

**Vermont IPM Extension Implementation Program
2022-2023 Annual NEERA Report
Ann Hazelrigg, Ph.D., P.I.**

IPM Implementation in Agronomic Crops - Heather Darby

Field Days & Winter Conferences

- Fall Field Day: hemp, small grains seed health relationship to crop health/yields 10/22/21 (116 attendees)
IMPACTS:
 - 88% increase knowledge of prevalent pests, IPM practices to minimize yield/quality impact
- Small Grain Webinar Series: small grains production, seed quality, head diseases, storage, IPM Provided links to scouting tools and factsheets 3/22,3/24, 3/30, 4/5, 4/6/22 (146 attendees)
IMPACTS:
 - 76% increase knowledge of prevalent pests, IPM practices to minimize yield/quality impact
- Hemp Conference: production, disease management, weed management, arthropod management. Shared links to scouting tools, factsheets, and goScout 3/15 & 3/16/22 (108 attendees)
IMPACTS:
 - 94% increase knowledge of prevalent pests, IPM practices to minimize yield/quality impact
 - 82% intend to implement or adjust a IPM practice to manage pests in hemp
- Annual Crop and Soil Field Day: hemp, hops, small grains pest identification, scouting, and management. Provided pest management guides and training on goScout 7/28/22 (180 attendees)
IMPACTS:
 - 84% increase knowledge of hemp, grain, hop pests, IPM practices to minimize impacts on yield/quality
 - 56% intend to implement a new IPM strategy to manage pests
 - 72% will purchase certified seed
 - 58% improve crop rotation
 - 93% will buy tolerant or resistant varieties
 - 45% will modify mechanical cultivation

Hop and Hemp Disease Survey

- 3 hop farms in MA/VT visited in August to assess hop cone disease incidence and severity. Samples taken from varieties exhibiting disease symptoms. Disease identification completed by the UVM Plant Diagnostic Clinic. Diseases identified included, downy mildew, Alternaria cone disease, botrytis, and powdery mildew. Farms provided results and disease management factsheets.
- 5 hemp farms in VT visited approaching harvest time. Plants assessed for overall health and signs of disease. Scouting sheets shared with the farmers.

IMPACTS:

- 100% increase knowledge on pest scouting, pest identification, and possible IPM strategies to manage pest pressure and impact on crop

Seed Quality Testing

- Seed quality testing offered to farmers so they can identify seedborne diseases and seed health and potentially harmful mycotoxins. 225 small grain and corn samples submitted by farmers for mycotoxin analysis, seedborne disease assessment, and/or germination rate. A disease factsheet accompanies the results.

IMPACTS:

- 96% increase knowledge of prevalent diseases, IPM practices to minimize yield/quality impact
- 76% intend to implement a new IPM strategy to manage seedborne diseases
- 92% will purchase certified seed
- 62% improve crop rotation
- 74% will buy tolerant or resistant varieties
- 83% will manage harvest to segregate lots of seed

Extension Outreach Education

- 3 blog posts (174 subscribers) <http://blog.uvm.edu/outcropn> : Industrial Hemp Regional Scouting Pest Survey update, When to Test for Aflatoxins, Managing Disease on Hemp Farms
- Darby, H. 2022. When to Test for Aflatoxins. St. Albans VT https://www.uvm.edu/sites/default/files/Northwest-Crops-and-Soils-Program/Articles_and_Factsheets/Aflatoxins_FactSheet.pdf

IPM Implementation in Specialty Crops: Tree Fruit/Grapes - Terry Bradshaw**Orchard Scouting Network**

- 4 orchards scouted by undergraduate UVM Agroecology and Extension (AX) Fellows weekly with growers, results reported in program newsletters
- 8 other orchards visited by AX Fellows with UVM Extension personnel for in-depth consultations on production issues

Grape 'Natural' Production Evaluation

- 2 vineyards conducted research on organic disease management: four biofungicides combined with low-rate sulfur and/or copper effects on disease/crop yield and quantity, cultivar evaluation better-suited for 'grower standard' organic disease management.
- Survey results: 'natural' methods included those used in organic production (mineral fungicides, biofungicides, biodynamic preparations and other alternatives) with few producers 'very satisfied' with management practices leaves considerable room for improvement.

Extension Outreach Education

- 164 subscribed to vtapplegrower@list.uvm.edu listserv; 297 subscribed to vermontgrape@list.uvm.edu listserv
- 49 UVM Fruit blog posts <http://go.uvm.edu/ogreu>
- 100 grower consultations
- Presentations:

- Vineyard disease management that works. 2022 New England Vegetable and Fruit Conference. Manchester NH. 12/15/22 (45)
- Question those assumptions: Success with modern orchard systems demands attention to the details. 2022 New England Vegetable and Fruit Conference. Manchester NH. 12/14/22 (85)
- Apple Insect Management in Cider Apple Production Systems. West Virginia University Cider School. Online 6/8/22 (35)
- Northeast Cider Apple Project. New England Extension Fruit Consortium Winter Webinar Series 3/22/22 (100)
- Journal Articles
 - Bradshaw T., Autio, W. Blatt, S. Clements, J. Einhorn, T. Elkins, R. Fallahi, E., Francescatto, P., Lordan, J., Minas, I., Peck, G., Robinson, T., and Yao, S. 2023. Performance of 'Modi' apple trees after 5 years under Organic management as affected by several dwarf rootstocks in the 2015 NC-140 Apple Rootstock Trial. J Am Pom Soc. (APS) 77:14-27 http://www.pubhort.org/aps/77/v77_n1_a2.htm
 - Foster, J., Kingsley-Richards, S.L. and Bradshaw, T.L. 2022. Summer applications of NAA and ethephon show little effect on return bloom, yield, tree growth, and juice quality of cider apple cultivars. Acta Hort. 1346, 511-518 DOI: 10.17660/ActaHortic.2022.1346.65.
 - Foster, J. Kingsley-Richards, S.L., and Bradshaw, T. 2022. Effect of Summer Hedging on Return Bloom, Yield, Tree Growth, and Juice Quality of Apples Grown for Cider. Acta Hort. 1346, 439-446. DOI: 10.17660/ActaHortic.2022.1346.56

IPM Implementation in Specialty Crops: Ornamentals/Vegetables in Greenhouse/High Tunnel/Nursery - Margaret Skinner

Tri-State IPM

- 100 attendees (including presenters and organizers) The ABCs of a Better Crop: new pesticide chemistries and biocontrol compatibility, scheduling biocontrol releases, disorder diagnosis and management, sanitation strategies, UV light for thrips and powdery mildew, Systems Approach to Nursery Certification (SANC), top diseases from 2022. Pesticide recertification certificates @4 credits each 1/19/23, 1/26/23 <https://go.uvm.edu/iu58h>

IMPACTS:

- 89% average usefulness rating for solving pest management problems
- 77% indicated they learned new techniques to use in their production this year
- 26% learned new biocontrol use and release information they intend to use this year
- 28% learned new pesticide-biocontrol compatibility strategies they intend to use this year
- 42% learned new abiotic disorder ID and management techniques they intend to use this year
- 47% learned new sanitation strategies they intend to use this year
- 70% increased knowledge about biological control
- 65% increased knowledge about integrating chemical pesticides with biological control
- 73% increased knowledge about sanitation strategies
- 58% increased knowledge about disorder diagnosis

IPM First

- 40+ growers provided ongoing support as needed

- 90+ consultations (site visits, email exchanges, phone calls, insect id requests, etc.)

Extension Outreach Education

- Presentations (~300 attendees)
 - UV to Manage Western Flower. Pest management research short reports & open discussion. Tri-State Greenhouse IPM Workshop. Online 1/19/23
 - Self-sustaining Beauveria bassiana granules for the biological control of Western flower thrips, Frankliniella occidentalis. ESA, ESC, and ESBC Joint Annual Meeting Incorporating Microbials into the Culture of IPM; On-Demand Presentations. Vancouver, British Columbia. Online 11/13-11/16/22
 - Benefits for beneficials – habitat plantings discussion. Research Highlights Tour - Vermont Nursery and Landscape Association Summer Meeting. UVM Horticulture Research Facility 8/25/22
 - Benefits for Beneficials: Habitat Hedges. Public webinar in place of cancelled on-site demo (rain). Online 8/17/22
 - Habitat plantings in field vegetables to attract beneficials. UVM Farmer Training Program Guest Lecturer. UVM Horticulture Research Facility 7/13/22
 - High Tunnel Pests & Natural Enemies 101. UVM Farmer Training Program Guest Lecturer. UVM Horticulture Research Facility 7/13/22
 - Un-Bee-lievable Beneficials 101. UVM Master Gardener Seminar. Online 5/25/22.
 - Plant-Mediated Systems for High Tunnels. Mid Atlantic Fruit and Vegetable Convention February 2022.
- 2 factsheets: High tunnel scouting for beginners, Syrphid (hover) flies of Vermont
- 1 email listserv blurb (~900 subscribers)
- 2 newsletter articles:
 - Magnificent Marigolds and Awesome Alyssum: Plant-Mediated Systems for High Tunnels. Rodale Institute Pocono Organic Center Newsletter, October 2022
 - Be on the lookout for Aphid Problems in High Tunnels. VVBA Electronic Newsletter 7/1/22 <https://www.uvm.edu/vtvegandberry/newsletter/7-1-22.pdf>
- 1 scientific article: Sullivan, C.F., Davari, A., Parker, B.L., Skinner, M. A Guardian Plant System for Management of Frankliniella occidentalis (Thysanoptera: Thripidae) in Greenhouse Ornamentals. Pest Manage. Sci. *Under review*.
- 1 new high tunnel IPM webpage High Tunnel Production ToolKit <https://www.uvm.edu/~htunnel/>, maintained 5 existing webpages

IPM Implementation in Communities - Ann Hazelrigg and Deb Heleba

Master Gardener Course

- No course offered in 2022 due to hiring of new Coordinator

Master Gardener Helpline

- 397 IPM questions answered
- Program uses a hybrid approach -- phone and online (through Ask Extension) -- to manage public gardening questions

IMPACTS:

- 90% said the info they received on IPM strategies that addressed their questions
- 68% implemented the IPM strategies recommended
- 54% reduced or avoided the use of pesticides

- \$124 average individual saving in pesticide costs

Advanced Training Webinars

- Soil Health Webinar: Nutrient Management Planning for Lawn & Garden. UVM Master Gardener Helpline Annual Spring Training 3/9/22 (19 attendees and 8 recording views)
- Garden Pests for 2022 Webinar 4/21/22 (27 attendees and 11 recording views)
- Mindful Pest Management Webinar 6/29/22 (20 attendees and 32 recording views)
- “Bringing Nature Home to Vermont” and “IPM Update: Looking Back & Looking Forward” keynote presentations annual UVM Extension Master Gardener Conference 12/3/22 (120 attendees)

IPM for Pollinator Health

Tree Fruit Pollinator Community Assessment

- Bee boxes installed for 2022 season

Greenhouse/High Tunnel/Nursery Pollinator Plantings

- Habitat plantings, educational signs and brochure holders established at 6 sites
- 900 beneficial habitat plantings brochures distributed
- 1 factsheet
- 5 presentations (~150 attendees)

Master Gardener Pollinator Education

- Un-Bee-lievable Beneficials 101 5/25/22 (13 attendees and 45 recording views)
- Benefits for Beneficials: Habitat Hedges 8/17/22 (9 attendees and 107 recording views)

Pesticide Education Pollinator IPM Training

- Reducing Pesticide Risk to Pollinators in Pest Management (Laura Johnson). Commercial Pesticide Applicator Meeting, live online: 3/28/22 (58)

IMPACTS:

- 88% moderately/very likely to adopt at least one new IPM practice to protect pollinators
- Pollinators. Initial Pesticide Certification Meetings White River Junction VT 4/19/22 (27), Burlington VT 4/21/22 (33)

IMPACTS:

- 89% moderately/very likely to adopt at least one new IPM practice to protect pollinators

IPM Support for Pest Diagnostic Facilities – Ann Hazelrigg

Plant Diagnostic Clinic Disease/Insect/Weed Diagnostics

- 166 Commercial samples diagnosed, IPM information provided.
- ~100 email pictures diagnosed, IPM information provided

IMPACTS:

- 85% clients said diagnostic ID helped to manage their pest problem with IPM
- 66% clients able to reduce pesticides as a result of the IPM information
- \$600 average per client estimated cost savings by reducing pesticide use
- “This ultimately saved an entire crop of almost 25,000 mums”
- “Helpful in suggesting cultural control options before going to typical pesticide solutions”

- “The information I received meant I was able to give recommendations to commercial growers that provided alternatives to pesticide use”
- “I plan to make more use of this service in the future as I continue to understand how beneficial it can be”

Extension Outreach Education

- Presentations (attendees)
 - Tree Diseases. UNH Pesticide Supervisory workshop. Online 1/12/22 (30)
 - Climate Change Panel VT Garden Network panelist. Online 1/12/22 (30)
 - Planning committee and Root disease recap. Tristate IPM Conference. Online 1/20/22 and 1/27/22 (63)
 - UVM Plant Diagnostic Clinic updates. Northeast Plant Diagnostic Network 1/31/22 (20)
 - Pests and Diseases of Past and Future. Hanover Garden Club. Online 2/1/22 (35)
 - Vermont Hemp research projects. Fourth Annual NE Hemp Conference. Online 3/16/22 (107) eval. <https://na.eventscloud.com/website/35699/>
 - PSS 124 Agroecology Class 3/17/22 (55)
 - Diseases and Pests of the Garden and Landscape. Friends of the Horticulture Farm. Online 3/19/22 (40)
 - Moderator and two presentations: Diseases of Vegetable Crops, Diseases of Landscape Plants. Ft Ticonderoga Garden Series. Ft. Ticonderoga, NY 4/2/22 (50)
 - PSS 021 Sustainable Vegetable Class 4/8/22 (30)
 - NE APS meeting President and Moderator online division meeting 4/21-4/22/22 (40)
 - Pest and disease. UVM Master Gardener NW Chapter 4/21/22 (40)
 - PSS 145 Farm Management Class 4/22/22 (35)
 - VT Blueberry Twilight meeting on Pollinators. Stowe VT 6/2/22 (20)
 - Vegetable Diseases. Farmer Training Program HRC. South Burlington VT 6/24/22 (40)
 - Farm Practices for Pollinator Health, Soil Health, and Pest Management. Intervale Community Farm Burlington VT 7/13/22 (40)
 - Disease Field walk. Farmer Training Program HRC. South Burlington VT 7/27/22 (20)
 - Tree Diseases. UNH Pesticide Supervisory workshop. Manchester NH 9/21/22 (30)
 - UVM PSS 124 Agroecology Class 10/12/22 (50)
 - Master Gardener Fall wrap up. Pests and diseases of 2022-3 11/10/22. (20) <https://www.youtube.com/watch?v=n-p8qRWbs1l>
 - Plant Diagnosis. UVM P BIO Plant Pathology. (40)
 - Diseases Global to Local. UVM Master Gardener State Conference 12/3/22 (122, 9 states)
 - NE Vegetable and Fruit Growers Conference. Manchester NH 12/13-12/15/22 (1200)
 - Farmer to Farmer Session on Vegetable disease (30)
 - Co-Moderator Blueberry Session I and II (90)
 - Winter Growing and Diseases presentation (100)

IPM Education for Pesticide Applicators - Ann Hazelrigg and Sarah Kingsley Richards

Pesticide Certification Meetings

- Commercial Pesticide Applicator Meeting, live online 3/28/22 (58 attendees)
 - IMPACTS:**
 - 98% moderate/considerable (4% increase) general knowledge about PPE for Pesticides

- 98% moderate/considerable (31% increase) general knowledge about Ag Container Recycling
- 98% moderate/considerable (14% increase) general knowledge about Pesticide Risk to Pollinators
- 94% moderately/very likely to apply and use pesticides more safely
- 92% moderately/very likely to adopt at least one new IPM practice
- 88% moderately/very likely to adopt at least one new IPM practice to protect pollinators
- Initial Pesticide Certification Meetings: White River Junction 4/19/22 (27 attendees), Burlington 4/21/22 (33 attendees)
 - IMPACTS:**
 - 91% pass rate
 - 87% moderately/well prepared (104% increase) to take the exam following the review session
 - 51% moderately/very likely to apply and use pesticides more safely
 - 81% moderately/very likely to adopt at least one new IPM practice
 - 89% moderately/very likely to adopt at least one new IPM practice to protect pollinators
 - “This was a very helpful review course to prepare for the exam.”
 - “Because I'm so new to the industry, this meeting has been very helpful”
 - “Good overview of the regulations and strategies for pest management”
 - “The manual itself is very extensive and this meeting does a great job of highlighting what's important”
 - “This training helped me consider how to better buy, store, and apply pesticides on my farm”

Pesticide Applicator Report

- Spring 2022, Fall 2022 issues (1574 subscribers)
 - IMPACTS:**
 - 103 S22 recertification credits issued

IPM and Pesticide Basics

- “IPM: Integrated Pest Management” brochure published with Vermont Master Gardener <https://www.uvm.edu/sites/default/files/Extension-Community-Horticulture/Resources/IPMOverview2023.pdf>
- Course will be available Summer 2023

Extension Outreach Education

- Mindful Pest Management. Master Gardener Advanced Training Webinar <https://youtu.be/b2HN88X4-7E> 6/29/22 (20 attendees) & included in 2023 Master Gardener Course assignments
 - IMPACTS:**
 - 100% moderate/considerable (49% increase) general knowledge about reading pesticide labels
 - 91% moderate/considerable (214% increase) general knowledge about pesticide regulations
 - 100% moderate/considerable (133% increase) general knowledge about pesticide exposure and risk
 - 100% moderately/very likely to apply and use pesticides more safely
 - 93% moderately/very likely to adopt at least one new IPM practice

- “Although you had a lot of ground to cover, I thought you did a fabulous job navigating the material at a good but thorough pace and your style was completely professional and inviting on a topic that is not always welcome – Well done!! And what a great refresher for our EMGs!!
- On-demand online training <https://www.uvm.edu/extension/pseponline> (participants)
 - Vermont Pesticide Safety Education: CORE Manual Review (no credit) (15)
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #1 (1 credit) (4)
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #2 (1 credit) (2)
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #3 (1 credit) (2)
 - Vermont Pesticide Safety Education: CORE Manual Review, Unit #4 (1 credit) (2)
 - Vermont Pesticide Education: Managing Pests While Protecting Pollinators (1 credit) (2)
 - Vermont Pesticide Education: Category 7A Manual Review (no credit) (5)
 - Vermont Pesticide Education: Category 7A Manual Review, Unit #1 (1 credit) (2)
 - Vermont Pesticide Education: Category 7A Manual Review, Unit #2 (1 credit) (2)
 - Vermont Pesticide Education: Category 7A Manual Review, Unit #3 (1 credit) (2)
 - Vermont Pesticide Education: Category 7A Manual Review, Unit #4 (1 credit) (2)
 - Vermont Pesticide Education: Category 7F Manual Review (no credit) (2)
 - Vermont Pesticide Education: Category 7F Manual Review (2 credit) *new* (0)
- IMPACTS:**
 - 98% moderately/very prepared comfortable with the manual information
 - 100% moderately/very likely to apply and use pesticides more safely
 - 95% moderately/very likely to adopt at least one new IPM practice
- **Pesticide credit administration**
 - 2022 Northeast Extension Fruit Consortium Winter Webinar Series (7 events)
 - 306 VT certificates @1 credit each
 - 180 participants certified
 - Commercial Pesticide Applicator Meeting, live online 3/28/22
 - 58 VT certificates @4 credits each; 4 NY certificates @1.75 credits each
 - 60 participants certified
 - Vermont Pesticide Safety Education: On-demand online training
 - 19 VT certificates @1 credit each

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