NEERA 2104: Northeast Region Technical Committee on Integrated Pest Management Annual Meeting

Monday March 3, 2025, 1 -5 PM Pacific Time

The Paradise Point Resort in San Diego, CA

(in-person and remote)

Project/Activity Number – NEERA 2104

Project/Activity Title: Northeast Education/Extension and Research Activities

Period Covered: 9/1/2023 – 8/31/2024

Date of this Report: 5/7/2025

Annual Meeting Date: 3/3/2025

Participants:

In-person:

Alejandro Calixto, Rakesh Chandran, Deb Grantham, David Lane, Sarah Kingsley-Richards, Susan Scheufele, Lisa Tewksbury, Nick Goltz, Raymond Delaney, Amber Vinchesi-Vahl, and Simon Zebelo

By Zoom:

David Handley, Glen Koehler, Kelly Hamby, and David Owens

Brief Summary of Annual Meeting: After introductions, a representative from every state presented the highlights of their annual report – focusing on outputs and accomplishments, and activities with multi-state involvement. There was time for questions and discussion after each report. Due to travel restrictions, Margaret Smith, NEERA's Admin. Advisor, was not able to attend.

Discussion of the next chair:

After Rakesh Chandran of West Virginia (chair for 2024-2025), there was no successor identified, so we began the process of determining who was next in line. Lisa Tewksbury reviewed past reports and determined this to be the chain of succession:

2026-New York, 2027-Connecticut, 2028-New Jersey, 2029-Pennsylvania,

2030-Maryland, 2031-Massachusetts, 2032-Delaware, 2033-Maine,

2034-New Hampshire, 2035-Rhode Island, 2036-West Virginia

State reports are provided below:

UCONN
UNIVERSITY OF CONNECTICUT

College of Agriculture, Health and Natural Resources
Department of Extension

Connecticut IPM Program Report, NEERA Meeting 2025

Prepared by Victoria Wallace, IPM Program Team Leader

The 2024 IPM Program Team included Shuresh Ghimire (vegetables and hemp), Nick Goltz (plant pathology/diagnostics), Jacqueline Kowalski (Urban Agriculture), Srikanth Kodati (Pesticide Safety Education), Ana Legrand (vegetable entomology), Evan Lentz (fruit), Rosa Raudales and Charles Krasnow (greenhouse), and Victoria Wallace (schools, invasive plants, pollinators, turf and landscape).

The UConn IPM Program provides education to CT agricultural businesses and citizens to provide sustainable, science-based approaches for the management of plant pests (insects, mites, diseases, wildlife, and weeds, including invasive plants) through knowledgeable decision-making, efficient landscape and on-farm resource use, and integration of cultural and biological controls. Program objectives include maintaining the economic viability of agricultural and green industry businesses, enhancing and conserving environmental quality and natural resources, educating participants on the effective use of biological control agents, and educating pesticide users about the safe use and handling of pesticide products. **For more detailed information, please review our 2024 Annual IPM Report on the UConn IPM website: ipm.cahnr.uconn.edu.**

Accomplishments and Impacts

- In 2024, there were 167,000 users of the IPM website (ipm.cahnr.uconn.edu) (an increase of 100.1% over last year). The total number of page views was 226,000 (an increase of 83.7% over last year).
- 636 fruit growers, related industry members, state officials, and other stakeholders were engaged 34 times with the UConn Extension Fruit IPM program through on-going email updates which include in-season phenology, weather, pest management, and cultural management updates; distribution of Extension publications; and industry event updates.
- Vegetable integrated pest management education was delivered to over 500 vegetable growers and stakeholders every week from April to October 2024 through 18 weekly vegetable pest alert emails focusing on pests, pest management and decision making, and safe pesticide use. Thirty-eight students enrolled in UConn Extension's online Vegetable Production Certificate course in the winter of 2024.
- The Greenhouse IPM Program engaged 275 email subscribers 28 times (7,700) through ongoing greenhouse pest messages focusing on pests, diseases, abiotic disorders and use of cultural methods, biological control agent and proper use of insecticides and fungicides to manage pests and diseases as well as alert the industry of upcoming events and webinars.
- UConn Plant Diagnostic Laboratory processed a total of 275 physical samples and responded to at least 300 stakeholder plant health inquires via phone, email, and walk-in, and, in collaboration with the UConn Home & Garden Education Center (HGEC), more than 1,684 additional stakeholder inquiries.
- The twelfth biennial Connecticut Invasive Plant Working Group (CIPWG) symposium was held in Storrs, CT on October 29, 2024, with 390 people attending.
- A Turfgrass Field Day was held on July 25, 2024. Attendees included. The program was attended by 265 turfgrass professionals (UConn Today) including municipal and school grounds managers, golf course superintendents, sports turf managers, landscape and lawn care professionals. Ten research tour stops were provided.
- The Ornamental and Turf Short Course online winter session ran from January-March (65 attendees), and a fall session ran from October-early December (60 attendees).
- An updated 2024 Native Tree, Shrub and Perennial Availability List, which supports the marketing of ecologically beneficial CT specialty crop nursery producers to enhance their economic viability and connect consumers with native plants that are important to pollinator health and diversity, was released.
- A pollinator assessment form (available online and as a PDF document) was created to evaluate an existing pollinator friendly space.

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2024 IPM Publications

Refereed Journal Articles

Cabrera-Garcia, J., M.A. Toro-Herrera, and **R.E. Raudales.** 2024. *Assessing micro-irrigation clogging risk through water quality classification systems.* Water Practice and Technology, 19(8): 3237–3250. https://doi.org/10.2166/wpt.2024.199

Toro-Herrera, M. and **R.E. Raudales.** 2024. The Application Timing of a Cytokinin/Boron-based Product Affects Root Growth and Non-Structural Carbohydrates of Coleus (*Plectranthus scutellarioides* cv Wild Lime) during Adventitious Root Formation. HortScience, 59(6):840-848. https://doi.org/10.21273/HORTSCI17756-24

Raudales, R.E., M. Toro-Herrera, P. Fisher, J. Boldt, and J. Altland. 2024. Paclobutrazol Residues in Recirculated Water in Commercial Greenhouses. *HortTechnology,* 34(2):198-203 https://doi.org/10.21273/HORTTECH05367-23

McGehee, C.S., A. Louyakis, and **R.E. Raudales.** 2024. Spatial variation of oomycetes and bacteria on surfaces, solutions, and plants from a commercial hydroponic greenhouse. *Phytobiomes Journal*. 8(3):297-308: https://doi.org/10.1094/PBIOMES-08-23-0078-R

Tomis, S. M., L. E. Kurtz, A. J. Siegel-Miles, and **V. Wallace**. 2024. Determining Need: Opportunities for Connecticut Invasive Plant Programming. *HortTechnology,* 34(4):485–492. https://doi.org/10.21273/HORTTECH05467-24

Factsheets and Publications

Ghimire, S. 2024. *Soil fertility management for vegetable farms*. UConn Extension Factsheet #EXT062. https://doi.org/10.61899/ucext.v1.062.2024

Goltz, N.C. 2024. Diseases of Globe Artichoke, Leek, Lettuce/Endive/Escarole, Okra, Onion/Scallion/Shallot, Parsley and Cilantro in 2025-2026 New England Vegetable Management Guide. 19 pp. https://nevegetable.org.

Goltz, N.C. 2024. *Is Early Leaf Drop an Indicator of Tree Health?.* The Chronicle.

Krasnow, C. 2024. *Botrytis Blight.* October 7, 2024. https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2024/10/GH-Pest-Message-Oct-7.pdf

Krasnow, C. 2024. *Powdery Mildew.* October 22, 2024. https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2024/10/GH-Pest-Message-Oct-22.pdf

Kurtz, L., A. Siegel-Miles, and **V. Wallace**. 2024. *Invasive Species Profile: Hydrilla verticillata*. Univ. of Connecticut, Storrs, CT. 4 pp. https://doi.org/10.61899/ucext.v1.061.2024

Kurtz, L., A. Siegel-Miles, and **V. Wallace**. 2024. *Invasive Plant Triage*. Univ. of CT, Storrs, CT. 4 pp.

Legrand, A. 2024. *Bacterial plant pathogens and their overwintering 'bug' refuges.* UConn Extension and Department of Plant Science and Landscape Architecture Crop Talk Newsletter, 20(1):19-21. https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2024/03/Crop-Talk-March-2024.pdf

Lentz, E. 2024. *Blueberry Weed Control and Pre-Emergent Herbicides.* UConn Extension and Department of Plant Science and Landscape Architecture Crop Talk Newsletter, 20:4. https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2024/11/Crop-Talk-November-2024_r.pdf

Pundt, L. 2024. *Echinothrips americanus*. UConn IPM factsheet. 3 pp. https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2024/06/echinothripsamericanus-3.pdf

Pundt, L. 2024. *Non-Infectious Plant Disorders: Oedema and Intumescences.* UConn Extension Factsheet #EXT036. https://doi.org/10.61899/ucext.v1.036.2024

P. Picone, **V. Wallace**, A. Siegel-Miles, and S. Tomis. 2024. *Native Tree, Shrub, and Perennial Availability List.* 19 pp. ipm.cahnr.uconn.edu

Raudales, R.E. 2024. *Sanitation: A culture to be established & nurtured*. E-Gro 13(8). https://www.e-gro.org/pdf/2024-13-08.pdf

Wallace, V., A. Siegel-Miles, and S. Tomis. 2024. *UConn Pollinator Assessment Form*. Univ. of Connecticut, Storrs, CT. 4 pp. ipm.cahnr.uconn.edu/pollinators

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Delaware State IPM Report

Regional IPM Meeting (NEERA 2104)

March 3, 2025

IPM Team Members

Mark VanGessel – Extension Weed Science
Alyssa Koehler – Extension Plant Pathology
Brian Kunkel – Extension Entomology, Horticulture
Rose Ogutu – Horticulture Specialist, DSU
David Owens – Extension Entomology, Agriculture
Carrie Murphy – Lawn and Garden Program Leader, Ag Team Leader
James Adkins, Irrigation Specialist and Ag Team Leader
Emmalea Ernest – Extension Fruit and Vegetable Program
Deborah Delaney - Apiculturalist
John Emerson – Pesticide Safety Coordinator and Turfgrass extension agent
Jill Pollok – Plant Diagnostician

General Comments and Current State

The Delaware IPM extension team includes personnel from the University of Delaware and Delaware State University. Delaware IPM extension activities are funded though state grants, specialty crop block grants, grower commodity boards (ex. Delaware Soybean Board, Maryland Grain Production Utilization Board, Mardel Watermelon Association, Pennsylvania Vegetable Marketing and Research Program), Northeast SARE, Northeast IPM Center, and USDA-NIFA's CPPM and SCRI programs. DE Cooperative Extension serves stakeholders through demonstration trials, pest scouting, and research to provide guidance on practices of interest to our producers, and traditional and innovative knowledge transfer. Besides traditional pest management, our extension team members are also involved in investigating practices that may yield plant health benefits, or, conversely, not yield benefits touted by industry to farmers. Through our activities, we reach a great proportion of DE farmers, and many farmers and consultants in adjacent states, providing real-time pest updates and guidance as well as scientifically based assessments of management changes. In addition, The UD extension team has been strengthened by increasing the capability and impact of our Pesticide Safety and Education Program.

State Overview

Planted acreage by the approximately 2,000 farms is around 410,000 acres (including double-crop production- a fall-spring small grain followed by a shorter season crop; FSA 2023). Agricultural fields comprise ¼ of the total state area. Important crops can be divided into several categories: grain (corn, soybean, wheat, barley, sorghum), specialty grains (malt barley, Plenish soybean), forage hay, processing vegetables (sweet corn and legumes), fresh market vegetables, and fruit crops. Agricultural productivity is supported by a 7,200- hive honey bee industry and native pollinators, but these systems are under stressors that our project seeks to address. Delaware is also a densely populated state (6th) with rapid suburban development in agriculturally important areas (US Census Bureau 2020). The landscaping and Green Industry contributes more than $1.2 Bn to the state's economy (Hall 2020). Extension specialists at both University of Delaware and Delaware State University maintain strong extension programs targeting each of these commodity groups and their myriad of pest and production challenges.

Major objectives and research/extension activities under New EIP (2024-2027) included:
The DE EIP grant funds a significant portion of the salaries of 4 research associates and two extension agents, one of whom is responsible for the Delaware PSEP program. The grant also provides funding to the plant diagnostic clinic, reducing the need for additional cost recovery from clients, and provides undergraduate training for many students. EIP funds personnel and activity at Delaware State University as well.

Agronomic and Specialty Crop IPM

1. Cover Crops and Pest Management
- Weed management with cover crops in conventional soybean: 2025 surveys
- Processing vegetable and pest management in cover crops: 2025 surveys

2. Monitoring Changes in Pest Complex and Management Implications
- Survey high tunnels
- Survey alfalfa forage: alfalfa weevil and other insect pests and AW parasitoids
- Survey malt barley: aphid surveillance and BYDV
- Survey legume vegetables
- Survey vineyards: grape root borer
- Survey soybean: stink bugs around field edges
- Survey corn: stink bug populations around field edges
- Pesticide resistance assays: Italian ryegrass, palmer amaranth, striped cucumber beetle

3. Resource Creation and Content Delivery
- IPM videos
- NEWA training
- Traditional Print Media - strengthen abilities of extension communications team

4. Pest Identification Aids
- Photo compendium
- Pest models and collections

IPM in Communities

1. Expand 3 demonstration plots: native plants, trees, shrubs, monitor for pests and training Master Naturalists
- Add boxwood, arborvitae, and crepe myrtle
- Monitor crepe myrtle bark scale crawler emergence

2. Stakeholder Education
- HOA workshops for native plants and ecosystem services
- Geocaching with 20 caches

IPM for Pollinator Health

1. Pests and Pathogens
- Study impact of miticides on Varroa and viruses
- Pest and Pathogen workshop with 3D models

2. Demonstrate queen performance and colony health to beekeepers

3. Pollinator Nutrition

IPM for Pesticide Applicators

1. Educational seminars covering underserved applicator categories

7A and 7B structural pests (General pest control and wood destroying pest control)
CORE training with classroom, hands-on activities, videos and fact sheets

2. Demonstration of IPM in turf to reduce inputs

Field days and calibration demonstrations
Demonstrate BMPs, nutrient and water management, and pest impact
Inclusion of low-input mixtures of clovers, forbes, and turfgrasses

Plant Diagnostic Clinic: 787 samples processed by the clinic in 2024. 75% from Delaware, 20.2% from Maryland, and the remainder from PA, DC, NJ, VA, and MS. More than half were from woody ornamentals, 21% were from agricultural commodities. Assistance from 5 undergraduate students.

Major extension events and outputs included:

1. Weekly Crop Update – UD's weekly pest and crop advisory continues to be successful and reaches over 1000 unique email addresses. Issues run regularly from April to September; https://sites.udel.edu/weeklycropupdate/.
2. Ornamentals Hotline – weekly newsletter reaching approximately 200 landscapers and other green industry professionals; https://sites.udel.edu/ornamentals-hotline/archive/.

Meetings and Field Tours

1. Multiple county extension meetings including a field demonstration on August 7 of insect pest management, corn foliar diseases and weed management.
2. 2024 Biofumigant Mustards Field Day October 29
3. 2024 Carvel Research and Education Center Fresh Market Vegetable Field Day August 13
4. New Castle County Tailgate Session August 29
5. Summer Turf and Nursery Expo August 14
6. Ornamental and Turf Workshop November 21
7. DE Horticulture Industry Expo January 17-18, 2025
8. Category 03 Ornamental pre-exam training and workshop
9. Turfgrass Plant Walk and Spray er Calibration October 18
10. First State African American Farmers Association meeting September 18
11. Varroa Monitoring and Treatment Workshop multiple dates and sessions (August, September, October)
12. Landscape Pest Walks, New Castle County and Sussex
13. MidAtlantic Crop Management School, November 2024
14. Delaware Agriculture Week January 2025

Maryland IPM State Report

Submitted by Kelly Hamby, MD IPM Coordinator

Maryland (MD) is a heavily urbanized, densely populated state bordering the Chesapeake Bay. Agriculture is the largest single land use in the state, with 32% of MD's total land area used for farming. The proximity between agriculture, environmentally sensitive areas, and human populations necessitates the implementation of sustainable IPM practices that reduce risks to human health and the environment. We serve a diverse population producing numerous agricultural commodities.

Pest diagnostics (EIP: Karen Rane)

- Karen Rane retired from the pest diagnostics clinic in April 2024 and Ana Cristina Fulladolsa was hired in Fall 2024 and re-opened the lab in January 2025
- Clinic diagnoses and reports on 600-800 samples per year

Pesticide safety (EIP: Niranjana Krishnan)

- MD has nearly 9000 private and commercial pesticide applicators
- Niranjana Krishnan coordinates MD's pesticide safety programming including a monthly Maryland Pesticide News newsletter that shares proposed and upcoming changes to pesticide regulations
- Niranjana leads our most recent EIP grant and serves as co-IPM coordinator

Pollinator health (EIP: Dennis vanEngelsdorp, Anahí Espíndola)

- Recent online survey to help plan next 3-5 years of extension to beekeepers, provided ~40 talks to beekeepers in MD, PA, and VA
- Deliver programming to farmers, city planners, public, and Spanish speakers to promote establishment and maintenance of pollinator habitat
- Over 60 blog posts on pollination and pollinator-friendly practices (>500,000 views)

IPM in fruit and vegetable crops (EIP: Alan Leslie, Haley Sater, Ben Beale, Macarena Farcuh)

- Sent out real-time pest alerts and timely updates via e-mail and social media
- Drone applications to watermelon as well as grafting demonstrations for Fusarium wilt
- Fruit Pulse: Apple Maturity News continues to provide timely updates to improve apple harvest and quality
- Kelly Hamby leads an SCRI project focusing on corn earworm management in sweet corn, see CEWIPM.org for more information. Northeastern IPM center also funded a sweet corn working group for 2025.
- Fruit and Vegetable News newsletter 1-2 times a month from April to November and reaches a readership of over 3,000

IPM in green industries (EIP: Stanton Gill, Paula Shrewsbury)

- Mourning the loss of Stanton Gill, currently advertising his position: Agent (Extension Specialist) – Entomology in Ornamental Horticulture IPM
- Second largest crop commodity with an estimated value of $1.4 billion, 12,000 landscape businesses worth an additional $3.7 billion
- Ongoing collaborative work on mycoinsecticides to suppress adult spotted lanternfly
- Provided 95 presentations to 5,447 green industry stakeholders

IPM in communities (EIP: Stephanie Pully, Karin Burghardt)

- Master Gardeners trained using a variety of mechanisms including conferences, updates to the handbook, new online training modules, and more. Reached >2,000 trainees.
- Peer-reviewed Extension publication "Managing city and suburban yards and gardens to sustain insect communities"
- Community groups received information on four IPM in communities subject areas at 20 events to > 1,200 audience members

IPM in agronomic crops (EIP: Kelly Hamby, Andrew Kness, Ben Beale Nicole Fiorellino)

- 66.5% of state's total farmland (2022)
- Hosted field days that included content on 1) fertility and variety impacts on orchard grass hay yields and persistence over time; 2) managing herbicide resistant weeds, 3) managing soybean pathogens; 4) nutrient management and agronomic practices for small grains, corn, and soybean; 5) insect monitoring and management in corn and soybean
- Working with national Testing Ag Performance Solutions (TAPS) team to bring TAPS to Maryland, piloted a 2024 soybean TAPS program with MD extension agents. More information on TAPS: https://tapsnetwork.org/

Spanish language Extension (EIP: Macarena Farcuh, Anahí Espíndola)

- Extensión en Español blog now hosts over 100 articles in Spanish with >12,000 monthly views

Maryland Eastern Shore IPM Program Report 2024

The University of Maryland Eastern Shore (UMES) Extension program serves farmers in Southern Maryland and the Delmarva Peninsula with educational programs, training, technical assistance, and other outreach activities. One of the main focuses of UMES Extension is the Small Farm Program (SFP). The primary mission of the SFP is to deliver educational programs, training, and outreach that help limited-resource and socially disadvantaged farmers own and operate farms successfully. Though most end-users are in MD, the SFP extends its support throughout Delmarva and is not constrained to small farms. Maryland is an agriculturally diverse state, interfacing with an ecologically sensitive and economically vital Chesapeake Bay. The Chesapeake Bay is the second most important economic resource. This situation makes creating eco-friendly IPM programs in MD essential. UMES IPM program provides farmers with information that allows them to farm sustainably.

Funding

The UMES IPM Program is funded by USDA (Evan Allen, NIFA CPPM-EIP, IR4, SARE, 1890 Extension) and the State of Maryland Extension Program,

IPM Team Members

- Behnam Khatabi- Plant Pathologist
- Naveen Kumar Dixit- Horticulture Extension Specialist
- Jennifer Timmons- Poultry Production
- Sadanand Dhekney- Plant breeder
- Tigist Tolosa- Entomologist
- Simon Zebelo-Entomologist
- Berran Rogers- Extension Specialist
- Nadine Burton- Extension Specialist

Partners/Collaborators

- University of Maryland, College Park
    - Cerruti Hooks, Kurt Vollmer, Dwayne Joseph,
- The IR-4 Project
    - Marylee Ross and Megan James
- University of Maryland Extension (UME)
    - Jonathan Moyle, Jennifer Rhodes, Alan Leslie

Significance of the UMES IPM program: The UMES IPM program clientele consists mainly of conventional growers of large and medium-sized farms. However, agriculture census data indicate that small-scale and organic farms are increasing in MD. Organic, small-acreage, and underserved farmers, such as those along the MD Eastern Shore and the Delmarva Peninsula, face many challenges, such as high input costs, insufficient market outlets, rising farmland costs, finite

production skills, lower annual sales, and quality of life. Their ability to remain viable in the face of these challenges has become progressively difficult. Consequently, there is a dire need to develop more educational programs to provide the skills required to thrive under economically trying times. UMES IPM program is tasked with directing educational programs that improve the economic condition of small-scale, limited-resource and/or socially disadvantaged farmers and allow them to overcome their challenges. Much of this work is done via UMES's Small Farm Program (SFP). UMES IPM Program objectives include maintaining the economic viability of the small farmers, providing farmers with information that allows them to farm sustainably by conserving environmental quality and natural resources, educating pesticide users about the safe use and handling of pesticide products, and the effective use of biological control agents. Moreover, the program participates on international programs to mitigate pest problems in the developing world. The program activity is mainly supported by the 1890 extension, the Evans Allen Project, the IR-4 Project, SARE, USDA-CBG, and the USDA CPPM EIP project. This report exclusively focuses in EIP.

Extension Implementation Project (EIP)

The aims of this project include helping crop and poultry farmers move forward by adopting practices that protect human health and are eco-friendly and economically efficient. To this end, we will broaden and diversify our involvement in IPM development, delivery, and implementation by forming a stronger partnership with farmers. These efforts will strengthen our ability to: **i**) disseminate new research-based information to end-users, **ii**) reach a greater number of stakeholders, **iii**) eliminate management practices that lower farm profits, and **iv)** enhance clientele confidence in implementing novel IPM tools. The primary priority areas include:1)IPM Implementation in Specialty Crops(50%) (cucurbits, sweet corn, eggplant, strawberries, and grapes and other fruits and vegetables), 2) IPM Implementation in Agronomic Crops(23%) (hemp and soybeans), and 3)IPM Implementation in Animal Agriculture focusing on poultry(17%).

To learn more about UMES-Center for the Integrated Pest Management(UMES-CIPM), **please visit** the center's website at Center for Integrated Pest Management | School of Agricultural and Natural Sciences (umes.edu)

IPM Implementation in Specialty Crops – vegetable and Small fruit

The objectives of this priority include to: **i**) disseminating new research-based information to cucurbits, sweet corn, eggplant, strawberries, and grape growers, and **ii**) managing insects, weeds, and disease that often occur jointly in specialty crops. Thus, a holistic approach to their management is needed to minimize chemical inputs. As such, our team started to combine our specialties to create comprehensive IPM training programs.

Major Project Accomplishments, Outcomes, and Impacts

Scientific Publications

1. Simmons, J., Tolosa, T., Zebelo, S., 2023. Plant growth-promoting rhizobacteria (PGPR) modulate sweet corn-corn earworm interactions. Crop Protection, 106246. https://doi.org/10.1016/j.cropro.2023.106246
2. Yurchak, V., A.W. Leslie, C.R.R. Hooks. 2023. "Assessing the efficacy of a living and dead cover crop mixture for weed suppression in sweet corn". Agronomy. 13(3):688.

3. Yurchak, V., A.W. Leslie, S.R. McCluen, C.R.R. Hooks. 2023. “Evaluating French marigold (*Tagetes patula* L.) as a border insectary plant for the enhancement of beneficial arthropods in sweet corn plantings. Ecological Engineering. 190:106928

Extension Publications

1. Zebelo S. 2024. Managing pests in ethnic crops. Around the Bay Farmers Alliance Group—February 2024 (Number of participants: 25).
2. Zebelo S. 2024. Integrated Pest Management in vegetable crops. UMES Small Farm Conference Noveber 2nd, 2024.
3. Dixit N. 2023. Infrastructure, Requirements, Protection from Pest and Pathogens, and Funding Sources. (11/2/2023 11/4/2023). UMES 20th Small Farm Conference (11/2/2023-11/4/2023). UMES, Princess Anne, MD (Number of participants: 27).
4. Dixit N. 2023. Second annual Methi/Fenugreek Day and Demonstration of Weed Suppression by Fenugreek. (10/14/2023). UMES, Princess Anne, MD (Number of participants: 28).
5. Dixit N. 2023. Demonstration of Day neutrals and June bearer strawberries, irrigation and fertigation, and leaf spot disease under high tunnel and open bed regimes. (10/7/2023). UMES, Princess Anne, MD (Number of participants: 7).
6. Dixit N. 2023. UMES Extension Asian Ethnic Vegetable Workshop for US Service Veterans-I: Cultivation of Bitter Gourd and management of associated pests and pathogens. (8/31/2023). Therapeutic Alternatives of Maryland, Baltimore, MD. (Number of participants: 10).

Professional Presentations

1. Zebelo s. 2024. Vegetable pest management workshop for farmers members of around the bay farmer alliances, February 2024.
2. Zebelo s.2024. Conserving Pest's Natural enemies in Agricultural Drainage Ditches. UMES 20th Small Farm Conference (11/2/2024-11/4/2024). UMES, Princess Anne, MD (Number of participants: 32).
3. Dhekney, S.A. 2024. Precision breeding and genome editing of wine and table grape cultivars for improving disease resistance. European Horticultural Congress, Bucharest, Romania, May, 10-14
4. Sardaru, P., Jackson, C., Wood. C., and S.A. Dhekney. 2024. Grapevine mildew locus O (MLO) gene editing improves disease resistance to powdery mildew. Association of Research Directors (ARD) symposium, Nashville, TN, April 6-10.
5. Sardaru, P., Jackson, C., Wood. C., and S.A. Dhekney. 2024. Using CRISPR/Cas-9 mediated gene editing to improve grapevine resistance to powdery mildew. UMES Research Symposium, April 18.
6. Okpah K, Tolosa T, Elliot-Simmons J, Zebelo S. 2024. The Efficacy of Entomopathogen Against Insects Pests. UMES Research Symposium, April 17, 2025 (3MT Oral Presentation)
7. Okpah K, Tolosa T, Elliot-Simmons J, Zebelo S. 2024. The Efficacy of Entomopathogen Against Insects Pests.Entomology Society of America Annual Meeting (ESA), November 11, 2024 (Oral Presentation)
8. ·Okpah K, Tolosa T, Elliot-Simmons J, Zebelo S. 2024. The Efficacy of Entomopathogen Against Insects Pests. UMES Research Symposium, April 18, 2024 (Oral Presentation)
9. Okpah K, Tolosa T, Elliot-Simmons J, Zebelo S. 2024. The Efficacy of Entomopathogen Against Insect Pests. Association of 1890 Research Directors Biennial Research Symposium (ARD meeting), April 6-9, 2024, in Nashville, TN (Poster Presentation)

10. Okpah K, Tolosa T, Elliot-Simmons J, Zebelo S. 2023. The Efficacy of Entomopathogen Against Insects Pests. Entomology Society of America Annual Meeting (ESA), November 5-8, 2023(Poser Presentaton)
11. Okpah K, Tolosa T, Elliot-Simmons J, Zebelo S. 2023. Evaluating the Effects of Methylbenzoate and its Derivatives on Spotted Wing Drosophila. UMES Research Symposium, April 20, 2023 (Poster Presentation)
12. Okpah K, Tolosa T, Zebelo S. 2022. Evaluating the Effects of Methylbenzoate and its Derivatives on Spotted Wing Drosophila. FMC diversity equity and inclusion meeting held on September 29, 2022, in Newark, DE. (Poster presentation)
13. Tolosa T, Smith B, Marsh L, and Zebelo S. Impact of Lemongrass Intercropping on Tomato Yield Response and Insect Abundance Under Organic Farm. UMES Annual Regional Research Symposium. April 18, 2024, Princess Anne, Maryland.
14. Tolosa T, Smith B, Marsh L, and Zebelo S. Impact of Lemongrass Intercropping on Tomato Yield Response and Insect Abundance Under Organic Farm. Association of 1890 Research Directors 21st Biennial Research Symposium (ARD). April 6-10, 2024, Nashville, Tennessee
15. Tolosa T, Smith B, Marsh L, and Zebelo S. Impact of Lemongrass Intercropping on Tomato Yield Response and Insect Abundance Under Organic Culture. Entomological Society of America (ESA) Annual meeting. November 5-8, 2023, National Harbor, Maryland.

Regional Extension Presentations (Dr. Neevin Dixit)

From May 2024 through March 2025, the USDA NIFA EIP project at UMES facilitated a robust series of 58 outreach events across Maryland and Delaware, engaging a wide range of stakeholders, including small farmers, veteran growers, youth, and agricultural service providers. These events covered diverse topics such as climate-smart soybean and corn production, vegetative propagation techniques, cut flower and fruit crop cultivation, ethnic vegetable production, soil health, and grant writing. A significant focus was placed on high tunnel systems, sustainable practices, and resilience to extreme weather conditions. The program reached more than 1,800 participants, including over 1,300 youth from events such as the Tri-County College Fair and the Upward Bound Summer Program. Approximately 500 adult participants, primarily farmers and educators, attended hands-on field workshops and classroom-style sessions. These were conducted at the UMES campus, Therapeutic Alternatives of Maryland (TALMAR), and several regional partner locations. Notable events included sessions on Dahlia flower cultivation, apple orchard establishment, strawberry and raspberry season extension, and grant-writing workshops tailored for SARE and NRCS opportunities

1. **UMES Extension Workshop:** Fundamentals of Apple Orchard Establishment: Best Practices for Successful Cultivation. (12/20/2024). UMES, Princess Anne, MD (Number of participants 5). Adult: 8, Youth: 0, Male: 1, Female: 7, White: 0, Black: 7, Asian: 1, Hispanic: 0

2. **UMES Extension Workshop:** Cultivation of Asian Ethnic Vegetable: Fenugreek Workshop (12/13/2024). UMES, Princess Anne, MD (Number of participants 7). Adult: 7, Youth: 0, Male: 0, Female: 7, White: 0, Black: 7, Asian: 0, Hispanic: 0

3. **2024 Mid Atlantic Vegetable Worker Meeting:** Asian Ethnic Vegetables Cultivation Potential on the Delmarva Peninsula (12/10/2024). UMES, Princess Anne, MD (Number of participants 21). Adult: 21, Youth: 0, Male: 8, Female: 13, White: 20, Black: 1, Asian: 1, Hispanic: 0

4. **UMES Extension Workshop:** Grafting in Temperate Fruit Crops (12/7/2024). UMES,

Princess Anne, MD (Number of participants 5). Adult: 5, Youth: 0, Male: 2, Female: 3, White: 0, Black: 4, Asian: 1, Hispanic: 0

5. **UMES Extension Workshop:** T-Budding in Temperate Fruit Crops (12/7/2024). UMES, Princess Anne, MD (Number of participants 5). Adult: 5, Youth: 0, Male: 2, Female: 3, White: 0, Black: 4, Asian: 1, Hispanic: 0

6. **UMES Extension Workshop:** Cultivation of Asian Ethnic Vegetables: Bitter Gourd Workshop (12/6/2024). UMES, Princess Anne, MD (Number of participants 3). Adult: 6, Youth: 0, Male: 1, Female: 5, White: 0, Black: 5, Asian: 1, Hispanic: 0

7. **UMES Extension Workshop:** Cultivation of Asian Ethnic Vegetables: Bottle Gourd Workshop (12/6/2024). UMES, Princess Anne, MD (Number of participants 3). Adult: 6, Youth: 0, Male: 1, Female: 5, White: 0, Black: 5, Asian: 1, Hispanic: 0

8. **UMES Extension Workshop: Hands-On Training:** Apple Tree Pruning Workshop for Healthier Growth and Improved Yield" (11/16/2024). UMES, Princess Anne, MD (Number of participants 3). Adult: 3, Youth: 0, Male: 1, Female: 2, White: 0, Black: 3, Asian: 0, Hispanic: 0

9. **UMES Extension Workshop:** Basics of Pomegranate Cultivation on the Delmarva Peninsula: Techniques for Successful Growth (11/11/2024). UMES, Princess Anne, MD (Number of participants 7). Adult: 7, Youth: 0, Male: 0, Female: 7, White: 1, Black: 6, Asian: 0, Hispanic: 0

10. **UMES Extension Workshop:** Dahlia Flower Cultivation on Open Beds. (11/9/2024). UMES, Princess Anne, MD (Number of participants 8). Adult: 8, Youth: 0, Male: 4, Female: 4, White: 1, Black: 6, Asian: 1, Hispanic: 0

11. **UMES Small Farm Conference-2024:** UMES Small Farm Conference: Grant and Resource Information on NE-SARE to Stakeholders. (11/2/2024). UMES, Princess Anne, MD (Number of participants 25). Adult: 120, Youth: 0, Male: 50, Female: 70, White: 10, Black: 110, Asian: 5, Hispanic: 5

12. **UMES Small Farm Conference-2024:** Demonstration of Pruning in Raspberry. (11/2/2024). UMES, Princess Anne, MD (Number of participants 16).Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

13. **UMES Small Farm Conference-2024:** Demonstration of Raspberry Cultivation using High Tunnels. (11/2/2024). UMES, Princess Anne, MD (Number of participants 16).Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

14. **UMES Small Farm Conference-2024:** Demonstration of Strawberry Cultivation using High Tunnels for Season Extension. (11/2/2024). UMES, Princess Anne, MD (Number of participants 16).Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

15. **UMES Small Farm Conference-2024:** Demonstration of Vegetative Propagation in Strawberry using Runners and Crowns. (11/2/2024). UMES, Princess Anne, MD (Number of

participants 16). Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

16. **UMES Small Farm Conference-2024:** Demonstration of Vegetative Propagation in Raspberry using Hardwood cuttings. (11/2/2024). UMES, Princess Anne, MD (Number of participants 16).Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

17. **UMES Small Farm Conference-2024:** Dahlia Field Demonstration for Cut-flower Production. (11/2/2024). UMES, Princess Anne, MD (Number of participants 16). Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

18. **UMES Small Farm Conference-2024:** Blooming Brilliance: Mastering Dahlia Cultivation for Stunning Cut Flowers. (11/2/2024). UMES, Princess Anne, MD (Number of participants 16).Adult: 16, Youth: 0, Male: 7, Female: 9, White: 5, Black: 11, Asian: 0

19. **Tri-County College Fair:** Demonstration of Apple Orchard. (11/3/2024). UMES, Princess Anne, MD (Number of participants 6). Adult: 6, Youth: 0, Male: 3, Female: 3, White: 0, Black: 6, Asian: 0

20. **Tri-County College Fair:** Demonstration of Cut-flowers and Opportunities in Agriculture. (10/3/2024). UMES, Princess Anne, MD (Number of participants 1269). Adult: 50, Youth: 1219, Male: , Female: , White: , Black: , Asian:

21. **SANS open House-2024:** Demonstration of Cut-flower cultivation. (9/19/2024). UMES, Princess Anne, MD (Number of participants 88).Adult: 29, Youth: , Male: 4, Female: 25, White: 0, Black: 29, Asian: 0

22. **2024 Upward Bound Summer Program:** High Tunnel Cultivation of Strawberries. (7/3/2024). UMES, Princess Anne, MD (Number of participants 88).Adult: 1, Youth: 49, Male: 20, Female: 30, White: 2, Black: 47, Asian: 1

16. **2024 Upward Bound Summer Program:** High Tunnel Cultivation of Raspberries. (7/3/2024). UMES, Princess Anne, MD (Number of participants 88). Adult: 1, Youth: 49, Male: 20, Female: 30, White: 2, Black: 47, Asian: 1

23. **2024 Upward Bound Summer Program:** Budding in Apple and other fruit crops. (7/3/2024). UMES, Princess Anne, MD (Number of participants 88). Adult: 1, Youth: 49, Male: 20, Female: 30, White: 2, Black: 47, Asian: 1

24. **Crop yield and Climate Change Data Presentation to Stakeholders**. (6/25/2024). UME Extension Center, Howard County, MD. (Number of participants: 24). Male: 14, Female: 10, White: 19, Black: 1, Asian: 2

25. **UMES Extension Season Extension of Strawberry using Low Tunnels Workshop for US Service Veterans-Group-I:** (5/2/2024). Therapeutic Alternatives of Maryland, Baltimore, MD. (Number of participants: 8).

26. **Wicomico High School Field Trip to UMES:** Demonstration of Strawberry and Raspberry

Season Extension using High Tunnels and Salt stress in Hemp and Strawberries. (4/11/2024). UMES, Princess Anne, MD. (Number of participants: 29).

IPM Implementation in Agronomic Crops-Hemp and Soybeans

In Delmarva, many farmers of agronomic crops rely on pesticides to manage pests and diseases in soybeans. This led to resistance problems. In addition, industrial hemp farmers have to deal with insects, disease, and weeds, and there are no established IPM programs for industrial hemp. The objectives of this priority area include: **i**) Form a diverse IPM dissemination team inclusive of hemp and soybean growers, **ii**) design and establish demonstration plots in growers' fields and at education centers, **iii**) demonstrate the benefits of using resistant soybean cultivar, **iv)t**rain stakeholders how plant breeding can be a part of IPM, and **v**) develop & distribute educational material

Scientific Publications

1. Xu, J., Knight, T., Boone, D., Saleem, M., Finley, S. J., Gauthier, N., Ayariga, J. A., Zebelo, S, Akinrinlola, R., Pulkoski, M., Britt, K., Tolosa, T., Rosado-Rivera, Y. I., Iddrisu, I., Thweatt, I., Li, T.,., Burrack, H., Thiessen, L., Hansen, Z., ... Ajayi, O. S. 2024. Influence of Fungicide Application on Rhizosphere Microbiota Structure and Microbial Secreted Enzymes in Diverse Cannabinoid-Rich Hemp Cultivars. *International Journal of Molecular Sciences, 25*(11), 5892. https://doi.org/10.3390/ijms25115892

Professional Presentations

1. Junior, A., Tolosa, T., Zebelo, S., and S.A. Dhekney. 2024. Optimizing Cannabis sativa L. harvest time for maximizing flower terpene yields. Cannabis Science Conference, Kansas City, May 7-9.
2. Ahuchaogu, C., Foland, M.H., and S.A. Dhekney. 2024. Influence of mycorrhizal amendment on growth and development of hemp (Cannabis sativa L.). Cannabis Science Conference, Kansas City, May 7-9
3. Ahuchaogu, C., Foland, M.H., and S.A. Dhekney. 2024. Assessing the amendment effect of mycorrhiza on growth performance of hemp (Cannabis sativa L.). Association of Research Directors (ARD) symposium, Nashville, TN, April 6-10.
4. Tolosa T.A., Henry S. A., and Zebelo S.A. Temporal and spatial population dynamics of corn earworm (Helicoverpa zea) in hemp fields in Delmarva peninsula. Entomological Society of America (ESA) Annual meeting. November 10-13, 2024, Phoenix, Arizona
5. Tolosa TA, Henry SA, and Zebelo SA. Monitoring the Population Dynamics of Corn Earworm on Hemp Fields in Maryland Eastern Shore. American Society for Horticultural Science (ASHS) Annual Conference. July 31 - August 4, 2023, Orlando, Florida. (Poster presentation)
6. Abrha, F., Tolosa, T., & Zebelo, S. A. 2024. Impact of corn earworm on cannabinoid levels of hemp. Poster presented at the ARD Symposium, Nashville, TN.
7. Abrha, F., Tolosa, T., & Zebelo, S. A. 2024. Impact of corn earworm on cannabinoid levels of hemp. Poster presented at the Regional Research Symposium, University of Maryland Eastern Shore, Princess Anne, MD.
8. Abrha, F., Tolosa, T., & Zebelo, S. A. 2024. Impact of corn earworm on transcription levels of cannabinoid synthesis genes in hemp. Poster presented at the Entomological Society of America Annual Meeting, Phoenix, AZ.
9. Joseph, D.D. (2023). Evaluating spring-seeded cover crops as an integrated weed management tool in plasticulture systems. Northeast Cover Crop Council Conference, Portland, Maine.

10. Joseph, D.D, Alan W. Leslie, Kurt M. Vollmer, Cerruti RR Hooks. (2023). Integrated Weed Management Using Biosolarization, Cover Cropping, and Strip Tillage. 63rd meeting of the Weed Science Society of America, Arlington, Virginia. (Poster presentation)

Local Extension Presentations

11. Joseph, D.D. (2023). Spring-seeded cover crops for weed management in row middles. BARC Pesticide Applicator Recertification Training. (Online course). Attendance 87.
12. Joseph, D.D. (2023) Herbicides and Integrated Weed Management. Lower Eastern Shore Agronomy Day, Pocomoke City, Maryland. Attendance 122.

Field Days

The UMES Agshowcase program was held in August 2024. Sixty people attended the event. Stakeholders were provided information on the use of different grapevine cultivars for wine, table, and juice production, different training systems and rootstocks utilized for production, and pest management strategies used for sustainable production. The vineyard was infested with Japanese beetles during the event, and growers were shown how to identify damage caused by Japanese beetles and integrated pest management approaches, including using pheromone traps, chemical sprays, and cultural methods such as soil tilling to effectively manage the pest populations. Additionally, special tours were organized for the Maryland Department of Agriculture and the Comptroller of Maryland to provide information on what programs were being organized for stakeholders.

IPM Implementation in Animal Agriculture focuses on poultry

Poultry production is the leading agricultural industry in the Delmarva region. A challenge to this industry is pest management. Flies such as *Musca domestica*, can pose health problems to the egg-laying hens and broilers, and humans and can be a nuisance to residents living near poultry facilities. The objectives include educating: fly management in poultry facilities and residences, poultry facility management, good agricultural practices for food safety, practices to improve poultry health, and the development of new IPM tools.

Major Project accomplishments, outcomes, and impacts

Extnsion Publications

1. Zebelo SA, Timmons J, Moyel J. 2022. Life Cycle of Houseflies in poultry houses. GROWER LUNCH BREAK NOTES. Wed. 5.4.22 Dr. Zebelo Life Cycle of a House Fly_0.pdf (umd.edu)
2. Zebelo SA. 2023. Moisture, temperature key in fly control. The mid-Atlantic poultry farmer Poultry-February-2023-web.pdf (americanfarmpublications.com)

UMass Extension

Vegetable Program
ag.umass.edu/vegetable

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IPM in Massachusetts

April 28, 2025

Susan B. Scheufele
Vegetable Specialist, UMass Extension

Vegetable & Fruit IPM: MA is a densely populated state with very highly diversified specialty crop farms and a high proportion of specialty crops grown for sale direct-to-consumer. Agri-tourism is an important source of revenue for many MA farms. Thankfully the 2024 growing season was uneventful and production and prices were good. The 2023 season was incredibly challenging for fruit and vegetable producers; a deep freeze in February caused nearly 100% losses to peach crops, a hard frost on May 18 caused up to 80% losses to apple crops state-wide, flooding of the Connecticut River in July caused an estimated $15 million in crop losses due to adulteration, and excessive rains from July through September led to poor quality and yields of vegetable and fruit crops. Because of the diverse nature of farms in MA and the high prices garnered at retail markets, there is very little enrollment in crop insurance programs, especially among vegetable producers. We have a new grant program funded by NE-ERME partnering with RMA and FSA, insurance agents, and growers to do education around crop insurance and develop case studies that will help service providers and other growers learn more about the process and what to expect. Another new project involves partnering with NRCS-MA to increase planning of practice 595, pest management, to help growers overcome one major barrier to adopting IPM, cost to implement. We continue to offer **cut flower Extension programming** to support this growing industry in MA. We conducted **15 applied research trials** on topics including: climate mitigation strategies for field-grown vegetables, heat- and disease-resistant vegetable variety trials, pesticide efficacy trials, attract-and-kill strategies for fruit insect pests, managing perennial weeds in blueberries, and apple rootstock evaluations. We publish 3 newsletters read by 3,350 subscribers. We hosted 50 in-person or online grower meetings for 3,201 attendees including 15 Twilight Meetings. *Our USDA-CPPM Extension Implementation Program funds about 80% of these efforts.*

- **Added two new Extension faculty members**
  - Jianyu Li, Sustainable Fruit and Vegetable Production
  - Joshua Arnold, Urban Agriculture
- Offered new Cut Flower Extension programming with funding from a MA Specialty Crop Grant
- Research, Education, and Extension Experience for Undergraduates (REEU) Program trains 9 undergrad interns in fruit IPM research and Extension
- Research on mass trapping for Japanese beetle management in grape and blueberry
- Growers who participated in tree fruit IPM research reported reducing pesticide use by 75-82%
- Maintain 35 NEWA stations and provide ongoing maintenance and grower training
- 288 growers and ag service providers attended food safety trainings and 89 were certified through the Produce Safety Alliance Grower Training Program
- New England Vegetable Management Guide was updated and distributed in print and the online version has 78,376 views per year.
- Our Extension websites receive nearly 400,000 views per year
- Work collaboratively to plan and host the New England Vegetable and Fruit Conference held biannually for ~2,000 growers and service providers

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- Authored six new factsheets and 14 new newsletter articles
- Partnered with NRCS to expand use of practice 595 so that growers can receive financial assistance for implementing IPM on their farms
- We are also reaching online audiences via Instagram where our @UMassFruitTeam has 238 followers and our @umassvegetableteam has **over 1,180 followers** and our YouTube page, which has **299 subscribers**, 49 videos, and **almost 44,000 views**.

Extension Team Members
Susan Scheufele, Vegetable Specialist
Lisa McKeag, Food Safety Specialist
Genevieve Higgins, Vegetable Educator
Hannah Whitehead, Pollinator Specialist
Jaime Pinero, Extension Faculty, Tree Fruit Entomology
Elsa Petit, Extension Faculty, Viticulture
Jon Clements, Tree Fruit Specialist
Elizabeth Garofalo, Tree Fruit Specialist
Maria Gannett, Weeds Specialist
Ali Shokoohi, Vegetable Entomologist
Jianyu Li, Fruit and Vegetable Production
Joshua Arnold, Urban Agriculture

Cranberry IPM: Many people think of Massachusetts when they think of cranberries. Cranberry farming started on Cape Cod in the mid-1800's and Massachusetts continues to grow an excellent crop of native berries. Massachusetts ranks second in the nation in cranberry production with more than 14,000 acres in production. Importantly, the cranberry industry helps to conserve open space since growers own more than 60,000 acres of uplands that are associated with their farms. The state provided $8 million in funds to renovate the state cranberry research center in East Wareham, MA on Cape Cod. The renovation was completed in April 2023 and the new facility provides state-of-the-art lab and meeting space that supports 6 faculty, 2 USDA-ARS researchers, 6 post-docs, two Extension Educators, and 10 staff. The team publishes a newsletter read by 214 subscribers, and updates the "Cranberry Chartbook" annually, providing up-to-date pesticide recommendations. In 2024 they made >240 consultations, hosted 5 "bogside chats" for >150 attendees in 2024. *The IPM program supports research and education on use of drones in ag, pesticide efficacy and residue tolerances, WPS training, pollinator education, and risk management.*

Extension Team Members
Marty Sylvia, Entomologist
Katherine Ghantous, Weed Scientist
Ryan Wicks, UAV Pilot and Educator

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Green Industries IPM: UMass Extension runs two certificate-based training courses for landscape professionals and turf managers for >200 attendees per year. Their 4 newsletters go out to >35,000 subscribers. They conduct >2,500 1-on-1 consultations and >1,000 diagnostic consultations annually. Their annual garden calendar sells 8,290 copies. *The programs are industry-supported and are not funded by our USDA-CPPM Extension Implementation Program.*

- Turf Winter School – Annual certificate program for ~70 students.
- Green School – Biannual certificate program for Landscape Professionals for 140-160 students
- Invasive Insect Certification Program – Biannual, for 50 students.
- Multiple single-day pest management focused workshops throughout the year.
- Spring Kickoff and Fall Wrap-Up programs generally reach ~200.
- The new Pollinator Specialist. Working with beekeepers and initiated a Pollinator Steward Certificate program currently has 265 students.

Extension Team Members
Jason Lanier, Turf and Greenhouse Specialist
Tawny Simisky, Woody Plant Entomologist
Nicholas Brazee, Woody Plant Pathologist
Angela Madeiras, Plant Pathologist
Geoffrey Njue, Horticulture Specialist
Randy Prostack, Weed Scientist
Rick Harper, Extension Faculty, Urban Forestry
Nicole Bell, Pollinator Health

Pesticide Education Program
Conducts Pesticide Applicator License Exams Training Workshops, Recertification Training Workshops, Contact Hour certification for other Extension programs

- 16 2-hour Recertification Workshops – 2,378 participants
- 14 3-day Exam Prep Trainings – 313 participants

Extension Team Members
Natalia Clifton

University of New Hampshire Extension

IPM Work Team: Amber Vinchesi-Vahl (amber.vinchesi@unh.edu), Jeremy Delisle, Liza DeGenring, Rachel Maccini, Shyloh Favreau, Bo Liu, Tyler Edwards, Jonathan Ebba, Carl Majewski

Our IPM program focuses on providing education and technical support in the areas of Specialty Crops, Communities, Pesticide Applicators, Public Health, and Pest Diagnostic Facilities.

Proper identification of pests is the first step in IPM. Our program provides education in the importance of proper identification as well as how to identify key pests and diseases. New Hampshire residents can call or email our Ask UNH Extension home horticulture program for assistance in pest identification. We provide training to our Master Gardener volunteers on the identification of common pests. Our Plant Diagnostic Lab serves both homeowners and commercial growers with disease and insect pest identification. Many of our in-person agricultural workshops include hands-on training in how to identify key pests, including our vegetable and tree fruit Twilight Meetings, Pasture Walks for livestock producers and growers of small grains & cultivated forages, and our Greenhouse Crop Production series.

Monitoring is a critical aspect of IPM that helps identify when pest management actions are necessary. We run region-wide monitoring programs for key pests affecting tree fruit, small fruit, sweet corn, and cucurbit crops. Growers participating in these programs regularly save thousands of dollars per year in crop loss and avoid the unnecessary application of pesticides. We provide education on how to use weather monitoring tools to predict risk of crop disease and when to time IPM interventions.

Pesticide resistance is a major challenge to many of our industries, particularly our greenhouse growers of ornamental crops. Adoption of IPM-friendly pesticides and biological controls is often part of a robust resistance management plan. We collaborate with pest managers in participatory and demonstration research to encourage adoption of novel approaches.

We provide training for licensed pesticide applicators, including those pest control services that provide New Hampshire residences with protection from vectors of human diseases like ticks and mosquitoes. Community IPM includes training of school teachers, camp counselors, and other youth leaders in protection from ticks. Education in bed bug prevention and control is provided to medical personnel, housing managers and residents.

Our IPM program is diverse and addresses the needs of many and results in implementation of IPM practices by program participants. Participants gain skills that they can apply on the job and in their homes. Public awareness campaigns elevate knowledge of pests of public health concern and strategies to reduce personal risk. Agricultural programs provide critical education, assistance, and

data to help producers reduce costs, increase yields, and minimize environmental impacts of pest management.

New personnel since March 2024 working in IPM

- Liza DeGenring, PhD, UNH Extension Field Specialist, Hillsborough County
- Caroline Beaton, Beginner Farmer Program Manager, UNH Extension

UNH Extension's Production Agriculture Team held over 27 events, with 979 participants in 2024. Over 79% of the events were in person and included workshops, field days, trainings, twilight meetings, grower association meetings, new farmer school, and webinars. Direct technical assistance from our state and field specialists is also extremely important and valuable to our clientele. We have 3,000 active subscribers to our NH Agriculture Update and 70 subscribers for our new text subscription service for IPM reports and pest alerts that we launched in Spring 2024. Viewership of Fruit IPM Reports increased 55% in 2024, likely due to text service.

Insect ID and Plant Disease Diagnostics

- >300 plant samples 2024 from farmers, gardeners, and homeowners
- ~13 insect samples for identification from the public and municipalities

Field Crops

- Educate landowners on the principles of weed IPM, including identification of perennial weed species, encourage the adoption of cultural controls for weeds in forage crops.
    - Web Resource: "Integrated Weed Management for Pastures and Hayfields - A Guide for Landowners" developed
- Developing network of small grains producers for idea sharing, education events around scouting and disease management
- 3 Mid-Season Corn Evaluation Field Meetings (pest scouting, variety discussions, pest management in till vs no-till)
- 2 Hay Production Farmer-to-Farmer Sessions
- Annual Corn & Forage Grower Meeting (western bean cutworm updates, research updates)

Tree Fruit

- Region-wide trapping program for tree fruit (expanding to more locations and pests of interest in 2025)
    - Informs weekly Fruit IPM Report
- 4 Tree Fruit Twilight Meetings in 2024 (topics included IPM updates and research for tree fruit pests, agritourism, and farm transition)
- Annual New Hampshire Fruit Growers Association Meeting (native bee populations in apple orchards, climate predictions, effects of soil fertility and health on pests)
- Hired IPM Scout to expand tree fruit trapping in central NH
    - Informs Fruit IPM Report and hotline
- Encourage use of Network for Environment and Weather Applications (NEWA) weather modeling for managing tree fruit pests
    - Establishing new stations, maintaining existing stations

    - Education and training on using NEWA at grower meetings (NEWA impact survey completed in late 2024)
- Collaboration with NRCS & Xerces Society to encourage adoption of IPM practices (pollinator-friendly, NEWA stations, cultural practices, sprayer calibration)
    - Currently we have 41 weather stations, the goal is 50 by 2027.
    - Building a working relationship between Extension and NRCS to inform and expand 595 programs (working to add mating disruption as an NRCS pest management practice)

Vegetables and Small Fruit

- 4 Vegetable & Berry Twilight Meetings focused on Climate Resilience in 2024 in response to freezes and flooding events in 2023 (permanent raised beds & no-till, preparing your land for extreme weather, food safety, physically protecting crops with high tunnels, emergency plans)
- Hemp Twilight Meeting on IPM and ID of insects and diseases—fact sheet in development
- New Hampshire Vegetable and Berry Growers Association annual meeting (blueberry leaf rust, insecticide resistance management of corn earworm, frost protection)
- New Hampshire Winery Association Annual Meeting (using NEWA models for pest management, food safety updates and regulation, spotted lanternfly review, variety discussion)
- Encourage adoption of monitoring key pets of sweet corn, cucurbit crops, and berries
    - Continue state trapping network for sweet corn pests, brown marmorated stink bug, squash vine borer, spotted wing drosophila (funded by NH Department of Agriculture Markets & Food, Division of Pesticide Control, IPM Program)
        - Report trap captures and relevant field observations in weekly Vegetable IPM Report
        - 2024 was 19th year of the trapping program, funded for 2025
        - European corn borer reported in sunflower and hemp in 2024, not just sweet corn issue
    - Conduct evaluations each year— average reduction in sprays is 3 for sweet corn and 4 for cucurbits by using monitoring data to make spray decisions rather than relying on calendar sprays→large cost savings (time, labor, pesticide and fuel costs)→ improved efficacy and crop quality, increased yields
    -
- Provide education on pesticide resistance
    - Insecticide resistance management for solanaceous crop pests at New England Vegetable and Fruit Conference
- Monitor and identify invasive pests like leek moth and swede midge affecting small farms in northern and western New Hampshire
    - Educate producers on best practices for emerging insect pests and encourage adoption of monitoring practices

Greenhouse, Nursery and Landscape

- Conducted cut flower growers needs assessment→ IPM is top need

- 2024 Greenhouse Webinar Series held monthly (topics included: mixing a spray tank, mycorrhizae, growing media, black root rot management, mealybug management)
    - Continuing in 2025
- Alternative pest management strategies—Biocontrol Workshop planned for 2025
- Encourage adoption of biocontrol for those that have not adopted the practice/Provide education on biocontrol and emerging pest issues (ex: exotic thrips species)
- Landscape Association Field Day (PPE for ticks, pruning, overview of common landscape pests and pest management)
    - 2023 and 2024 events were very successful, over 250 attendees

Public Health

- Work with state and non-profit organizations to provide education on ticks and tick-borne disease, conduct needs assessments
- Establish UNH Tick Diagnostic Lab (launched April 2025)

Pesticide Safety Education

- Pesticide Certification Training includes IPM
- 35-45 Pesticide Safety Education Program events with >500 attendees (initial certifications for private and commercial applicators and supervisory registration trainings in multiple license categories)

Cornell IPM
New York State Integrated Pest Management

Cornell CALS
College of Agriculture and Life Sciences

Prepared by Alejandro A. Calixto, Director - NYSIPM Program

SITUATION
New Yorkers are exposed to risks from pests and the methods used to control them.

RESPONSE
The NYSIPM Program reduces environmental, health, and economic risk by teaching, demonstrating, and researching IPM practices. We conduct programs in crops—fruits, vegetables, ornamentals, field crops, and livestock; and community settings—schools, homes, municipalities, parks, and golf courses.

MAJOR ACOMPLISHMENTS
Funding: $7,479,031 total
In fiscal year 2024-2025, New York State provided the New York State IPM Program $2,000,000 for Agricultural IPM, $2,250,000 for IPM Implementation (from NYSDAM under EPF and NYS Bioeconomy), $1,000,000 for Community IPM (from NYSDEC under EPF), $250,000 for PSEP (From NYSDEC) and $293,309 for PSUR-PSEP (From NYSDEC). We were further supported by $238,164 in USDA-NIFA-CPPM Extension Implementation Program (EIP) Area (grant no. 2024-70006-43573), and approximately $1,447,558 in program-wide leverage funding secured by IPM staff.

Towards Safer and Sustainable Alternatives to Neonicotinoid Insecticides – Specials Projects and an Action Plan: As part of our ongoing commitment to helping New Yorkers meet regulatory requirements, New York State Integrated Pest Management's Pesticide Safety Education Program (PSEP), is offering "**Introduction to Neonicotinoid Insecticides**," a course that meets the mandated neonicotinoid training requirements under the New York State Birds and Bees Protection Act for applicators in non-production roles treating outdoor ornamental plants and turf. The course, developed by NYSIPM Director Alejandro Calixto and Tobias Mueller, a Ph.D. student in Cornell University's Department of Entomology who was participating in an Extension and Outreach Assistantship, covers what neonicotinoid insecticides are and how they work; the benefits of neonicotinoid insecticides; non-target risks with neonicotinoid insecticides and strategies to reduce these risks; what the Birds and Bees Protection Act is and how it affects the use of neonicotinoid insecticides in New York State; and alternatives to neonicotinoid insecticides. Within three weeks of its implementation, more than 110 applicators had registered for the course, which became a requirement under the State's Birds and Bees Protection Act December 31, 2024. The course is also accepted for state recertification training credits for applicators in Connecticut, Maine, Maryland, Massachusetts, New Hampshire, Rhode Island, West Virginia and Vermont. The Birds and Bees Protection Act requires any applicator using pesticides containing clothianidin or dinotefuran in non-production settings for treatment of invasive species affecting woody plants, or under a DEC-issued environmental emergency must take a DEC-approved neonicotinoid course annually. Applicators need to keep a record of this training for three years. Beginning December 31, 2026, this neonicotinoid training requirement will extend to applicators using a pesticide containing imidacloprid, thiamethoxam, or acetamiprid in the same situations. "Introduction to Neonicotinoid Insecticides," is part of NYSIPM's ongoing support during the transition from widespread use of neonicotinoids. NYSIPM has also worked to identify and conduct innovative research to source alternatives to neonicotinoids, develop risk assessment tools and bolster outreach and extension efforts.

NEWA 3.0 – Network for Environment and Weather Applications (NEWA): The Network for Environment and Weather Applications (NEWA) is an innovative agricultural risk forecasting platform. In early 2025, the new Grape Cold Hardiness Model (GCHM) was released for public testing. A first-of-its-kind in many exciting ways, the Model is a state-of-the-art tool designed to provide vineyard managers, anywhere in the continental United States, up to five days advance warning of impending freeze events. By harnessing the power of advanced Machine Learning on the NEWA platform, this model marks the first ever trained system of its kind to be integrated as a widely available resource, providing critical early warnings to growers. The GCHM features interchangeable physical weather station or high-resolution gridded data at 4km resolution. These enhancements deliver precise, localized climate insights essential for making informed decisions in the face of unpredictable weather patterns. Vineyard managers can now implement proactive strategies to safeguard their crops, optimize resource allocation and mitigate potential losses from freeze damage. In 2024, the wider impact of the NEWA platform was evident at a national scale through user engagement statistics. The platform reached 63,197 unique users across the U.S. , with 22,453 new users joining the community. These visitors generated 159,596 individual sessions, resulting in 298,968 page views. The outstanding engagement rate of 78.8% highlights a highly active and responsive audience—a testament to the relevance and reliability of the tool. This pioneering model not only elevates our predictive capabilities but also sets a new standard for integrating technology and agriculture. As we continue to support diverse public sectors, NYSIPM remains committed to delivering innovative solutions that drive both scientific progress and practical, on-the-ground benefits for farmers and the broader agricultural community.

Insect Trapping Network - Since 1993, the Sweet Corn Pheromone Trap Network (SCPTN) has been providing New York's sweet corn growers with pest monitoring information essential to crop quality and successful yield. A program of New York State Integrated Pest Management and Cornell Cooperative Extension, the Network leverages collaborative citizen science from farmers and crop consultants to collect data from traps at 35 farms located throughout the state. Each participating farm has five traps baited with pheromone lures that help attract European corn borer (ECB-E and ECB-Z), corn earworm (CEW), fall armyworm (FAW) and Western bean cutworm (WBC). Traps are checked weekly from mid-May through late September, to track pest activity and provide timely data for growers. Annual SCPTN data has revealed significant shifts in pest populations. ECB numbers have remained consistently low for the past decade, while WBC populations, which peaked in 2023, declined considerably in 2024. CEW populations have been steadily increasing over the last five years, though they remain well below their peak in 2011. FAW numbers, on the other hand, have stayed relatively low for the past two seasons. The consistent collection of trapping data has been used in major publications, has contributed to multiple research projects and has been shared with other pest monitoring networks. One current focus of research is investigating potential lure efficacy issues, particularly examining why ECB trap catches remain low despite observed field damage. The network is testing various lures to determine if they influence trap counts. The Network's long-term monitoring efforts have allowed researchers and growers to track changes in pest populations and assess lure effectiveness over time. SCPTN also operates a comprehensive blog, Sweet Corn Pheromone Trap Network, which offers detailed and up-to-date trapping data for New York's fresh market sweet corn. In addition to trapping data, the network provides growers with scouting and threshold recommendations, as well as resources on major sweet corn pests, helping them make informed pest management decisions.

***Spotted lanternfly* (SLF)**

A groundbreaking study by Allan Pinto, Agricultural Economist with the New York State Integrated Pest Management (NYSIPM) Program, has projected that New York's grape industry could incur economic losses of up to $8.8 million annually due to infestations of the invasive spotted lanternfly (SLF). Published in the *Journal of Integrated Pest Management*, the study titled "*Assessing the potential economic impacts of spotted lanternfly (Hemiptera: Fulgoridae) infestations on grape production in New York State*" presents a modeled worst-case scenario in which no pest management practices are implemented. The simulation, informed by research from Pennsylvania State University and grower

experiences, estimates crop damage at $1.5 million in the first year, $4 million in the second year, and $8.8 million by the third year—if SLF populations reach the levels observed in Pennsylvania during the early stages of its outbreak. SLF was first detected in the United States in Berks County, Pennsylvania in 2014 and has since been confirmed in 17 states, including New York. The first known population in New York's Finger Lakes region was reported in 2024. Pinto conducted this work in collaboration with NYSIPM Director Alejandro Calixto; Miguel Gómez, Robert G. Tobin Professor in Cornell University's Charles H. Dyson School of Applied Economics and Management; NYSIPM Associate Director Brian Eshenaur; and Pennsylvania State University researchers Michela Centinari and Flor E. Acevedo. The team drew on vineyard acreage, production data, and insights from growers and extension personnel to estimate the potential scale of economic loss. This analysis is particularly relevant given the importance of New York's grape industry: the Finger Lakes region leads in wine production, while the Lake Erie region is the world's largest producer of Concord grapes. The study underscores the significant threat SLF poses to grape yield and quality in the absence of early detection and management. NYSIPM continues to work closely with growers, industry stakeholders, and regulatory agencies to provide the tools and knowledge necessary to mitigate these risks and prevent extensive economic damage.

Joro Spiders

With adjectives like "giant" and "venomous" at the forefront of media coverage surrounding the Joro spider, New York State Integrated Pest Management Director Alejandro Calixto helped alleviate public concern over the invasive pest's anticipated Empire State arrival during summer 2024. Through media interviews, science podcasts and a Facebook reel that garnered more than 13,000 views, Calixto shared that Joro spiders do not pose a risk to human health or an immediate threat to other species.

Weed IPM - Weed management has long been one of the most challenging production-related issues for organic farmers, but due to herbicide resistant weeds, labor shortages, and increasingly variable weather, New York farmers of all types are now struggling with weed management. To help growers develop comprehensive weed control strategies, our Integrated Weed Management Specialist, Bryan Brown, launched a project to help farmers deplete the weeds in their soils. Brown, with the help of summer technician Saige Crawley and Extension Aide Kassady Cerny, collected soil samples from 50 farms throughout the state and grew weeds in a controlled environment, where they identified the species and will provide individualized reports to help farmers understand which weeds are present in their soil, and more importantly, what they can do to manage them.

Biocontrol - Newly developed web profiles for more than 40 biocontrol agents have been viewed over 26,000 times, putting practical information for using and conserving beneficial insects in the hands of extension educators, farmers, researches and the general public.

Pesticide Risk Assessment - As pest pressure increases, so does pesticide reliance—New York State reported an increase in applications between 1997 and 2022—but new research from. New York State Integrated Pest Management Program suggests that mass spraying may have unintentional consequences for beneficial macro-organisms. NYSIPM Post Doctoral Research Associate Diana Obregon Corredor used New York's booming apple industry for her study, sampling soil and flowers from 24 of the state's more than 600 commercial apple farms to assess how macro-organisms–organisms that can be seen with the naked eye–are impacted by widespread pesticide use. Beneficial organisms are essential to the apple industry, with soil macro-organisms aiding in decomposition, nutrient cycling and pest suppression, and pollinators contributing to apple fruit set and size. However, Obregon Corredor's research found that of the 79 reported active ingredients used to control pests on subject farms, 42 were found in the tested soil samples and 36 were found in sampled fruit flowers. The study concluded that due to pesticide spraying, populations of several macro-organisms, including earthworms, springtails and wild bees, were significantly reduced. In order to mitigate future loss, Obregon Corredor made several suggestions, including a reduction in the use of more problematic pesticides, rotating pesticide use based on toxicity, seeking alternatives

with less persistence in the soil, using NYSIPM's Network for Environment and Weather Applications to forecast pest and weather pressure and using NYSIPM's Environmental Impact Quotient (EIQ) to identify the minimum effective amount of specific pesticides.

Tick Prevention Outreach - New York State Integrated Pest Management made information about ticks and tick-borne diseases available to the more than 21,000 attendees of Farm Aid 2024 in Saratoga Springs. In addition to those reached at Farm Aid's long-running annual celebration of America's farmers and growers, NYSIPM team members spread the Don't Get Ticked New York message at more than 60 tabling events and presentations between April 2024 and March 2025, reaching more than 37,000 New Yorkers.

IPM Events

2024 Annual NYSIPM Conference - **"*Fruit IPM for the Home Garden and Landscapes*"**. NYSPM's annual conference provided novice and seasoned growers and gardeners with strategies for reducing pests in home fruit crops. More than 60 participants learned how to incorporate fruit into their landscapes, while gaining an understanding of how to safely reduce the impacts of pests. Speakers provided insight and instruction on incorporating sustainability and trusted IPM strategies for managing common pests, pollinators and natural enemies of tree and small fruit.

Six Right-of-Way Recertification Training Program - Held in Auburn, NY, October 10 and 11, 2024, the Category Six Right-of-Way Recertification Training Program, offered an opportunity for pesticide applicators and vegetation managers to learn the latest in integrated vegetation management (IVM) strategies, receive updates on new herbicide products, hear regulatory updates from the New York State Department of Environmental Conservation and access pesticide safety refresher training. The program included both in-field and classroom training focused on rights-of-way related to electric transmission and distribution, pipelines, highways, and railroads. Through their work with the Category Six Right-of-Way Training Committee, Pesticide Safety Education Program Lead Mike Helms and Program Extension Aide Amber VanNostrand helped coordinate annual right-of-way training that reached 260 individuals from public utility, contract vegetation management and tree care companies, as well as state and local transportation and public works departments, pesticide manufacturers and regulatory agencies.

National Pesticide Applicator Training Manual Development Workshop - NYSIPM's Pesticide Safety Education Program hosted the National Pesticide Applicator Training Manual Development Workshop at Cornell AgriTech from October 22 through 24. The event brought 36 pesticide safety educators and regulatory officials from 20 states, the District of Columbia, American Samoa and Canada together to share knowledge and expertise for updating and improving training manuals.

Public Housing IPM Extension and Outreach - Public housing units and nursing facilities face countless challenges when it comes to pests, however, traditional treatments are often one dimensional, relying solely on pesticides to address infestations. Through extensive outreach and training, New York State Integrated Pest Management (NYSIPM) Community IPM Specialist Susannah Krysko has helped change that practice at several New York properties. Krysko, who spent ten years overseeing the Department of Housing and Urban Development's StopPests in Housing Program with the Northeastern IPM Center prior to joining NYSIPM, worked with five affordable housing properties and one nursing home to offer training and technical assistance to building managers, staff and residents, enhancing pest control efforts and empowering residents and staff with knowledge about safe and effective tools for managing common pests like bed bugs, cockroaches and rodents.

Rodent IPM - NYSIPM and the City of New York Office of the Mayor and Department of Health and Mental Hygiene host Inaugural National Urban Rat Summit. The Inaugural National Urban Rat Summit was a two day event for academic researchers, municipal managers, and regulatory agency

staff to share research and collaborate on municipal rat management, including best practices and brainstorming possible innovations and technologies for the future. The event was a collaboration of The City of New York, Office of the Mayor and Department of Health and Mental Hygiene, and the Cornell Integrated Pest Management Program at Cornell University and counted with over 100 participants.

What's Bugging You First Friday Events – Launched in March 2021, this program invites experts from different parts of the US each month to share practical information and answer questions on using IPM to avoid pest problems and promote a healthy environment where you live, work, learn, and play. Each presentation ends with an IPM Minute, covering specific actions participants can take in the next few days to help avoid pest problems. This well-established and successfully branded program is well attended, with over 2200 people registered and an average of 70 attending each event. Four events were offered in Spanish.

NYSIPM Academic Seminars – Launched in February 2021 – This monthly seminar series was designed to increase awareness of new research and techniques that advance IPM and its adoption in all pest management settings. We offered eight seminars with over 300 participants.

2024-2025 Annual Report, now electronic, our Annual Reports are excellent tools for communicating NYSIPM to stakeholders. In our most recent report, we featured research efforts including featuring neonicotinoid alternatives projects, spotted lanternfly economics, weed IPM, and pesticide risk assessment studies in apple orchards. It also features NYSIPM events including the Annual IPM Conference and Pesticide Safety training. This report shows NYSIPM's positive impact on New Yorkers and their environment and is an excellent outreach tool for our program.

Resources produced

- NYSIPM YouTube channel – 376 videos with a total of 2,360 subscribers, and over 648,000 views since 2011.
- The NYSIPM Image Gallery provides visual identification information and links to IPM educational materials with over 5,000 images and videos, and over 2 million views since 2013.
- 14 podcasts on Weed IPM ("Into the Weeds") available in Spotify and Google Podcasts
- Dung beetles visual guide – provides identification and biology for 18 dung beetle species.
- Spotted lanternfly expansion map
- Spotted wing drosophila distribution map
- Blogs
- ABCs of School and Child Care Pest Management
- Weekly Field Crop Pest Report
- Spotted Wing Drosophila
- Biocontrol Bytes
- Sweet Corn Pheromone Trap Network
- Ornamental Crops IPM
- ThinkIPM
- Your NEWA
- Twitter feeds

@NYSIPM, @NYSFIeldCropsIPM, @OrnamentalIPM, @Iknwplnts, @IPM_School&Childcare, @AmaraDunn, @Tinigua

Pennsylvania Integrated Pest Management (PAIPM) Program Report to NEERA 2025

John Tooker, IPM Coordinator, Professor of Entomology, tooker@psu.edu

PAIPM is a diverse program that spans agricultural and urban systems. Listed below are some activities of the programs supported during 2024 by the USDA EIP in Pennsylvania with project leaders listed. These activities do not include all the IPM working happening at Penn State or Pennsylvania because some key contributors were unable to send their details to be included here.

Insect Diagnostic Services, Dept. of Entomology, Michael Skvarla. Dr. Skvarla performed 1052 identification requests in 2024, a 13% decrease from 2023 and 24% lower than the average of 1342 requests per year for 2018-2022. We are not sure why the requests were lower in 2024. The percentages for different categories (Indoor, Fruit & Vegetable, Medical & Veterinary, etc) and arthropod orders are similar to past years, so it seems to be a general decrease in the number of requests rather than a decrease in a specific area. Most (75.6%) ID requests were processed and clients contacted within 2 days of receiving the request, while 3.5% took longer than 5 days.

Arthro-pod podcast. We recorded 20 episodes in 2024, with an average of 1509 downloads (903–2574) per episode and 27,174 downloads in total, an increase of ~200 downloads per episode compared to 2022.

Other activities: Dr. Skvarla was interview 39 times by media outlets, including Popular Science magazine, Country Living magazine and Philadelphia Inquirer.

Extension-related peer-reviewed publications

Skvarla, M. J., K. Poh, C. Norman, and E. T. Machtinger. 2024. Commercial products are not effective at repelling European deer keds, *Lipoptena cervi* (Diptera: Hippoboscidae) but may increase mortality after exposure. Journal of Medical Entomology 61(6): 1435–1442.

Skvarla, M. J., and J. L. Larson. 2024. A survey of pesticide use in horticulturally grown carnivorous plants, with a review of arthropod pests. Carnivorous Plant Newsletter, 53(2): 75–103.

Skvarla, M. J., J. R. Fisher, and J. G. Hill. 2024. First record of *Tetramorium bicarinatum* (Hymenoptera: Formicidae) in Pennsylvania. Journal of the Entomological Society of Ontario, 155: 1–5.

Skvarla, M. J., and S. A. Schneider. 2024. New host records for white peach scale (Hemiptera: Diaspididae:*Pseudaulacaspis pentagona* (Targioni Tozzetti, 1886)) in North America. Proceedings of the Entomological Society of Washington, 126(1): 69–73. https://doi.org/10.4289/0013-8797.126.1.69

Skvarla, M. J., K. D. Chase, C. B. Riley, and J. Slone. 2024. First records of crapemyrtle bark scale (Hemiptera: Eriococcidae: *Acanthococcus lagerstroemiae*) from New Jersey and New York. Proceedings of the Washington Entomological Society, 125(3): 428–432. https://doi.org/10.4289/0013-8797.125.3.428

Murphy-Hollies, K., **M. J. Skvarla**, and R. Verble. 2024. Entomologists require ethical guidance for compassionate management of delusional parasitosis cases. American Entomologist, 70(1): 44–48. https://doi.org/10.1093/ae/tmae003

Extension publications

Skvarla, M. J., J. G. Prudencio (trans.). 2024. Garrapatas comunes en Pensilvania. PSU fact sheet. Available online at: https://extension.psu.edu/garrapatas-comunes-en-pensilvania

Skvarla, M. J., J. G. Prudencio (trans.). 2024. Sclerodermus, una pequeña avispa que en ocasiones infesta los hogares. PSU fact sheet. Available online at: https://extension.psu.edu/sclerodermus-una-pequena-avispa-que-en-ocasiones-infesta-los-hogares

Skvarla, M. J., D. Biddinger, N. Boyle, and M. Lopez-Uribe. 2024. Enemies of mason bees. PSU fact sheet. Available online at: https://extension.psu.edu/enemies-of-mason-bees

Hoover, G, and **M. J. Skvarla**. 2024. Peachtree borer. PSU fact sheet. Available online at:https://extension.psu.edu/peachtree-borer

Skvarla, M. J. 2024. Booklice. PSU fact sheet. Available online at: https://extension.psu.edu/booklice

Skvarla, M. J. 2024. Do Chickens, Guinea Fowl, or Opossums Control Ticks? PSU fact sheet. Available online at: https://extension.psu.edu/do-chickens-guinea-fowl-or-opossums-control-ticks

Skvarla, M. J. 2024. Research update: Box tree moths. Bucks County Master Gardener Newsletter. Winter 2024: 11–13.

Skvarla, M. J. 2024. Jumping worms. PA Native Plant Society Newsletter, 26(1): 4–5.

***Community IPM in Philadelphia,* Ray Delaney.** Urban IPM Technician Training in North Philadelphia. Working with ECA (Energy Coordinating Agency), a local NGO that provides training in building trades, the PAIPM Program received a US EPA Environmental Justice grant for an innovative program to train residents of North Philadelphia as Urban IPM Technicians. A third cohort of 6 students took the training in the Fall 2024. Similar Workforce Development programs have been created at Lankenau High School and the Philadelphia Prison system that are currently training participants for the PA pesticide certification exam. In addition to these efforts, IPM and Pesticide Technician training has been provided to employees of the City of Philadelphia – Parks & Recreation Department, Children's Hospital of Philadelphia, Women for a Healthy Environment and the membership of the PA Pest Management Association.

Medicare Reimbursement for IPM-based Pest Control for Disabled Adults. By January 2024, the program contractors performed 866 service calls. Bed bugs were the most common pest treated, accounting for over 43% of treatments. Cockroaches (39%) were the next most common pest treated, with mice (33%) rounding out the top complaints. Only 23% of treatments involved more than one pest; cockroaches and mice were the most common combination (10% of treatments), followed by bed bugs and cockroaches (6%). "Other" pests (i.e., rats, squirrels, fleas, and raccoons) were encountered rarely. Notably, contractors resolved 91% of complaints with a single visit. Encouragingly, our program has had more success eradicating pests in single visits than conventional (e.g., National) pest control companies, and about 20% less expensive. Customer satisfaction with the program is 100%.

During this period, PA IPM staff have participated in the Northeast IPM Center's Municipal Rodent Working Group, the PPMA Rodent Academy and the National Urban Rat Summit.

Publications

Richardson, J. L., McCoy, E. P., Parlavecchio, N., Szykowny, R., Beech-Brown, E., Buijs, J. A., Buckley, J., Corrigan, R. M., Costa, F., Delaney, R., Denny, R., Helms, L., Lee, W., Murray, M. H., Riegel, C., Souza, F. N., Ulrich, J., Why, A., & Kiyokawa, Y. (2025). Increasing rat numbers in cities are linked to climate warming, urbanization, and human population. Science Advances, 11(5). https://doi.org/10.1126/sciadv.ads6782

School IPM, Don DeMackiewicz, IPM Specialist

Contacted (e-mail/phone) 461 school districts (public k-12) and compiled a contact list including District Name, IPM Coordinator's Name, address, e-mail, phone #, web site, address. Using that list inquired if they need any IPM support.

53 IPM manuals sent to IPM coordinators.

Visited 18 school districts in person (Sayer SD, Athens SD, Big Spring SD, South Middleton SD, Waynesboro Area SD, Everette SD, Berlin-Brothersvalley SD, Rockwood SD, Shanksville-Stoneycreek SD, Bellefonte Area SD, Curwensville Area SD, Glendale SD, Susquehanna Township SD, Palmyra Area SD, Greencastle-Antrim SD, Southmoreland SD, Belle Vernon SD, Norwin SD, Fox Chapel Area) to set up new or revive existing IPM programs.

Presented talk on "School IPM" at Lebanon/Lancaster Counties maintenance meeting (Conestoga Middle School, about 8 certified cat 23 applicators).

Joined PA Advisory Council for Environmental Education and attended annual in-person meeting.

Attended two PSU Extension trainings (Professional Pest Managers School and Turf and Ornamental School). Helped at the 2nd one by introducing speakers and with records of attendance.

Joined Pennsylvania Association of School Nurses and Practitioners (PASNAP)

Joined Pennsylvania Pest Managers Association (PPMA) and attended 2 meetings (the Annual Meeting and a semi-annual regional meeting in Trevose)

Joined Pennsylvania Association of School Business Officials (PASBO)

Attended Pennsylvania Vector Control Association Annual Meeting, State College, PA, Oct 2024

IPM in Vegetable Crops, Heather Grab, Assistant Professor of Entomology

In 2024 we continued a statewide monitoring and reporting network for corn earworm and fall armyworm, two key migratory lepidopteran pests that impact a range of specialty and field crops. We had 24 sites across the state trapping and reporting weekly counts. These counts as well as timely management recommendations based on IPM practices were communicated in weekly alerts to the Penn State Extension website, the 1-800-PENN IPM phone line (funded in part by EIP funds), the Pennsylvania Vegetable Growers Association newsletter, and at produce auction kiosks around the state. As the trapping season wrapped up in fall 2024, we began planning and coordinating with the Southern IPM center to produce an online dashboard that would provide real-time updates for trap catches during the coming 2025 season. Results from the 2024 season along with general information on trapping and managing these key pests using IPM principles were communicated to stakeholder communities during farm visits (n = 6), twighlight meetings (n=2), and auction meeting talks (n=2). During these events and in following events during spring 2025, we collected survey responses from 33 sweet corn growers to establish their key

pest management challenges and current management practices which will be used as a baseline for future extension program planning and comparison.

IPM in Agronomic Crops, John Tooker, Professor of Entomology. Tooker's group led three efforts to track pest populations with the expectation that information on local pest populations can encourage folks to adopt IPM. First, we used pheromone traps to detect migrating populations of black cutworm, which is a significant pest of corn. We detected five "significant flights" of black cutworm moths and communicated these results with the agricultural community. Second, we collaborated with county-based extension educators on a project funded by the Pennsylvania Soybean Board to scout "typical" soybean fields. The goal of the project was to encourage growers to adopt Integrated Pest Management by providing growers with local assessment of insects and diseases active in soybean fields across the state. Including 2024, over 13 years only three fields out of 255 field (1.2%) have needed insecticides and no fields have needed fungicides. In 2024, Tooker presented 12 talks at meetings reaching 908 farmers and other agricultural professionals in eight counties in Pennsylvania and three additional states (MD, NY, WI). Tooker also authored 24 weekly newsletter articles, each of which was distributed to >12,500 digital subscribers to Penn State's Field Crop News.

Publications

Kammerer, M, A. L. Iverson, K. Li, J .F. Tooker, C. M. Grozinger. 2024. Seasonal bee communities vary in their responses to local and landscape scales: implication for land managers *Landscape Ecology* 39: 97.

IPM in Grape production, Flor Acevedo, Assistant Professor of Entomology

In 2024, Dr. Acevedo performed the following IPM-related activities:

Conducted research on the identification of grape berry moth (*Paralobesia viteana*) larval parasitoids in northwest Pennsylvania. We were able to identify six parasitoid species and determine their parasitism rates in the field. The identified species were: *Enytus obliteratus* (Hymenoptera: Ichneumonidae), *Campoplex tortricidis* (Hymenoptera: Ichneumonidae), *Scambus* spp. (Hymenoptera: Ichneumonidae), *Glypta* spp. (Hymenoptera: Ichneumonidae); *Bracon variabilis* (Hymenoptera: Braconidae), and *Goniozus fratellus* (Hymenoptera: Bethylidae). Of these, *B. variabilis* was the most abundant species, representing 68.6 % followed by *G. fratellus* and *E. obliteratus*, comprising 13.8% and 11.9%, respectively, of all parasitoids found (n = 159). We also develop a laboratory rearing protocol for *E. obliteratus.*

Conducted samplings of grape berry moth in three vineyards over the growing season. This research, as well as reports from grape growers, indicate a need to adjust the current recommendation to control this insect. We identified a large grape berry moth population during the first 4 weeks of the growing season that needs to be managed more efficiently to reduce infestations later in the season. We will repeat the sampling in 2025 to determine seasonal variations in grape berry moth phenology.

Conducted research aimed at estimating economic thresholds for the management of spotted lanternfly in *Vitis vinifera*. This is a multi-year study; 2024 was the third season. We found a steep decrease in yield associated with high insect densities after three consecutive seasons of infestation. We also found a decrease in juice sugars associated with lanternfly feeding.

Dr. Acevedo delivered ten extension talks to grape growers (n = 525), extension educators (n = 374), and the general public (n =187) about research, basic biology, and management of spotted lanternfly and grape berry moth in vineyards. Enhanced knowledge of ~ 962 people about research, basic biology, and management of spotted lanternfly and grape berry moth in vineyards.

Two IPM-related research papers were published in 2024:
Pinto A.F., Eshenaur B.C., Acevedo F.E. Calixto, A.A., Centinari M., Gomez M.I. (2025) Assessing the potential economic impacts of spotted lanternfly (*Lycorma delicauta*, Hemiptera: Fulgoridae) infestations on grape production in New York State. *Journal of Integrated Pest Management* 16: 2

Laiton-Jimenez, L. A. (Author - Graduate Student), Samiksha, F., Acevedo F. E. (2024) Biology and life table parameters of grape berry moth *Paralobesia viteana* (Lepidoptera: Tortricidae) grown on different grape cultivars. *Journal of Economic Entomology* 117: 12.

Helped produce five extension videos illustrating spotted lanternfly research and management in vineyards. Available at https://extension.psu.edu/spotted-lanternfly-in-vineyards:

Acevedo F., Hickey C., and Centinari M. Spotted lanternfly in vineyards: Management considerations. Video. Penn State Extension.

Acevedo F., Hickey C., and Centinari M. Spotted lanternfly in vineyards: Managing Eggs and nymphs. Video. Penn State Extension.

Acevedo F., Hickey C., and Centinari M. Spotted lanternfly in vineyards: Managing Adults. Video. Penn State Extension.

Hickey C., Acevedo F., and Centinari M. Spotted lanternfly in vineyards: Scouting and Observation. Video. Penn State Extension.

Centinari M., Hickey C., and Acevedo F. Spotted lanternfly in vineyards: Impacts on grapevine health and productivity. Video. Penn State Extension.

IPM in Fruit Production, David Biddinger, Research Professor.

Extension articles published in non-refereed journals for 2024

D. Biddinger. Lorsban/Pilot (Chlorpyrifos) is Back for Pennsylvania Tree Fruit in 2025.

Enemies of Mason Bees . M. Skvarla, D. Biddinger, N. Boyle, & M. Lopez-Uribe. 2024. Penn State Extension.

K. Demchak & D. Biddinger. 2024. Spotted Wing Drosophila (SWD) – a 2024 Update for PA. Spotted Wing Drosophila (SWD) – a 2024 Update for PA

Extension Bulletins and Circulars

Pennsylvania Tree Fruit Production Guide 2024-2025 edition. Edited by G. Krawczyk. Co-author of entomology section with G. Krawczyk, co-author of pollinator section with Xerces Society, author of biological control section. Penn State Cooperative Extension. AGRS-045. 540 p.

Extension Workshop

Native & Non-Native Pollinator Workshop. D. Biddinger, N. Boyle, & D. Weber. April 17, 2024. Penn State FREC, 4 hours.

Extension presentations

Biddinger, D. J. 2024. Increases in plum curculio and how to control secondary pests in apple. Mid-Atlantic Fruit & Vegetable Convention. 1/31/2024.

Biddinger, D. J. 2024. Lorsban is back and how it affects early season IPM programs in tree fruit. Joint Central Susquehanna and Northeast Region Winter Commercial Tree Fruit School. Selinsgrove, PA 2/13/2024.

Biddinger, D. J. 2024. Early season apple pest control (without killing your bees). Adam/Frederick County Winter Commercial Tree Fruit School. Biglerville, PA 2/19/2024.

IPM of Livestock and Wildlife Pests, Dr. Erika Machtinger, Associate Professor of Entomology

Led the newly established VectorED Network, leveraging established education networks to deliver vector-borne disease training across the Ohio River Valley region, serving pest management professionals, veterinary professionals, Extension educators, and academic communities. Needs assessments have been conducted for many of our target audiences to establish goals for future training and education.

Created extensive educational materials with the "Fight the Bite" and "Know Your Risk" video series covering vector identification, risk assessment, and prevention strategies. Cumulatively, this series has 21 short videos with over 8,100 views.

Conducted hands-on training workshop "From Bites to Insights" at the Wildlife Society of America meeting and the Eastern Branch of the Entomological Society of America meeting. Post-workshop evaluations showed 94% of participants reported increased confidence in identifying ectoparasites and increased awareness of vector-borne disease risks.

IPM of Mushroom Production, Michael Wolfin, Assistant Research Professor, and Maria Gorgo-Simcox, Penn State Extension Educator.

Dr. Wolfin and his graduate students gave four presentations and four posters at the 2024 Mushroom Short Course and gave three presentations at the spring and fall Mushroom Pesticide Credit Meetings. They also visited dozens of farms to discuss research with growers.

The Wolfin lab completed field studies with significant grower input that supported mites and nematodes as effective and feasible tools to control mushroom phorid fly larvae on farms, the first interventions that target larvae. Additionally, laboratory studies established that Long Lasting Insecticide Netting kills over 80% of mushroom fly adults after only a 5-minute exposure, and these nets remain effective after between 7-10 months. Nets can survive the essential steam sanitization process on farms as well, increasing the applicability of these nets. Successfully updated the Mushroom IPM Handbook, will be printed in 2025.

The mushroom team continued our efforts to promote IPM in mushroom production. They continue to maintain the Mushroom Fly Hotline, which residents and farmers dealing with

mushroom pests can call for advice. They conducted several trainings for the industry such as four pesticide meetings (two in English and two in Spanish) offering two Core and two category credits in each session. We also conducted two pesticide applicators short courses in English and one course in Spanish to help participants take the Pennsylvania Department of Agriculture's license exam. We offered specialty mushroom webinars on mushroom pests' control with IPM methods. And we offered several FSMA Produce Safety Rule trainings for mushroom and other fresh produce growers.

Maria Gorgo-Simcox – Mushroom Team leader for PSE Program development Process
2024 PA Farm Show – Mushroom commodity chair and judging
"IPM Basics for Mushroom Farms" webinar for Cornell University
"Post-harvest handling of fresh produce and sanitation of packing houses" webinar for Cornell University
FSMA Produce Safety Rule trainings (2 Online and 2 in Person)
Spring Mushroom Pesticide meetings (E&S) – Chester county - in person
Spring Mushroom Pesticide meetings (E) – Berks county - in person
Fall Mushroom Pesticide meetings (E&S) – Chester & Berks - online
Pesticide Applicator Short Course (2 in English and 1 in Spanish)
64th Mushroom Short Course (English & Spanish sessions)
Participation in Giorgi Mushroom Company's Safety Days
Shiitake Mushroom Production for beginner growers – Living in a Few Acres webinar
Mushroom Production for FDA inspectors and extension – webinar for FDA
Specialty mushroom consultations with beginner growers
Participation in the American Mushroom Institute (AMI) committees (IPM, Food Safety, Sustainability, Farm Show, Pesticide credits)

Grants:
1. "Focusing on Novel Pest and Disease Management Strategies for U.S. Mushroom Farms"
Project Dates: 09/01/2023 - 08/31/2027 – $7 million
Develop bilingual educational materials (English Spanish) on mushroom pests and diseases to support the implementation of novel IPM techniques (IPM Manual update, posters, factsheets, etc.). Develop and deliver a bilingual IPM training program (in person, webinars, etc.)
2. Housing and labor shortage grant with Kathy Sexsmith
3. PDA Phorid Fly grants since 2018

Rhode Island IPM Extension Implementation Program
2025 Annual NEERA Report
Lisa Tewksbury, PhD, URI EIP Co-Coordinator

2024 IPM Team: Lisa Tewksbury, Keiddy Urrea-Morawicki, David Weisberger and Lexi Johnson

Major Objectives and Accomplishments:

IPM Implementation in Communities:
Focuses on Landscape IPM, which addresses the needs of homeowners, landscapes and growers through education programs and site visits. Our objective is to inform our stakeholders of pest issues and IPM techniques for new and existing pests. We provide up-to-date information on new and emerging species such as spotted lanternfly, box tree moth and beech leaf disease. We provide this information to our Master Gardeners and Rhode Island Nursery and Landscape industry members who can use this information while providing plants and plant maintenance to homeowners. Lisa Tewksbury and Keiddy Urrea-Morawicki provided a pest update for the Annual RINLA meeting on Feb. 28, 2024. The annual winter meeting is attended by over 300 nursery producers and landscapers.

Lisa Tewksbury has been a participant in the SLF Working group and the Stakeholder partnership group, both organized by Penn State. We are contributing to SLF biocontrol, as well as contributing to the state's efforts at surveying for SLF and providing SLF outreach materials, including a strong presence on social media.

IPM Implementation in Specialty Crops:
Two fruit and two vegetable twilight meetings were held in 2024. The newsletter RIAgNotes was used to keep growers informed of all IPM workshops, webinars and other opportunities available for pest management training. Grower training on NEWA was provided at a twilight meeting by a RI fruit grower who wrote the grant to purchase weather stations for RI orchards.

David Weisberger works closely with the Young Farmer Network (YFN) to provide production and pest management guidance for beginning farmers. David regularly visits both fruit and vegetable growers to assist with pest management.

Winter moth populations have increased in blueberries in recent years, and blueberry growers have benefited from Heather Faubert's newsletter identifying when egg masses are hatching to allow better timing of pesticide treatments.

The Allium leafminer was first found in RI in 2022 and regular scouting continued into 2023. By April of 2023 it was found in all 5 RI counties. A Pest Alert was sent to growers and adult monitoring was set up in one RI farm. RI vegetable growers were educated about this new pest to allow them to manage it effectively. In 2024, a pest of Kale and other crops in the Brassicaceae,

Diagnostic Lab:
Keiddy Urrea-Morawicki has begun the process of accreditation through the National Plant Diagnostic Networks, for the URI diagnostic lab. The updated lab aims to increase the diagnostic capabilities by incorporating more morphological (culturing) and molecular identification capabilities for new and emerging diseases in Rhode Island and the region.

Outputs:

- 20 Educational events (2,300 participants)
- 379 Commercial grower and public samples diagnosed
- Social Media – Instagram: 48 posts and many stories (currently 1,110 followers)

Publications:

Harlequin bug Pest Alert

Beech Leaf Disease in Rhode Island Update – URI IPM Website
https://web.uri.edu/coopext/wp-content/uploads/sites/2042/2024-BLD-update_9.23.24-1.pdf

URI Diagnostic Lab Update – RINLA Newsletter Spring 224 (Rose Black Spot, Boxwood leafminer, and winter moth)
https://rinla.org/wp-content/uploads/2024/04/2024-RINLA-Spring-Newsletter-130-web.pdf

URI Diagnostic Lab Update – RINLA Newsletter Fall 2024 (Bagworms p. 12)
https://rinla.org/wp-content/uploads/2024/10/2024-RINLA-Fall-Newsletter-Vol-132-2.pdf

The Vermont IPM Extension Implementation Program Addressing Stakeholder Priorities and Needs for 2021-2024

Ann Hazelrigg*, Terence Bradshaw, Heather Darby, Margaret Skinner, Sarah Kingsley-Richards - University of Vermont Extension, Burlington, VT 05405 - ann.hazelrigg@uvm.edu

https://www.uvm.edu/extension/integrated-pest-management

Integrated Pest Management

The Vermont Integrated Pest Management (IPM) Program addresses critical needs identified by stakeholders to encourage adoption of effective, affordable and environmentally-sound IPM practices while maintaining agricultural productivity and healthy communities.

Agriculture is Essential to Vermont

Vermont's farms have been diversifying to include many specialty crops and welcoming many beginning farmers eager for information to successfully incorporate IPM tools into their operations. The Vermont IPM program provides essential information for diverse crops and audiences to reduce pesticide use, reduce pest and disease losses, decrease production costs, and reduce human and environmental risks.

Meeting the IPM Needs of Vermont Stakeholders

Program areas address critical IPM needs by:

- Closely integrating with **research** led by specialists at the University of Vermont
- Utilizing effective **outreach** to deliver programs in a wide range of crops and settings
- Involving strong **collaborative** relationships with state and regional stakeholders, commodity groups, and agencies

"Use of sustainable IPM practices reduces health and environmental risks, while allowing us to offer a crop that is profitable and engages the community with premium fruit."

- Vermont Apple Grower

- **295 educational events**
- **16,996 participants**
- **4,431 pest questions**
- **233 outreach publications**

Grain demonstration plots

Agronomy

- Attendees of **Agronomy Field Days and Winter Conferences** learned to identify pests, purchase certified seed and resistant varieties, adjust fertility, and modify mechanical cultivation to minimize crop impact by pests.
- Participants in the **Hop and Hemp Disease Survey** learned to scout for pests, identify pests, and adopt IPM strategies. Scouting identified a new hemp flea beetle pest causing severe damage to cones.
- Participants in the **Seed Quality Testing** learned to identify diseases, purchase certified seed and resistant varieties, improve crop rotation and cleaning, and segregate seed lots to improve production and reduce risk to human health.
- **Pollinator Education Pest Assessment Plan** and event participants learned scouting, to minimize movement of insecticide dust, and use seed not treated with neonicotinoids to enhance and protect pollinators in agronomy crops.

One **Hop Disease Survey** farm adopted a new IPM program to effectively manage *Alternaria* cone disease while reducing pesticide applications by 50%

Orchard pollinator showcase

Tree Fruit & Grape

- Attendees of **Apple & Grape Extension, Outreach and Education** events adopted IPM practices including comprehensive pest monitoring to improve pest identification, timing, and decrease pesticide use. Changing these behaviors increased confidence in making pest management decisions.
- Participants in the **Orchard Scouting Network** received in-depth consultations on production issues. Scouting results reported in program newsletters provided IPM guidance to growers throughout the state.
- The **Grape 'Natural" Production Evaluation** included mineral fungicides, biofungicides, biodynamic preparations, and other pest management alternatives. Results shared with growers and published in journal articles improved understanding of emerging pest management systems throughout the region.

"Participation in the UVM Fruit Program has allowed us to be much more targeted and thus much more effective with our limited sprays."

- Vermont Fruit Grower

Greenhouse IPM

Greenhouse, Nursery, & High Tunnel

- Attendees of **Tri-State IPM Workshops** adopted IPM practices including scouting and identification of pests, biocontrol agents, and abiotic symptoms; use of biocontrol, biopesticides, reduced-risk pesticides, and plant-mediated IPM systems; soil and media testing; sanitation; and diagnostic services. Changing these behaviors decreased conventional synthetic pesticide use.
- Participants in the **IPM First** program adopted IPM practices including scouting and identification of pests and biocontrol agents; use of biocontrol, biopesticides, reduced-risk pesticides, and plant-mediated IPM systems; and diagnostic services. Many high tunnel growers utilized biocontrol agents for the first time through the program.
- **Pollinator Habitat Plantings** established at greenhouse, high tunnel, and nursery sites provided the public with educational signs and brochures.

"Our tunnel looks the cleanest and healthiest it has ever looked at this point in the season and our pest issues have been very manageable."

- Vermont High Tunnel Grower

Community education

Communities

- Students of the **Master Gardener Course** increased their knowledge of IPM and made changes to the way they garden or work with clients.
- Clients of the **Master Gardener Helpline** (home gardeners) adopted recommended IPM strategies to manage their pest problem. Changing these behaviors reduced pesticide use, saving up to $137 average annually per client.
- Students of the **Master Gardener Advanced Training Webinars** learned new information about specific garden IPM practices for pest, soil health, and introduced species management; indigenous plant use; and pollinator support. Sharing this knowledge with the general public reduced the use of pesticides in home gardens.
- **Pollinator Demonstration Gardens** established and maintained by Master Gardener volunteers throughout the state provided workshops, tours, and direct education for the public.

Gardening for Pollinators and Beneficial Insects *e*-book is a resource for home gardeners published by Vermont Extension Master Gardeners.

Assessing plant samples

Pest Diagnostics

- Attendees of **Plant Diagnostic Clinic** events increased knowledge of pests and IPM strategies for small fruit and vegetable crops, including high tunnel winter greens and tomatoes. Adoption of these strategies reduced pesticide use and increased farm profits.
- Clients of the **Plant Diagnostic Clinic** (commercial growers) adopted IPM practices as a result of the diagnosis and recommendations. Changing these behaviors reduced pesticide use, saving up to $600 average annually per client.
- Participants in the **Northeast Small Fruit and Vegetable Working Group** developed priorities for small fruit and vegetable crop production specialists, extension educators, agricultural service providers, and non-profit agricultural educators to promote IPM education, research, and regulations throughout the region.

"An essential service to Vermont growers; assistance over the years has saved thousands of pounds of produce on our farm."

- Plant Diagnostic Clinic Client

Certification workshop

Pesticide Education

- Attendees of **Pesticide Certification Meetings** learned IPM practices including pesticide compatibility, avoiding herbicide resistance, rodenticide use standards, PPE and respirator safety, and Worker Protection Standards. Applicators were better prepared to take certification exams and maintain certification.
- ***The Pesticide Applicator*** **Newsletter** increased awareness of pesticide regulations and IPM practices to allow pesticides to be used more safely.
- **IPM and Pesticide Basics** presentations introduced pesticide regulations, reading labels, biopesticides, and exposure and risk to home gardeners to reduce the use of pesticides.
- **Pollinator IPM Training** participants increased knowledge of reducing pesticide risk and drift, state rules, and IPM practices to protect pollinators.

"Helps me better protect myself as an applicator of pesticides, better protect the public, and the environment ."

- Vermont Pesticide Applicator

The ***IPM: Integrated Pest Management*** brochure is an introductory resource for home gardeners published by Vermont Extension Master Gardener in collaboration with the Vermont Extension Pesticide Safety Education Program.

National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

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IPM State Report - West Virginia

The IPM team members in West Virginia have been carrying out Extension IPM programs in primarily in the areas of Specialty Crops (Tree Fruit, Vegetables, and Urban Horticulture (Master Gardeners).

Staff changes. Ms. Nyla Zorbas will be joining our team this summer (2025) as the new IPM Associate.

Significant outputs of 2024-'25:

1. Monitoring of insect pests and diseases in Tree Fruit, Small Fruit and Vegetables to provide updates to growers on timely pesticide applications and integrate IPM methods to manage pests.
2. Continued publication of quarterly IPM Chronicle newsletter.
3. Continued programming in Greenhouse and High Tunnel IPM.
4. Development of new weed management technology in forages.

Success Stories

Tree Fruit IPM

Insect Pests. Codling moth is the most important insect pest of apples. We calculated biofix dates and trap them weekly during the growing season at WVU animal husbandry farm in Morgantown, Kearneysville Tree Fruit Research and Education Center and Shanholtz farm. We recommended insecticide applications when captures in pheromone traps exceed the threshold of 5 codling moths/trap/week. Results were sent through email in our bi-weekly newsletter, Orchard Updates. This information helps growers to decide the best time for insecticide application to increase efficacy of insecticides. Grower feedback include "I was planning to apply insecticides tomorrow, after hearing that most of the codling moth population is in the larvae stage inside apples, your information saves time and money" (grower from Shanholtz farm, Romney, WV); "I like to see your insect traps numbers. It helps me to make better decisions. Sometimes I make more applications based on insect traps and other times I reduce the number of applications" (Orr farm, Martinsburg, WV); "I like to receive your insect trap information because I can compare them to my private consultant information. Between the two of them, I feel I am making a better decision" (Kitchen farm, Falling Waters, WV). Based on our past training, IPM practices implemented by the growers included application of pesticides based on threshold levels, use of semio-chemicals and reduced-risk pesticides, partial application in orchards, along with application under proper environmental conditions. Plinazolin is a new insecticide that is in the final steps to obtain EPA registration. We evaluated the efficacy of Plinazolin on codling moth damage in apple.

Diseases. We generated apple fire blight forecast by using the data from weather stations placed in the fruit growing region of the state and shared the forecast with fruit growers that worked as a decision support system for their spray program.

Small Fruit IPM

A new disease 'Neo-pestalotiopsis' outbreak was confirmed on strawberry at the WVU plant diagnostic clinic, disease risk and IPM based management option was sent to county agents' listserv as 'AgAlerts' to

share with small fruit growers. Resistance of anthracnose casing fungal pathogen *Colletotrichum acutatum* against QoI fungicide was detected in a strawberry grower's field. Based on this information, grower used fungicide from a different FRAC group and got the disease under control.

Demonstration of multiple Carbon sources for anaerobic soil disinfestation was conducted to find the most effective and economically feasible C-source for perennial strawberry production system. Both mustard seed meal and grape pomace suppressed soilborne diseases and there was no significant difference between these two. Grape pomace is a very inexpensive C-source compared to mustard seed meal indicating a higher chance of adoption by growers to use it as a C-source for ASD.

Demonstration of improved IPM-based black rot management was conducted in two grower collaborators' vineyards. IPM components included removal of infested plant debris and pruning of mummified diseased berries with infected vines, application of lime sulfur before budbreak and application of fungicides at the early stage after new growth when most infections take place. One grower cooperator could not harvest grapes due to extreme severity of black rot before this demonstration work. Due to the implementation of this IPM plan, he could harvest 90% of the berries disease free. Outreach activities could reach up to 80 clienteles who gained knowledge about these sustainable options of grape black rot management.

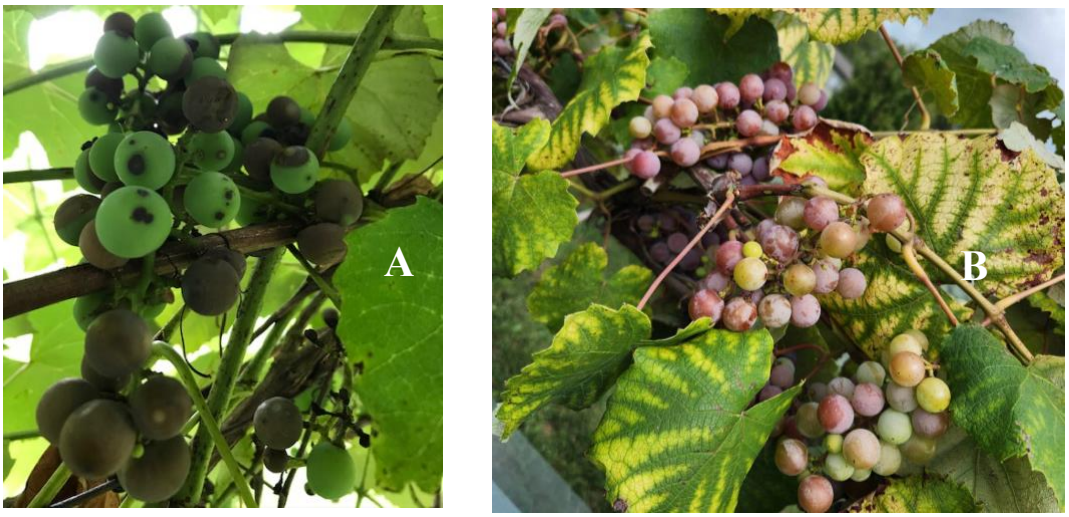

Fig. 1. Black rot on grapes; A) severe rot in 2023 when no control measure was taken; B) Very little or no black rot after implementation of IPM based management option.

Vegetable IPM

Monitoring data for major insect pests of sweetcorn. We monitored insect pests in sweetcorn in Jackson and Monongalia Counties. Insect pests included corn earworm, fall armyworm, and true armyworm. Pest alerts were not created because they were on acceptable numbers.

High tunnel insect exclusion screens. Several studies have reported the impacts of insect exclusion on insect pests. However, impact of screens on natural enemies has been poorly studied. We conducted research to determine the impact of insect exclusion screens on natural enemies. Our findings will provide insight into this mechanical control tactic on natural populations of parasitoids and predators.

Disease Resistant Tomato Seed Distribution. We distributed 1000 seed packets of Septoria leaf spot resistant tomato variety to small and backyard growers of the state for 2024 growing season. Tomato growers utilized host-resistance to keep SLS under control with low level of organically approved fungicides. Adoption of host resistance against this major tomato disease was remarkable.

Weed Management

We have identified a new herbicide mixture that could selectively control broadleaf weeds in cool-season grass pastures and hayfields without affecting desirable forages. A provisional patent was secured, and an industry partner signed a license agreement with WVU to develop and potentially market this technology by 2027.

Outreach Efforts

The IPM trifold brochures containing graphics and condensed information were passed on to the end-user at Farm Markets and during Extension events. During the past three years, the IPM Team participated the Small Farm Conference, where IPM booths with brochures were set up. Evaluations of various programming efforts indicated that the ability/understanding of participants improved in all areas including: IPM practices, identification of pests, scouting/monitoring, non-chemical pest management measures, selection of chemical sprays, pollinator safety, understanding of pesticide labels, matching signal-words with toxicity ratings, safe pesticide storage, handling and disposal of pesticide spills, balancing plant nutrition, and identifying mineral deficiencies.

Respectfully submitted by:

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