

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

Bradshaw, T., Kingsley-Richards, S. UVM Fruit Tree Fruit Website: http://www.uvm.edu/~fruit/?Page=treefruit/tf_home.html&SM=tf_submenu.html

Accession No. 1004998 **Project No. VTN29202**

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2017	YES

Citation

Bradshaw, Terence. Non-Chemical Weed Management in Apple Orchards, ASHS HortIM, accessed July 12, 2017, http://hortim.ashsmedia.org/items/show/52

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2017	YES

Citation

Bradshaw, Terence and Lorraine P. Berkett, 2017. An Initial IPM Strategy for New Cold Climate Winegrape Growers, ASHS HortIM, http://hortim.ashsmedia.org/items/show/48

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2017	YES

Citation

Bradshaw, Terence and Lorraine P. Berkett, 2017. Relative Disease Ratings for Wine Grape Varieties Grown in Vermont, ASHS HortIM, http://hortim.ashsmedia.org/items/show/49

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	YES

Citation

Bradshaw, T.L., Berkett, L.P., Moran, R.E., Garcia, M.E., Darby, H.M., Parsons, R.L., Kingsley-Richards, S.L., Griffith, M.C., Bosworth, S.C. and Görres, J.H. 2016. Disease and arthropod pest incidence in two organic apple orchard systems in Vermont, USA, 2008-2013. Acta Hortic. 1137, 129-136.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2018	NO

Citation

Bradshaw, T.L., Hazelrigg, A.L. and Berkett, L.P. 2018. Characteristics of the cold-climate winegrape industry in Vermont, USA. Acta Hortic. 1205, 469-476.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	YES

Citation

Bradshaw, T.L., Hazelrigg, A., Kingsley-Richards S.L., and Foster, J.A. 2016. Biological disease management of Vf-gene scab resistant organic apples, 2015. Plant Dis. Manag. Rep. 10:PF032.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	YES

Citation

Bradshaw, T.L., Hazelrigg, A., Kingsley-Richards S.L., and Foster, J.A. 2016. Field assessment of salicylic acid to aid in reduction of sulfur to manage apple scab. Plant Dis. Manag. Rep. 10:PF031.

Accession No. 1004998 **Project No. VTN29202**

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

Darby, H. Northwest Crops and Soils Program Website: http://www.uvm.edu/extension/cropsoil

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

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

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

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

Type	Status	Year Published	NIFA Support Acknowledged
Theses/Dissertations	Published	2015	NO

Citation

Hazelrigg, A.L. 2015. The Efficacy and non-target impacts of an organic disease management systems containing biostimulants compared with two sulfur-based systems on four apple cultivars in Vermont. Ph.D. Dissertation. http://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1333&context=graddis

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	NO

Citation

Hazelrigg, A.L., Berkett, L.P., Darby, H.M., Görres, J.H. and Parsons, R.L. 2016. Assessment of agricultural biostimulants compared with sulfur-based fungicides on diseases, tree growth, fruit yield and quality on three cultivars in a certified organic apple orchard in Vermont, ME, USA. Acta Hortic. 1137, 161-168.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	NO

Citation

Hazelrigg, A.L., Berkett, L.P., Darby, H.M., Görres, J.H. and Parsons, R.L. 2016. Non-target impacts of agricultural biostimulants compared with sulfur-based fungicides on pest and beneficial arthropods on three cultivars in a certified organic apple orchard in Vermont, ME, USA. Acta Hortic. 1137, 169-172.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	NO

Citation

Hazelrigg, A.L., Berkett, L.P., Darby, H.M., Görres, J.H. and Parsons, R.L. 2016. Non-target impacts of agricultural biostimulants compared with sulfur-based fungicides on phytophagous mites on 'Zestar!' apple trees in a certified organic orchard in Vermont, USA. Acta Hortic. 1137, 173-176.

Accession No. 1004998 **Project No. VTN29202**

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2018	NO

Citation

Hazelrigg, A.L., Bradshaw, T.L., Maia, G.S., Kingsley-Richards, S.L. and Berkett, L.P. 2018. Disease susceptibility of cold-climate grapes in Vermont, USA. Acta Hortic. 1205, 477-482.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2014	NO

Citation

Noel, Z.A., Bradshaw, T.L., Kingsley-Richards, S.L., and L.P. Berkett. 2014. Evaluation of the efficacy of natural resistance in 'Honeycrisp' to reduce fungicide applications for Venturia inaequalis, 2012-2013. Plant Disease Management Reports 9:PF004.

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2014	NO

Citation

Parker, B.L., Skinner, M., Tobi, D. and Wanderlich S. 2014. General facts about conifer root aphids and management considerations. UVM Entomology Research Lab., Burlington. https://cdn.sare.org/wp-content/uploads/20171204120041/GeneralFactsaboutConiferRootAphid.pdf

Type	Status	Year Published	NIFA Support Acknowledged
Other	Published	2015	NO

Citation

Parker, B.L., D. Tobi, D., Wanderlich, S. and Skinner, M. 2015. Biological Control of Conifer Root Aphids in Christmas Trees: An Update. UVM Entomology Research Lab., Burlington. https://cdn.sare.org/wp-content/uploads/20171204115943/BiologicalControlofConiferRootAphidDraft.pdf

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2016	NO

Citation

Smith, Richard G., Sonja K. Birthisel, Sidney C. Bosworth, Bryan Brown, Thomas M. Davis, Eric R. Gallandt, Ann Hazelrigg, Eric Venturini, and Nicholas D. Warren. 2016. Environmental correlates with germinable weed seed banks on organic farms across northern New England. Weed Science, 66(1), 78-93.

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

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

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2018	YES

Citation

Sullivan, C.E.F. and Skinner, M. Landscape Integrated Pest Management Website: http://www.uvm.edu/~entlab/Landscape%20IPM/LandscapeIPM.html

Accession No. 1004998	Project No. VTN29202

Type	Status	Year Published	NIFA Support Acknowledged
Websites	Published	2017	YES

Citation

Twilight meeting focuses on fertility and weed control in apples. Country Folks New England. 4/28/2017. http://countryfolks.com/twilight-meeting-focuses-on-fertility-and-weed-control-in-apples/

Other Products

Product Type

Other

Description

Agronomy Field Days highlighting grain, oilseed, and hops pest management trials, scouting strategies, and pest identification tools.

Product Type

Other

Description

Agronomy Winter Conferences on pests, diseases, weeds and IPM specific to grain, oilseed, and hops. Webinars streamed live from each event.

Product Type

Audio or Video

Description

Agronomy Web Resources: website, blogs, YouTube videos, pest management information briefs

Product Type

Data and Research Material

Description

Grain Disease Survey: survey New England farms for foliar disease.

Product Type

Data and Research Material

Description

Loose Smut Seed Lot Testing. Farmers sent results and info on how to reduce loose smut in fields and seed lots.

Product Type

Educational Aids or Curricula

Description

Guides of Pests in New England for oilseeds, grains, and hops including pest id, lifecycle and management tools.

Accession No. 1004998 **Project No. VTN29202**

Product Type

Other

Description

Apple 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

Educational Aids or Curricula

Description

Apple IPM Guideline Assessment: selected group of advisory stakeholders participated in a survey of crop-specific IPM practices practiced in their orchard operation.

Product Type

Other

Description

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, planning and presentations at regional grower meetings.

Product Type

Educational Aids or Curricula

Description

Grape IPM Guideline Assessment: selected group of advisory stakeholders participated in a survey of crop-specific IPM practices practiced in their vineyard operation.

Product Type

Educational Aids or Curricula

Description

IPM First for Greenhouse Ornamentals: a statewide individualized grower program. UVM personnel visited each grower to provide one-on-one instruction and support on selecting, adopting and using plant-mediated IPM systems.

Product Type

Other

Description

Tri-State Greenhouse IPM Workshops: hands-on IPM demonstrations and IPM information packets.

Product Type

Educational Aids or Curricula

Description

Green Industry IPM ambassadors: a statewide individualized landscape/nursery industry stakeholder program. UVM personnel visited each stakeholder to provide one-on-one instruction and support on selecting, adopting and using plant-mediated IPM systems. Stakeholders will subsequently assist with promoting IPM to other growers.

Product Type
Other

Description
Regional IPM Workshops for Landscapers: hands-on IPM demonstrations and IPM information packets. Presentations also given at Green Industry association meetings.

Product Type
Educational Aids or Curricula

Description
Landscape IPM webpage and brochure: Development of Landscape IPM webpage and Landscape IPM Brochure.

Product Type
Educational Aids or Curricula

Description
Master Gardener Course IPM Lectures: a 13 week course with 200 students including three lectures on IPM topics.

Product Type
Other

Description
Master Gardener Helpline: a popular statewide toll-free source for gardeners needing information on current insect, weed and diseases

Product Type
Educational Aids or Curricula

Description
Master Gardener Advanced Training IPM Webinars: part of the training for the MG volunteers in advanced IPM concepts and emerging insect, weed and disease problems.

Product Type
Educational Aids or Curricula

Description
Master Gardener IPM Factsheets: developed by subject matter specialists and made available to the public on the Master Gardener website, and provided for MG information tables at fairs and farmer's markets.

Product Type
Other

Description
Plant Diagnostic Clinic disease/insect/weed diagnostics: diagnosis and IPM recommendations. Clients include commercial growers (agronomic, apple, grape, greenhouse, landscape, nursery, vegetable, berry, etc.), Master Gardener Helpline, the gardening public and urban consumers.

Product Type
Other

Description
Targeted stakeholder groups: apple growers, grape growers, and landscapers targeted through presentations and grower listservs to make them aware of the Plant Diagnostic Clinic's services.

Accession No. 1004998 **Project No. VTN29202**

Product Type

Other

Description

Plant Diagnostic Clinic Extension presentations/workshops: addressing current and emerging insect, weed and diseases using IPM tactics in commercial crops, for the vegetable and small fruit growers, and for Master Gardeners. Also information on insect, weed and disease outbreaks, id and IPM management strategies provided for MG volunteers, home gardeners and urban consumers through television, factsheets, listservs, MG blogs, websites, webinars, articles and newsletters.

Changes/Problems

- "Grain Disease Survey" was expanded to include scouting for arthropod pests and downy mildew severity in all hop trials at the Alburgh, VT research farm in addition to nine other farms.
- "Grape Extension, Outreach, Education" opportunities were greatly reduced by discontinuation of the Vermont Grape & Wine Council annual meetings in 2016.
- "IPM First for Greenhouse Ornamentals" and "Green Industry IPM ambassadors" number of recruits was reduced and sites limited primarily to Northwestern VT due to reduced funding.
- Only one "Regional IPM Workshop for Landscapers" was offered (in VT) due to reduced funding: Landscape topics were included in the 2017 "Tri-State Greenhouse IPM Workshops" in ME, NH and VT.
- "The Landscape IPM Steering Committee" was not established due to reduced funding.
- The "Master Gardener Course" switched to an online webinar format starting in 2015 due to the loss of the 11 VT interactive television facilities. 100% of students found the new technology to be effective for the course.
- A change of Master Gardener coordinators in 2016 resulted in 5 months without a full time coordinator.
- "Master Gardener IPM Factsheets" on weeds in lawns was not produced; a factsheet on maple problems was produced.
- No changes/problems of note for other project programs.