**NIMSS Report**

**Project No. and Title: NEERA-1604:**

**Northeast Region Technical Committee on Integrated Pest Management**

* **Period Covered: 01/03/2017 to 03/19/2018**
* **Date of Report: 04/04/2018**
* **Annual Meeting Dates: 03/19/2018 to 03/19/2018**
* **Prepared by: Donna Ellis, Chair, 2017-2018**

**Participants**

Ellis, Donna - CT IPM Coordinator; O’Neill, Michael – UConn Extension; Owens, David - DE IPM Coordinator; Van Gessel, Mark – University of Delaware; Koehler, Glenn, ME (remote) – ME IPM Program; Hamby, Kelly - MD IPM Coordinator; Sandler, Hilary - MA IPM Coordinator; Grant, Jennifer - NY IPM Coordinator; Rajotte, Ed – PA IPM Coordinator; Tewksbury, Lisa – RI IPM Co-Coordinator; Faubert, Heather – RI IPM Co-Coordinator; Hazelrigg, Ann - VT IPM Coordinator; Chandran, Rakesh, WV IPM Coordinator; Hoffmann, Michael – Interim Director, NE IPM Center; Gonzalez, Christopher - NE IPM Center; Bolton, Herbert - USDA NIFA; Kimble-Day, Kathryn – USDA NIFA Cusumano, Nancy, NE IPM Center (remote); Woodsen, Mary - Cornell; Olmstead, Dan – Cornell; Wise, Ken – Cornell; Lerman, Dion, Penn State Extension.

**Brief Summary of Minutes of Annual Meeting**

# The NEERA-1604 (formerly NEERA-1004) Regional IPM meeting was held in conjunction with the 9th International IPM Symposium in Baltimore, MD. The National IPM Coordinator meeting convened prior to the four Regional IPM meetings. A summary of the NEERA Regional meeting appears below.

**Welcome and Introductions**

The meeting opened with a welcome from the Chair and introductions by the attendees. State IPM Coordinators from CT, DE, MA, MD, ME, NY, PA, RI, VT, and WV and other representatives from the Northeast were present at the meeting. Several members participated via remote conferencing, with thanks to Nancy Cusumano at the Northeastern IPM Center (NEIPMC).

**NIFA Crop Protection and Pest Management Information Session**

Herb Bolton, NIFA National Program Leader for Entomology presented an overview of the Crop Protection and Pest Management (CPPM) Applied Research and Development Program Area (ARDP) and Regional Coordination Program Area (RCP). Rubella Goswami, NIFA National Program Leader for Plant Pathology, discussed the Extension Implementation Program Area (EIP) during the National IPM Coordinator meeting. The CPPM overview presented during the National IPM Coordinator meeting is available for viewing as a PowerPoint presentation.

Herb provided additional updates to the NEERA group regarding the CPPM EIP. Indirect costs for EIP funds were mentioned. NIFA is neutral on negotiating for indirects, and the decision is based on actions from stakeholders in agricultural areas as well as directives from Congress. ARDP and RCP recipients do pay indirects, and the exemption only applies to EIP funds. The group talked about the importance of communicating information on major pests and telling an innovative story. It is vital to synchronize efforts in the region to target major pests such as brown marmorated stink bug and spotted lanternfly. The story must be relevant and reach the right people.

**Update from the NEERA-1604 Administrative Advisor**

Dr. Michael O’Neill, NEERA-1604 Administrative Advisor and Associate Dean & Associate Director for UConn Extension talked about the importance of stakeholders in each state who will contact congressional leaders regarding key pests. Citizens and businesses are needed to become involved and make a case. Dr. O’Neill informed the group that the management company Lighthouse Consulting Group was hired to support the Northeast Extension Directors and will redesign the website. Ali Mitchell will start in April as the new Northeast Executive Director. It is hoped that interactions and communication will increase between the Extension Directors, the new management team, and the NEIPMC.

While the Northeastern region is not the greatest production region in the US, there are 65 million consumers with a high level of purchase power, and we need to take advantage of this. Dr. O’Neill asked how our science can connect better to these consumers. NIFA has announced new Science Initiatives, including Sustainable Agricultural Production Systems and Workforce Development, which provide opportunities to work more with multi-state groups. We need to focus more on students to connect campus programs with Extension, raise visibility on campus, and increase the number of Extension faculty.

**New Director for the Northeastern IPM Center**

Dr. Michael Hoffman, Interim Director for the NEIPMC, provided an update on the search for the new Director to replace Steve Young. An offer was extended to one of the candidates, but the candidate declined and will remain in their current position. The second candidate will be offered the position, and it is hoped that the new Director will be on board within several months. Dr. Hoffman will continue to serve as the NEIPMC Interim Director. The group discussed the Project Director (PD) Workshop and the requirement that EIP and ARDP recipients present a seminar during the 3-year award period. Herb Bolton mentioned that other regions offer webinars where PDs can present project results and updates, and this may be an option for the Northeastern PDs. The webinars are recorded, providing opportunities to view presentations online in the future.

The group also discussed plans for the new Director and the NEIPMC. Jennifer Grant suggested that the Director and the NEIPMC should take the lead with NEERA activities (which had occurred with some of the previous Directors), continue with regional visits to states, and assist with NEERA Chair duties. The NEIPMC budget should include travel for the NEERA Chair to participate in required meetings.

Dr. Hoffman suggested that invasive species should be coordinated more across the centers, and Herb agreed. One of the NEIPMC Signature Programs is Climate Change and Pests, but there are other emerging and invasive pests being introduced into the region that need to be addressed, such as Spotted Lanternfly. Ed Rajotte commented that the NEIPMC and the Northeastern IPM Coordinators need to be involved in the process as new pests are detected and strategies developed. Dr. O’Neill suggested that we should broaden our programs to include Sustainable Ag Systems, where federal funds are available.

**IPM Priorities for the Northeast**

A discussion was held on updating the 2014 Priorities developed by NEERA-1004 members during the 2014 annual meeting. The group revised and updated the list and created a new draft of 2018 Priorities, which tie in with the NEIPMC’s five Signature Program Areas: IPM and Organic Systems; Climate Change and Pests; Rural and Urban IPM; Next Generation Education; and Advanced Production Systems. The Priorities are used primarily for grant-writing but are also applicable for regional Working Groups and other purposes. The group reached consensus that additional focus is needed for emerging and invasive pests. While there are many emerging and invasive pests of concern, it was decided that one insect, disease, and weed example would be included in the list. The group also thought that a brief background for the priorities should be added and that the list be clarified to state that “pests” include insects, diseases, and weeds. Lisa Tewksbury typed up the draft list during the meeting, which will be updated by the Chair and shared with NEERA members and NEIPMC staff for comments. The final 2018 Priorities will be posted on the NEIPMC website.

**Special Discussion Topics**

Spotted Lanternfly. Ed Rajotte led a discussion on Spotted Lanternfly (SLF), which was first detected in PA in 2014 and has since spread to over 3,000 square miles in the state.  Recent specimens have also been confirmed in DE, NY, and VA.  The group watched an informative webinar on SLF that was presented by Emelie Swackhamer (Penn State Extension) and Shannon Herbst (Rainbow Treecare Scientific Advancements). Ed commented that thresholds need to be set for this emerging pest.

Update on Weather Monitoring and Pest Forecasting Systems. Jennifer Grant introduced Dan Olmstead as the new Coordinator for the Network for Environment and Weather Applications (NEWA). There are 611 grower-owned weather stations operating in 13 eastern states and 40 models to assist with pest management decision making for apples, grapes, cabbage, onions, potatoes, tomatoes, sweet corn, and turfgrass. Betsy Lamb, Ornamentals IPM Coordinator at Cornell will be adding models for ornamentals. The website is being rebuilt with ARDP funding. The group talked about data sharing with other programs, such as SkyBit’s Ag-Radar.

Ticks and Mosquitoes – Diseases They Vector. Jennifer Grant discussed the four Centers for Excellence in Vector Borne Diseases, which are funded by the national Centers for Disease Control and Prevention (CDC). Cornell recently formed the Northeast Regional Center to study arthropod-vectored diseases. Other specialists and programs in the region are based in PA (new veterinary entomologist recently hired to look at Lyme disease in schools), MA (two tick specialists), and RI (TickEncounter Resource Center and RI Mosquito Abatement Coordinator).

**NEERA Chair Schedule and Duties**

The Chair shared a list of duties for the current NEERA Chair. The duties were reviewed and revised during group discussion. Printed copies of state reports will no longer be required for the NEERA Regional meeting, and all state reports will be available on the NEIPMC website.

Kelly Hamby (MD) will be the new Chair and talked about potential sites and dates for the 2019 NEERA Regional IPM meeting.

Upcoming national and regional IPM meeting locations and dates were discussed, including the National IPM Coordinating Committee Meeting in Washington, DC (October 23-24, 2018) and the Northeastern IPM Center Advisory Council Meeting (October 2018).

**State Reports and Discussion**

Northeastern IPM Coordinators provided updates on state activities and shared 2017-2018 state reports. All State reports will be posted on the Northeastern IPM Center website. Please visit the website for additional details on state reports.

**Accomplishments**

**CONNECTICUT**

The Connecticut IPM Program 2017 Annual Report, IPM fact sheets, and other information are available on the UConn IPM website (www.ipm.uconn.edu).

**Funding**

* The Connecticut IPM Program is funded in part by USDA (NIFA CPPM EIP, NIFA BFRDP, APHIS, RMA, SARE, and SCBG), the Northeastern IPM Center (NEIPMC), CT Department of Energy and Environmental Protection (DEEP), CT Department of Agriculture, and the University of Connecticut.

**Partners/Collaborators**

State and Federal agricultural and environmental/non-governmental agencies and organizations; State, New England, and Northeastern fruit, greenhouse, grounds keepers, nursery, turf, landscape, and vegetable associations; industry suppliers/dealers; regional universities; educators; schools and municipalities; individual growers, farmers, and producers; Master Gardeners; and the general public.

**Issue**

* Integrated Pest Management applies multiple tactics in a variety of settings through the selection of appropriate tools and the education of agricultural industry members and Connecticut citizens to provide sustainable, science-based approaches for the management of plant pests (insects, mites, diseases, wildlife, and weeds, including invasive plants). The UConn IPM Program incorporates all possible pest management strategies through knowledgeable decision making, utilizing the most efficient landscape and on-farm resources, and integrating 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.

**Accomplishments**

1. IPM Program team members conducted intensive on-site educational training for fruit and vegetable producers, garden center owners, greenhouse growers, nursery producers and retailers, and turf and landscape professionals. Growers and green industry professionals received information on the current status of and recommendations for important plant pests and training via pest messages, email alerts, webinars, newsletters, articles in national trade journals, management guides, websites, social media, consultations and counseling via phone, site visits to their operations, workshops, conferences, exhibits, and short courses.
2. **Evaluations:** IPM programs were evaluated by the following methods: pre- and/or post-program surveys and evaluations, needs assessment surveys, focus groups, key informant interviews, testimonials, and unsolicited comments.

Connecticut IPM Outcomes and Impacts

1. The UConn IPM Program Team was honored to have been selected as the recipient of the **2017 UConn Provost’s Team Award for Excellence in Public Engagement**. The IPM Team was recognized at the Excellence in Public Engagement ceremony and reception, which was held on November 14, 2017 at the UConn Storrs campus and hosted by Provost and Executive Vice President for Academic Affairs Jeremy Teitelbaum. IPM team members developed a poster of program accomplishments, which was displayed at the reception and in the Connecticut Legislative Office Building during January 2018.
2. A total of 29 IPM projects targeting fruit, vegetables, greenhouse and nursery crops, landscapes and turf, invasive plants, school grounds, plant diagnostics, and pesticide safety education were conducted by the IPM Program Team during 2017.
3. Major conferences and workshops developed and presented by the IPM Team included the Native Plants and Pollinators Conference; the Connecticut Vegetable & Small Fruit Growers’ Conference; a Biological Control Workshop for Greenhouse Growers; four Pest Management Workshops for Greenhouse Crops, Nursery Crops, Vegetables, and Fruit; a School IPM Workshop; and a Respirator Fit Testing Workshop.
4. The UConn Extension YouTube video published in May 2017 highlights the Extension Agriculture Team, including members of the UConn IPM Program. The video can be viewed at https://www.youtube.com/watch?v=ShdG8xL90kw.
5. There were 102,823 sessions created by 86,110 users of the IPM website during 2017, representing 135,989 page views. IPM website sessions in 2017 increased 25% over the previous year.
6. During 2017, 763 plant pest samples were diagnosed, and management recommendations were provided to IPM Program participants and other stakeholders.
7. A total of 208 invasive plant activities in 44 Connecticut towns reached over 30,000 Connecticut citizens in 2017, including agency and municipal staff. A minimum of 7,950 hours was provided through intensive invasive plant training sessions and management activities, as well as brief technical educational outreach.
8. Two intensive, team-taught short courses providing active training time of 1,488 hours were conducted for 62 individuals seeking initial state certification as commercial Ornamental and Turf or Golf Course Superintendent pesticide applicators.
9. A total of 2,095 pesticide applicators and occupational users and consumers were provided with training on the safe use and handling of pesticide products, including those who earned pesticide recertification credits. Approximately 1,683 non-certified people received pesticide safety training.
10. In the past year, 16 programs for private pesticide applicators were held, training 1,066 individuals, and providing recertification credits for 412 applicators. Additionally, 167 Master Gardeners received pesticide safety and Integrated Pest Management education. A total of 450 Master Gardeners received advanced special topics diagnostic and pest management training.

**DELAWARE**

**Newsletters**

Weekly Crop Update weekly from April through September; monthly rest of the year http://extension.udel.edu/weeklycropupdate/?p=11414

 In 2017 included a series titled *Guess the Pest* included

**IPM-Related Research and Demonstrations**

Part of a USDA-Areawide Project examining the effect of cereal rye termination timing on winter and summer annual weed pressure in soybeans (VanGessel- weeds)

Examining critical weed-free period of Italian ryegrass on winter wheat growth and yield (VanGessel- weeds)

**IPM-Related Reports or Factsheets**

Winter Weed Identification Guide (https://cdn.extension.udel.edu/wp-content/uploads/2012/06/20094202/winter-weeds-2017-v-2.pdf)

Complete revisions of the Mid-Atlantic Commercial Vegetable Guide (Wyenandt lead)

Update the Delaware Insect Management Recommendations (Corn, Soybean, Small Grains, and Alfalfa)

**IPM-Related Grants Received**

Integrating Cover Crops for Weed Management in Plasticulture Systems, NE-IPM Program (Vollmer and VanGessel)

Overlapping Residual Herbicides for Weed Control in Lima Bean and Pumpkins, DE Dept. of Agric Specialty Crops Research (Vollmer and VanGessel)

Control of slugs in a multi-trophic context: Using friends to manage foes, DE Soybean Board. 2018 (Hiltpold, Kunkel, Cissel)

Slug nematodes in soybean: a survey for magic bullets in slug control, Atlantic Soybean Council. 2017-2018 (Hiltpold, Kunkel, Cissel, Tooker, Hamby)

Can Plant Population Play a Role in Reducing Lodging Loss from Dectes Stem Borer? 2017 (Cissel, Sylvester, Whaley)

**EIP Project Activities**

**Addressing New Pest Development in Small Grains IPM Systems**

1. Six on farm demonstrations were established to demonstrate the role wheat variety selection plays in fusarium head blight management (FHB). These demonstrations directly impacted 2200 acres of wheat in 2017 with an estimated value of $60.30 per acre. The results of this project have the potential to impact 65,000 acres of wheat grown in DE. A YouTube video was also created and posted on the IPM webpage to educate growers on how to stage wheat to time fungicide applications to reduce FHB. https://youtu.be/J2yEB6dH9Cc
2. In recent years, damage from cereal leaf beetle (CLB) has increased in small grains, especially in wheat. One possible explanation is the shift in fungicide application from flag leaf to flowering in response to fusarium head blight (FHB) management. An insecticide is often tank mixed with the fungicide application which has provided control of CLB. A degree day model was developed in VA and NC that predicts peak egg laying and hatch for CLB. Validating this model for DE can help focus scouting efforts and increase adoption of an IPM approach to manage CLB in small grains.

**Expansion of Existing Insect Trapping Program for IPM Decision Making in Processing and Fresh Market Vegetables:** A pilot insect trapping program was initiated to complement the existing UD trapping program. Participants of the pilot trapping program were provided education on how to identify key insect pests and how to interpret trap catch data when making insect management decisions. Participants of the pilot trapping program reported that the trap catch information was used to make management decisions on 24,872 acres of lima beans, snap beans, sweet corn, peppers, and soybeans and was valued at $25 per acre.

**Incorporating a Total Crop Management Approach into Current Soybean IPM Programs:**

1. Soybean Vein Necrosis disease (SVNd) is a new relatively new disease affecting soybeans in DE. The virus is transmitted by at least 3 species of thrips, including soybean thrips. To determine the frequency of this disease in DE, we conducted a survey of 88 soybean fields (48 full season, 40 double crop) from 2015-2017. Results of the survey average an 11.6% incidence in full season and 22.8% incidence in double crop soybeans. This suggests that full season soybeans planted early in the growing season are less likely to have symptoms of this disease compared to double crop soybeans. Survey reports are posted on the IPM webpage and a YouTube video was created to educate growers about how to identify the disease and how the disease is vectored. https://youtu.be/7gXDLjm5x7Q
2. A multi-disciplinary approach to improve weed and slug management, soil health and yields was demonstrated using of small grain cover crops. Delaying cover crop termination, often referred to as “planting green” was evaluated on six on-farm demonstrations. Ten soybean fields, 7 with and 3 without a small grain cover crop, were also sampled for slugs using shingle traps and surveyed for slug injury. A series of YouTube videos were created to demonstrate how to sample for slugs and slug eggs.

<https://youtu.be/yJAiut5IHqY>

<https://youtu.be/-5YD2BArGOg>

<https://youtu.be/JM2xTfw7z-M>

**Other**

University of Delaware is hiring an Extension Plant Pathologist with responsibilities for field crops (job is being advertised)

**MARYLAND**

Maryland (MD) is a heavily urbanized, densely populated state bordering the Chesapeake Bay, with ~32% of its 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. As the single largest commercial industry in MD, agricultural profitability and production must also be prioritized. MD produces a broad diversity of agricultural commodities, and University of Maryland Extension (UME) partners regionally to meet diverse stakeholder needs. Funding for IPM continues to be pieced together from multiple sources including commodity boards, SARE, NERIPM, and USDA NIFA (e.g., CARE, EIP, ELI, OREI, SCRI).

**Pests of Concern:** *Diseases.* Boxwood Blight, Cucurbit Yellow Vine Decline, various Downy Mildews, Potato Blackleg, Watermelon Fruit Rot. *Insects.* Allium Leafminer, Cucumber Beetles, *Dectes* Stem Borer, Emerald Ash Borer, Spotted Lanternfly, Sugarcane Aphid, Western Bean Cutworm. *Weeds.* Herbicide resistant weeds, Palmer Amaranth.

**Agronomy**

*Accomplishments*

* In a 2016 survey of Extension impacts at Agronomy winter meetings 29% (n = 482) planned to implement improved pest management practices.
* Completed a 3 year study of pest suppression and non-target impacts of neonicotinoid seed treatments in grain crop rotations.

*New Projects*

* Evaluating physiological yield loss and biological control of *Dectes* stem borer
* Sentinel plots to determine field corn pest pressure
* Soybean and field corn needs assessment surveys

*Products*

* Agronomy News newsletter
* Weed Resistance workshops

**Communities**

*Accomplishments*

* Home and Garden Information Center (HGIC) staff answered 6,630 questions from clientele via eXtension's "Ask an Expert" platform. ~75% of questions IPM-related.
* Master Gardener volunteers who received basic and advanced IPM training answered plant and pest questions of 15,583 residents at 88 plant clinics.

*Products*

* HGIC website
* Advanced Master Gardener Ecological IPM Training Survey
* HGIC e-newsletter
* Bug of the Week blog

**Green Industries**

*Accomplishments*

* In a 2016 survey conducted with 242 (of 2,893) recipients of the *Nursery and Landscape IPM Report* in 2016 100% of survey stakeholders found the information useful, and 97% were more likely to use alternative control measures.
* An economic analysis found that recipients (n = 57) of this report annually saved between $119,000 and $214,000 from information contained in the report.

*Products*

* Nursery & Landscape IPM Report
* Greenhouse IPM Report
* IPMNet website
* Pest Predictive Calendar
* Jennings et al. 2017. Effects of the emerald ash borer invasion on the community composition of arthropods associated with ash tree boles in Maryland, U.S.A. Agricultural and Forest Entomology. doi: 10.1111/afe.12186
* Jones et al. 2017. Field surveys of egg mortality and indigenous egg parasitoids of the brown marmorated stink bug, *Halyomorpha halys*, in ornamental nurseries in the mid-Atlantic region of the USA. J. Pest Sci. doi 10.1007/s10340-017-0890-8
* Saldago-Salazar et al. 2017. First report of *Hyaloperonospora sp.* associated with downy mildew disease of *Iberis sempervirens* in the U.S. Plant Disease 101(6):1058.

**Pollinators**

*Accomplishments*

* Bee informed partnership tech teams provide boots on the ground extension to 15% of the nation’s bees.
* 130 master gardeners in 6 counties were trained in pollinator identification, resulting in a combined (over two years) representing 460.4 volunteer hours, observing a total of 28,494 individual pollinator-plant observations.

*Products*

* Bee Informed Partnership website (30,000 visits/month)
* Sentinel Apiary program (66 participants in 26 states)
* Maryland Native Pollinator Survey
* Kulhanek et al. 2017. A national survey of managed honey bee 2015-206 annual colony losses in the USA. J Apicultural Research 56(4):328-340.

**Vegetables**

*Accomplishments*

* The vegetable IPM team increased training sessions in 2017 by 1.5x and on-farm demonstrations by 2.1x. These programs emphasized economic benefits growers achieve when they integrate learned practices into their production.
* Training programs included the dissemination and instruction on how to use the 2016 *Commercial Vegetable Production Recommendations Guides*. Using and following the guide could save/earn growers $15-20 per acre on their farm.

*Products*

* Vegetable and Fruit Headline News newsletter
* Contributed to Mid-Atlantic Commercial Vegetable guide
* Chen et al. 2017. Using reduced tillage and cover crop residue to manage weeds in organic vegetable production. Weed Technology 31(4):557-573.
* Chen et al. 2017. Can conservation tillage reduce N2O emissions on cropland transitioning to organic vegetable production? Sci. Tot. Env. 618: 927-940

**MASSACHUSETTS**

Fruit and Vegetable On-farm IPM Evaluation 2016

At the beginning of the 2016 growing season, members of the MA IPM team worked with 9 farms to identify pests and problems and set goals based on different Integrated Pest Management (IPM) strategies. In total, growers identified **88 problems or pests they wanted to address using IPM, each associated with a specific crop (or crops).** Throughout the growing season, we visited participating farms on a bi-monthly basis and worked with growers to recommend and implement IPM practices. A total of **275 specific management practices were recommended** to address these 88 problems or pests. During the fall and winter, we interviewed growers to evaluate the extent to which recommended practices were adopted and how successful they were in helping farmers achieve their goals.

* 76% of the practices were adopted by growers as recommended; an additional 11% were adopted with some modification
* For those practices that were adopted, 87% were rated by growers as successful (65% - largely successful, 22% moderately successful) in helping them to reach their goals

Helping Growers Achieve Speciﬁc Goals

As a result of working with the team to implement recommended IPM practices, growers reported the extent to which 3 specific goals were attained for 80 separate crop-problem combinations. Growers responded according to a 4-point scale (1 = not at all, 2 = minimally, 3 = moderately, 4 = largely). The results reported are the proportion of problems for which growers achieved their goals either “moderately” or “largely.”

* 55% resulted in changes in pesticide use consistent with IPM practices
* 63% resulted in reductions in crop loss
* 65% resulted in improvements in crop quality

**FRUITS**

**Diseases**

Apple scab -- there were 7 primary apple scab infection periods according

to NEWA (http://newa.cornell.edu) at the UMass Orchard with 100% ascospore maturity occurring on 23-May. Research at UMass suggests that ascospore maturity was delayed beyond 23-May, and there was one additional primary infection event in early June. Scab was quite manageable by most, however, an exception or two was noted. In addition to the apple scab model being available on 48 NEWA sites in Massachusetts, there were 4 RIMpro (http://www.rimpro.eu/) sites using either NEWA weather data or Meteoblue, plus 9 experimental RIMpro sites using HRDPS. There were also 6 AgRadar (http://agradar.info) locations available. All DSS’s (Decision Support Systems) provide valuable IPM decision support through the use of apple scab, fire blight and insect models, among others.

Fire blight -- while bloom was a long, drawn out affair for most of the state, drought conditions prevailed through most of this time creating conditions that were not particularly favorable for FB, except very late in the bloom period. Some strikes were found here and there, but seriously a pretty much a “no-show” in 2016. Orchards with a previous recent history of fire blight saw more strikes. FB will be back in force we are afraid one of these years, largely a consequence of earlier bloom combined with warmer early spring temperatures.

Other diseases reported during 2016 included rust, summer diseases, peach leaf curl, powdery mildew, and white pine blister rust.

**Insects**

San Jose scale -- we are seeing ongoing issues with SJS. Softer insecticide use (aka Assail) may be contributing to this and/or warmer winters. (Or a decline in spring oil/Lorsban applications.) Aggressive management, including a good dose of spring oil (with or without Lorsban, depending on your inclinations), and effective insecticides such as Esteem, Centaur, and Movento/Sivanto are being recommended.

Plum curculio -- an early influx of PC with warm and wet conditions (on or about 24-May and the days after) caught some growers off-guard as fruit were only 5-6 mm in size and significant damage resulted here and there. Overall it was a pretty high-pressure year for plum curculio, but still easy to control with timely effective insecticide application. (Emphasis on timely and effective. And Imidan.)

Putnam and Dearness Scale in Cranberry - For a second year, reports of dead vines across the MA cranberry-growing region were common. Over a four-month period, starting in April, we visited 22 bog sites and assessed presence of two damaging species of armored scale. New diagnoses of scale were made at 11 sites: ten were Putnam scale (Diaspidiotus ancylus) and one was Dearness scale (Rhizaspidiotus dearnessi). Sites were monitored to determine when the susceptible crawler stage appeared for best timing of treatment. A screening trial of five biological or low-impact options showed that none was effective, in comparison to conventional organophosphates.

Additional insect pests reported: European apple sawfly, Lepidoptera moths, mites, gypsy moth, spotted tentiform leafminer, apple maggot fly, pear psylla, winter moth, and spotted wing Drosophila.

**Weeds**

We continued work to identify herbicides that showed efficacy against poverty grass (*Andropogon virginicus* and *Schizachyrium scoparium*) and dodder (*Cuscuta* spp.). Several herbicides looked promising from an efficacy perspective, and one compound has been submitted to and accepted by the IR-4 program for cranberry trials. Residue trials will be conducted in 2017.

**IPM Fact Sheets**: Three new IPM fact sheets were published in 2016, Blueberry IPM – Cherry/Cranberry Fruitworm , Strawberry IPM – Tarnished Plant Bug, and Use of Tile Drainage in MA Cranberry Production (2016). More are planned for 2017.

**Smartphone app series:** tackles fruit diseases and pests. Developed in concert with Clemson University. MyIPM-NED. Free on iPhones and androids.

**“A Review On Bees: Northeast Crops Edition” published:** 32-page pamphlet http://ag.umass.edu/cranberry/publications-resources/books-pamphlets

**VEGETABLES**

Massachusetts’ vegetable farmers experienced the worst drought in 30 years this season, and our team of educators responded by conducting a drought survey with over 560 respondents to inform relief programs in the state. In addition, we maintained regular programming as highlighted below. We hosted 12 educational programs and collaborated with other groups to present at an additional 23 programs in MA and regionally. We reached an audience of over 1,100 people through our programming. We made farm visits to over 30 farms this year (map) representing over 1,000 acres. We developed 106 integrated crop and pest management strategies with these farmers, and gave 297 recommendations to address the strategies through biweekly farm visits, scouting and technical assistance.

**Publications:**

* 25 issues of *Vegetable Notes* reaching over 2,500 readers regionally and beyond including regional Pest Alerts in 19 weekly issues.
* Scheufele, S.B. and K. Campbell-Nelson, A. Zolondick, 2017. Insecticides for control of cabbage root maggot in direct-seeded root crops, 2015. Arthropod Management Tests. (In Press).
* Scheufele, S.B. and K. Campbell-Nelson, A. Zolondick, 2017. Insecticides for control of cabbage root maggot in organic systems, 2015. Arthropod Management Tests. (In Press).
* Susan B. Scheufele and L. McKeag, K. Campbell-Nelson, R. Hazzard, 2016. Insecticides for Control of Cabbage Root Maggot in Spring Cabbage, 2014. Arthropod Management Tests Volume 40 (1): E44. doi: 10.1093/amt/tsv100
* Susan B. Scheufele and L. McKeag, K. Campbell-Nelson, R. Hazzard, 2016. Efficacy of Thiamethoxam Seed Treatments to Control Cabbage Root Maggot in Broccoli, 2014. Arthropod Management Tests. Volume 40 (1): E43 doi: 10.1093/amt/tsv099

**Action Outcomes:**

* As a result of information provided by UMass Extension Vegetable Program through on-farm training, meetings, newsletters, websites, or other means, 74% (47 people) of *Vegetable Notes* survey respondents have adopted growing practices consistent with Integrated Crop and Pest Management.
* 22 Agricultural Professionals adopted growing practices consistent with Integrated Crop and Pest Management and provided educational programs and services (i.e., factsheets, newsletters, workshops, webinars, consultations) based on what they learned through the SARE Professional Development Program

**Knowledge Outcomes:**

* 46% (29 people) of *Vegetable Notes* survey respondents gave specific examples of growing practices consistent with Integrated Crop and Pest Management that they learned from us this year.
* 25 Agricultural Professionals increased knowledge and skills for growing practices consistent with Integrated Crop and Pest Management through the SARE Professional Development Program.
* 20 Farmers participating in on-farm scouting and on-farm research trials increased knowledge and skills for growing practices consistent with Integrated Crop and Pest Management

**NEW JERSEY**

Current Situation: The IPM programs coordinated by Rutgers Cooperative Extension encompassed production agriculture in the areas of blueberries, nurseries, greenhouses, tree fruit, and vegetables. Research conducted by faculty and staff connected to these various programs is helping to increase the adoption of IPM and at the same time reduce our reliance on pesticides as the sole pest management tool being used. During 2016/2017 work was done to develop management strategies for use against the brown marmorated stink bug in vegetables, tree fruit and grapes and the spotted wing drosophila in small fruits and blueberries. In addition, the vegetable IPM program was able to impact more acreage through the use of their website that tracks weekly European corn borer, corn earworm population and brown marmorated stink bug changes in the state. Overall, IPM adoption in the state was seen on ~7,000 acres of blueberries, 500 acres of nursery stock, ten greenhouse acres, ~ 8,500 acres of peaches, ~ 2,500 acres of apples, and ~ 27,500 acres in vegetables (carrots, cole crops, high-tunnel tomato production, pumpkins, peppers, snap beans, staked tomatoes, sweet corn, and sweet potatoes) for a total of more than 60,000 acres. The fruit IPM program’s faculty and staff also conducted research evaluating the impacts of the brown marmorated stink bug (BMSB), spotted wing drosophila, and the impact of pesticides on bees used in blueberries, and participated the Brown Marmorated Stink Bug (BMSB) working group (Hamilton is a co-organizer/chair). This group is supported by funds provided by the Northeast IPM Center.

EIP Grant 2017/2018: This grant continues the coordination of IPM programming in New

Jersey and the implementation of previously EIP funded projects in the IPM Implementation in

Specialty Crops emphasis area. During 2017/2018 this project increased IPM awareness and adoption in NJ by conducting annual advisory meetings with stakeholders, representing NJ on state and regional committees, responding to IPM-related inquires, and coordinated and reported on state/institutional activities. IPM Implementation in Specialty Crops emphasis area project integrated validated pest management research results into a delivery program that has been expanding since 2012 for grapes. The project also evaluated the presence of pesticide residues from beehives present in commercial blueberry fields and developed web based information regarding ZIKA and its importance in the Northeast.

Management of the Brown Marmorated Stink Bug: Since its introduction into the US in the mid

1990's, the brown marmorated stink bug has been detected and or established populations in 43 states. Since 2008, it has become a severe pest of fruit, vegetables, field crops and ornamentals in mid-Atlantic state so a moderate pest in surrounding areas, a moderate pest of these pests in surrounding states and a developing pest in California, Oregon and Washington. Researchers

(George Hamilton, Anne Nielsen, Dean Polk) in New Jersey are involved in two multistate

USDA funded projects to management this pest. The first was a 3 year project, led by George

Hamilton in NJ, funded by the Specialty Crops Research Initiative program. The second is a 5 year project led by Dr. Anne Nielsen in NJ funded by the USDA ARS Areawide Pest

Management Initiative.

Management of the Spotted Wing Drosophila: Following the spread of the spotted wing drosophila from the west coast to the east coast in 2011, this insect has become a severe pest of blueberries, grapes and other small fruit. Because of this growers are require the use of multiple insecticides sprayed multiple times during the season to manage it. Researchers (Anne Nielsen,

Dean Polk and Cesar Rodriguez-Saona) in New Jersey are involved in several USDA and state funded projects to management this pest.

Multistate collaborations: The New Jersey program maintains collaborations with extension and research personnel in Pennsylvania, Delaware, Maryland and New York on a variety of projects including the management of BMSB and spotted wing drosophila.

IPM Impacts: 1) Overall, growers are better able to monitor for BMSB and SWD allowing them to make better pest management decisions; 2) Conventional growers are using less insecticides to manage BMSB in fruit and vegetable crops; 3) Increased number of grape growers are enrolled in the grape IPM program when compared to the previous year, 4) blueberry and bee keepers have a better idea of the pesticide found in bee hives in NJ blueberry fields.

**NEW YORK**

**2017 NYS IPM Conference –** Invasive Species and IPM in NY, July 2017

**2018 NYS IPM Conference –** IPM and Vector Management, May 8, 2018, White Plains, NY

**Resources produced**

*Profiles of Active Ingredients Eligible for Minimum Risk Pesticide Use*—Profiles on each of the EPA’s 25(b)-eligible exempt active ingredients, that include a summary of uses, hazards, and efficacy information. Free. https://nysipm.cornell.edu/environment/active-ingredients-eligible-minimum-risk-pesticide-use

*How to Get Bed Bugs Out of Your Belongings—*Comprehensive 68-page document on handling bed bug infested items.https://ecommons.cornell.edu/handle/1813/55760

*IPM Image Gallery*—over 3,500 images with links to management info https://www.flickr.com/photos/99758165@N06/

Apps

-*ArcGIS/Collector field crops scouting* app developed for use by extension educators to keep track of pests on a field level basis.

-*ArcGIS/Survey 123 western bean cutworm app* for reporting weekly moth trap counts.

-*Sweet corn scouting app*, expected release 2018

-*Hops scouting app*, expected release 2018

**Community:**

* **Goose IPM:** We partnered with Rochester City Schools to evaluate goose harassment techniques that will move gees away from school athletic fields without lethal or dangerous methods and created a fact sheet about it at: https://ecommons.cornell.edu/handle/1813/44456
* **BMPs for school IPM in the Northeast**. http://www.northeastipm.org/bmps-for-school-ipm/
* We are part of a project led by Dr. Jenny Kao-Kniffin at Cornell that is evaluating the effects of **frequent overseeding of athletic fields** for better turfgrass quality.
* **ABCs of School and Child Care Pest Management blog**  https://blogs.cornell.edu/schoolchildcareipm/
* With Cornell faculty, **involving middle school students and their teachers** in assessing the persistence of native beneficial nematodes on school turf fields.
* Participating in the **Scientific Coalition on Pest Exclusion (SCOPE)—**working group focused on the scientific verification of pest exclusion (commercial and residential) and the promotion of exclusion as a primary tool in integrated pest management.
* Conducting a **Tick Outreach Campaign**, including a tick ID card, tick removal kits, and infographics.
* Researching the **distribution and movements of rats** on the perimeter of food plant facilities.
* Partnered with Dr. Laura Harrington’s laboratory to evaluate **distribution of the Asian tiger mosquito**.
* We are a partner in the **Northeast Regional Center of Excellence in Vector Borne Disease**, funded by CDC and housed at Cornell University.

**Vegetables**

* **Organic efficacy trials:** We continue to test organically-approved pesticides: https://nysipm.cornell.edu/agriculture/vegetables/organic-resources-vegetables.
* **Sweet corn pheromone trap network** (http://sweetcorn.nysipm.cornell.edu)**—**weekly summaries of lepidopteran trap catches and recommendations for scouting and thresholds.
* **Late blight:** We help the usablight.org website, facilitating confirmation of late blight reports, participating in training for the late blight Decision Support System, and creating educational materials.

**Fruit**

* **Statewide Spotted wing drosophila trapping**: SWD caught earlier in 2017 than in prior years. Significant infestation occurred in summer raspberry, early blueberry varieties and in tart cherry.
* **SWD blog**: blogs.cornell.edu/swd1/ 254 subscribers. 42 posts in 2017, focusing on grower alerts.
* **eNEWA daily email alerts** giving results for NEWA grape berry moth and grape diseases decision support tools provided to growers across NY State; they will be surveyed on outcomes.
* **Alternative management strategies for grape rootworm.** Project aimed at basic pest biology, scouting, management strategies using 4 new FIFRA 2(ee) insecticides, as well as biological control using entomopathogenic nematodes. Use of degree days shows promise.
* **European cherry fruit fly**: Fact sheet produced**.** ECFF caught along the Niagara River in wild and ornamental hosts (*Lonicera* spp. and *Prunus* spp.)
* **13 fact sheets on invasive insects** nysipm.cornell.edu/agriculture/fruits/invasive-species-exotic-pests.

**Ornamentals**

**•  Forest pest outreach survey project—**Resource sheets for 25 disease and insect pests, including *Amynthas* (jumping) worms, created. To be posted for free on https://nysipm.cornell.edu/

**• Forecasting insect management for nursery and Christmas tree growers:** Growing degree days (GDD) and phenology models being programmed to enter into NEWA.

**Livestock and Field Crops**

* **Weekly Field Crop Pest Report blog**, http://nysipm.cornell.edu/fieldcrops/tag/pestrpt/default.asp
* **Western Bean Pheromone trapping network**: In 2017, 62 traps caught 35,000 moths. Economic damage occurred to some conventional and Bt hybrids in Northern NY.

**NEWA – Network for Environment and Weather Applications**

NEWA is a system of 611 physical weather stations located in 13 member states. Each station sends real time weather data to http://newa.cornell.edu where 43 different models, tools, and resources are programmed to provide agricultural insect and disease risk estimates. The website will be rebuilt under a CPPM-ARDP grant.

**• NEWA Coordinator position** created and filled: Dan Olmstead

• **New models and tools** for berries, ornamentals and beets are being programmed into NEWA.

**STAFF**

With state agricultural funding restored to pre-recession levels, we hired three new specialists:

• NEWA Coordinator: Dan Olmstead, dlo6@cornell.edu

• Biological Control Specialist (Ag & Community): Amara Dunn, arc55@cornell.edu

• Integrated Weed Management Specialist: Bryan Brown, bryan.brown@cornell.edu

\*We are still searching for a Field Crops and Livestock Coordinator or Western NY Extension Educator

**FUNDING**

The NYS IPM Program had multiple sources of funding in the 2017-2018 fiscal year:

NYS Dept. of Agriculture and Markets—Ag IPM, $1,000,000

NYS Dept. of Environmental Conservation—Community IPM, $550,000

USDA-NIFA, CPPM-ARDP—$285,000 (approx. 45% of this came to NYSIPM)

NYS Dept. of Health—Tick IPM, $172,000

NYS Dept. of Education—Tick IPM, $28,000

Various smaller grants

**PENNSYLVANIA**

**PA Integrated Pest Management Program (Philadelphia and Beyond!)- Michelle Niedermeier and Dion Lerman (PAIPM/PSCIP)**

* Outreach and educational programs and trainings of the PA Integrated Pest Management
	+ Provided tailored outreach, education and training on Integrated Pest Management and Healthy Homes to Philadelphia area residents, and to the staff of the agencies that serve them

Current Programs Offered

* + - Bed Bug Basics
		- Pests, Pesticides, and Health (asthma)
		- IPM for Schools and Early Learning Environments
		- IPM in the Curriculum
		- IPM for Youth
		- School and Summer Camp Programs
		- IPM for Community Health
		- IPM for Home Health Professionals
		- Healthy Homes – Essentials, Community Health Workers, IPM for Multi-family Housing
		- IPM for Community, School, and Urban Gardeners
		- Public Event Informational Displays
	+ Provided insect and pest identification services
	+ Provided information on household pests and effective management to Philadelphia area residents via phone calls, emails, and health fairs
	+ Provided outreach education materials and specially designed programs to school-aged children and families on pests, less-toxic pest control, healthy homes, entomology, and environmental science related subjects
* Built and continues to expand membership in PSCIP to include nearly 300 members representing: private citizens, social service agencies, medical professionals, school and facility staff, center- and home-based childcare staff, housing providers, health department personnel, environmental health professionals, area University and College students and professors, and more.
* Worked with schools and childcares to improve indoor environmental health, especially those contaminants that are related to asthma triggers.
	+ Partnered with the PA DoH and the ALA to educate about the impact of pests, pesticides, and related environmental triggers of asthma
		- Updating and editing the *IPM for PA Schools: A How-to Manual* <http://neipm.cce.cornell.edu/neipm/assets/File/bmps/general/IPM_Manual_PA_Schools.pdf>
* Founding members of the Philadelphians Against Bed Bugs (PhABB) group comprised of area social services, health, law, university researchers, pest management professionals, and housing rights agencies working together to encourage and guide the City of Philadelphia to enact a bed bug ordinance and city-wide policy with current best management practices and protocols (regular and ongoing meetings)

**Field Crop IPM- John Tooker (Entomology) and Team**

We continued our efforts to promote IPM in field crop production. Over the past year, we communicated with the agricultural community of Pennsylvania the value and limitations of insecticidal seed treatments, insect-resistant crop varieties, details of pest biology, and alternative means of controlling insect pests, including farming to increase diversity and improve biological control. One of our key efforts focused on soybean production, establishing in 2017 a sentinel plot program in Pennsylvania soybean fields. The main goal of the project was to encourage growers to adopt Integrated Pest Management by providing growers with a statewide assessment of insects and diseases active in soybean fields.

**Mildew and Blight monitoring- Beth Gugino (Plant Pathology and Environmental Microbiology)**

In an effort to support wide area pest monitoring, two sentinel plots were established for monitoring cucurbit downy mildew and confirmed reports from these sites as well as confirmed reports from commercial fields and home gardens were reported into the cucurbit downy mildew ipmPIPE. Likewise confirmed report of late blight on tomato and potato were reported to the USAblight.org monitoring platform and a sentinel plot was established and monitored at the Russell E. Larson Research Farm at Rock Springs. Area wide pest monitoring and forecasting information was disseminated via the 1-800-PENN-IPM hotline for Pennsylvania growers and other stakeholders that do not access electronic technologies.

***An Integrated Pest Management and mHealth Program Aimed to Reduce Pesticides Exposures for Vulnerable Hispanic Mushroom Farmers in Pennsylvania—*Amy Snipes (Health and Human Development), Kathy Sexsmith (Rural Sociology) Maria Gorgo (Regional Extension Educator, late of PAIPM), Ed Rajotte (entomology)**

**Summary:** This proposal aims to reduce pesticide risks at human and environmental levels by combining three effective worker safety practices – 1) using personal protective equipment, 2) PPE and 3) integrated pest management, or IPM. Because of their individual effectiveness, the combined strategies may optimize the protection of farmworkers’ health through reductions in exposures to environmental pesticides. However, there is currently little evidence regarding this integrated approach.

In order to leverage the combined effectiveness of IMP and PPE in reduction of pesticide exposures, ***the proposed study will merge IPM with pesticide safety education including the use of PPE to reduce farmworker pesticide exposures using a mobile health (mHealth) program. We will focus on Hispanic farmworkers who are known to have increased risk of pesticide exposure.*** Our use of mhealth will be strengthened by the input of key constituencies who will evaluate the feasibility of our program development. Key constituencies for this proposal are the American Mushroom Institute, farmworkers themselves, and the research team.

**Spotted Lanternfly (SLF) response—Julie Urban, David Biddinger, Greg Krawczek, Ed Rajotte (entomology)**

SLFis thought to be native to China, and subsequently colonized Vietnam and India (Park et al., 2012). It is considered a serious invasive pest of grape, causing wilting, dieback and mortality of grape vines as well as damaging tree fruit, especially peach (Han et al., 2008; Kim et al., 2011; Park et al., 2012). To date, greatest economic losses in South Korea have been suffered by grape industries, primarily due to growth of sooty mold that blocked photosynthesis on grape leaf surfaces and rendered blackened grapes unsellable (Kim et al., 2011). In PA in 2017, extensive sooty mold growth on SLF honeydew was observed on and around forest trees that resulted in blackening of adjacent plants in the forest understory. SLF spread to more vineyards in 2017, reducing yield, fruit quality and having as yet unknown long-term effects on grapevines. In late August, large numbers of SLF were observed for the first time flying into commercial orchards and feeding on the trunks and branches of apple, peaches, and nectarines. SLF egg masses found in orchards and vineyards put trees at risk for heavier and sustained feeding by SLF nymphs and adults in 2018. Over the longer-term, SLF could prove to have devastating impacts to threatened USA specialty crops with over $10 billion in production value for apples, peaches and grapes alone (NASS 2017) including the Pacific Northwest fruit growing region and the California wine grape industry. Penn State University and the Pennsylvania Department of Agriculture (PDA) have been collaborating with federal agencies, regional universities, local governments, NGOs and affected stakeholders to document SLF spread and alert communities on the invasion front.

After the first report in 2014 of an unusual insect infestation on tree of heaven (*Ailanthus altissima*), a PDA survey found SLF on tree of heaven on several properties within a two-mile radius in Berks Co., PA (Barringer et al., 2015). The invasion likely began with a shipment of stone from China that harbored SLF egg masses that was received at specialty stone company. Using microsatellite markers developed by Park et al. (2013), PD-Urban genotyped SLF individuals from PA, China, Vietnam, and South Korea. SLF has emerged as an invasive pest of critical importance to specialty crops including tree fruit and grapes with the potential to affect many others. In PA alone it poses a serious threat to the state’s $20.5 million grape, $134 million apple, $24 million stone fruit and $12 billion hardwood industry; nationwide, these number total more than $10 billion just for grape, apple and peach crops (NASS, 2017).

**Integrated Pest and Pollinator Management- Biddinger and Rajotte (entomology)**

Integrated Pest and Pollinator Management (IPPM) is and expansion of the IPM approach that accommodates pollinator health. While IPM programs simultaneously address economic, environmental and social goals, the ability of IPM decision-making to evolve in response to new demands is one of the reasons that IPM is still viable after more than 50 years. We show in commercial apple production that by carefully selecting pesticides and adjusting application timing, pest populations can be reduced while preserving the pollinators to set the fruit. Specifically, we trace the change in neonicotinoid concentrations as they are transported to the pollen and nectar to calculate the time necessary to eliminate toxicity.

**RHODE ISLAND**

**Accomplishments:**

* Heather Faubert gave 9 presentations to 600 individuals about ornamental pests, groups included members of the RI Nursery and Landscape Association, Master Gardeners, and the general public.
* Heather Faubert gave 16 newspaper interviews and 8 Television or Radio interviews about caterpillars (winter moth, forest tent, and gypsy moths), providing information to avoid unnecessary pesticide applications by allowing biological controls to manage caterpillar outbreaks and to apply least-harmful insecticides to a limited number of high-value trees.
* Information about caterpillar outbreaks was also provided in articles written for the RI Nursery and Landscape Association Newsletter and RI Christmas Tree Growers Association.
* Heather Faubert and Lisa Tewksbury assisted RI Dept. of Environmental Management in creating a website to educate the public about gypsy moths in RI (dem.ri.gov/programs/forestry/gypsy moths/).
* The URI Plant Clinic received 300 plant and insect samples, and 200 were from landscapes
* Lisa Tewksbury and Richard Casagrande gave general IPM and entomology talks, updates on exotic insects, and updates on biological control research and implementation in 18 presentations to 1,038 individuals.
* RI fruit growers were provided with Tree Fruit and small fruit IPM information through 6 fruit grower meetings, 10 newsletters (web.uri.edu/ipm/), and hundreds of emails, phone calls and onsite farm visits.
* RI fruit growers used Ag Radar to help make IPM decisions.
* Seven RI tree fruit growers received daily SkyBit weather emails to aid in IPM decisions.
* 95% of IPM meeting attendees reported increasing their IPM knowledge, and that they would implement changes to their farming practices based on what they learned at a meeting.
* URI’s biological control program was featured in an article in Rhode Island Monthly, “On the Job with URI’s Pest Patrol”; readership of 166,000.
* Educational programs were conducted for vegetable growers, grape growers, Christmas tree growers, and small fruit growers.
* We are starting to find establishment of *Cyzenis albicans*, a biological control agent of winter moth. This program is being run in collaboration with Joe Elkinton of UMASS. *Cyzenis albicans* was released in eight locations in RI from 2011 to 2017, and flies have now been recovered in three of these release sites.
* URI received a permit to release *Hypena opulenta*, a biological control agent of swallow-worts in August, 2017. Releases were made in Massachusetts and Rhode Island. There is a large interest in this project with stakeholders in RI and throughout the Northeast.
* The lily leaf beetle biological project collaborated with New York and Connecticut to release lily leaf beetle parasitoids. There are plans to include Washington state and Vermont in the future. This program receives many emails from stakeholders indicating an interest in participation in this project.
* The biological control of Phragmites project has progressed to the point of submitting a petition for release for two biological control agents; both moth species.
* URI released 5,500 *Rhinoncomimus latipes* weevils, a biological control agent of Mile-a-minute in RI in 2017. We also released 2,355 *Larinus obtusus* in RI, which is a biological control agent of knapweed.

**VERMONT**

**Agronomy Accomplishments/Outputs**

**Agronomy Field Days**

* Annual Crops and Soils Field Day, Alburgh, VT. 4.7.17. 302 attendees.
* Harvesting and Malting Barley, Monkton, VT. 8.22.17. 23 attendees.
* Organic Dairy Series-Beidler Family Farm, Randolph, VT. 8.30.17. 30 attendees
* Hemp Fest, Burke, VT. 9.9.17. 175 attendees

**Agronomy Winter Conferences**

* 8th Ann. Hops Conference, Burlington, VT, 2.25.17. 177 attendees + 19 in Live Broadcast.
* 13th Annual Grain Growers Conference-Essex, VT, 3.23.17. 132 attendees + 17 in Live Broadcast.
* 9th Annual Hops Conference, Burlington, VT, 2.16.18

**Agronomy Web Resources**

* 20 research reports on pest management on grains, hops, oilseeds; 14 Hop Blog Posts; 5 grains, beans, oilseeds pest management blog posts; 40 hops, grains, beans, oilseeds Facebook posts

**Grain Disease Survey**

* Scouted wheat/barley/spelt at 7 VT, one Mass. and one NY farm; scouted dry beans in 2 VT farms; scouted hops in 6 VT and one Mass. farm; ID pathogens with the Plant Diagnostic Clinic.

**Loose Smut Seed Lot Testing**

* Two contaminated seed lots sent for testing using embryo count method: GH trials to determine the efficacy of steam treatment to control loose smut.

**Updated Guides of Pests in northeast for oilseeds, grains, hops-**Oilseed Field Guide; Field guide for growing grains; “Hop arthropod pest field guide; “Dry Bean Production Guide”

**Impacts**

**Agronomy Field Days**

* 100% learned new information; 90% intend to make a change based on what they learned; 67% improved grain quality and farm economics as a result of previous field days.

**Agronomy Winter Conferences**

* Hops Conference: 56% improved scouting skills; 67% reduced pest pressure; 71% improved pest ID skills, 63% used crowning to control downy mildew.
* Grain Growers Conference: 100% learned new information; 80% intend to adopt a new practice; 39% improved quality, 44% improved soil health, 33% improved weed mgt. strategies.

**Apple/Grape Accomplishments/Outputs**

**Apple Extension, Outreach, Education**

* 10,426 page views of UVM Fruit: Tree Fruit, January 2017-March 2018 http://www.uvm.edu/~fruit/?Page=treefruit/tf\_home.html&SM=tf\_submenu.html
* 162 email addresses subscribed to vtapplegrower@list.uvm.edu
* Annual revisions of the New England Tree Fruit Management Guide, released April 2018

**Apple IPM Guideline Assessment:** 3 selected growers responded to a follow-up online IPM assessment.

**Grape Extension, Outreach, Education**

* 2,655 page views of UVM Fruit: Grapes, 1/17-3/18 <http://www.uvm.edu/~fruit/?Page=grapes/gr_home.html&SM=gr_submenu.html> ; 270 subscribed to vermontgrape@list.uvm.edu;
* **Grape IPM Guideline Assessment:** 3 selected advisory stakeholders responded to a follow-up online assessment surveys to track adopted IPM practices.

**Impacts**

**Apple Extension, Outreach, Education**

* 2018 VT Tree Fruit Growers Assoc. meeting: 90-100% of participants indicated mod. /considerable knowledge following presentations on Pollinator Habitat (71% increase), Trunk Boring Insects (38%), Implementing Monitoring (23%), Bee Pollination (57%), Growing Cider Apples (32%); 50% will consider changing IPM management practices for cider fruit.

**Apple IPM Guideline Assessment:** 2% increase in average online assessment survey scores indicate adoption of new IPM practices by selected advisory stakeholders. Improvements in monitoring, insect management, and vertebrate management were reported on average.

**Grape Extension, Outreach, Education**

* NY & VT Winter Grape School, Lake George, NY, March 9, 2017: 95% rating by participants for value of topic (Grapes Disease Mgt., Minimal Spray Program); 52% said IPM topics important (disease ID, fungicide resistance management, spray timing)

**Grape IPM Guideline Assessment:** 20% increase in average online assessment survey scores indicate adoption of new IPM practices. Improvements in all categories of IPM practices were reported.

**Greenhouse Accomplishments/Outputs**

**IPM First for Greenhouse Ornamentals**

* 10 new operations enrolled. 17 past operations continue to receive guidance.
* Over 80 site visits at 24 different farms, reaching 37 growers in 11 of the 14 VT counties.
* 4 presentations on native beneficials in plant-mediated IPM systems. >200 attendees.
* 2 twilight workshops on habitat plant systems/aphid IPM in GH/high tunnel. >100 attendees.

**Tri-State Greenhouse IPM Workshops**

* 21th annual event held in ME, NH, VT reaching over 150 attendees.
* 3 hand-outs on ID of naturally-occurring beneficials, using habitat plants in greenhouses.

**Green Industry IPM ambassadors**

* 14 sites received support for IPM adoption and serve as ambassadors. >30 site visits
* 1 demo on natural enemies/pests attracted to habitat plantings. 6 students, 2 educators.
* Habitat plantings established at 4 commercial nurseries to promote natural enemies.

**Regional IPM Workshops for Landscapers**

* 3 presentations on habitat plantings for non-bee pollinators at Tri-State GH IPM Workshops.

**Website & social media updates**

* Over 10,000 hits on greenhouse/high tunnel/landscape IPM webpages
* Over 3,976 followed on Facebook

**Impacts**

**IPM First for Greenhouse Ornamentals & IPM Ambassadors:** 78% use plant-mediated IPM (an increase from 67% with minimal prior knowledge); 100% use biological controls (an increase from 56-78% with little prior knowledge); 89% now regularly scout for pests; 71% claim lack of knowledge about IPM implementation limits use.

**Tri-State Greenhouse IPM Workshops:** Workshop received 84% usefulness rating for solving pest problems and the program an 82%; 92% learned new techniques. Of the past workshop participants: 88% increased biological controls; 83% decreased chemical pesticides; 78% increased plant-mediated IPM systems; 93% improved scouting, 97% improved pest ID skills, 93% improved disease ID and 93% improved nutrient management.

**Communities/Master Gardener Accomplishments/Outputs**

**MG Course IPM Lectures:** 107 students across the state completed the 2017 MG Course; 85 students are currently enrolled in the 2018 MG course 15 modules/16 weeks.

**MG Outreach:** 270MG volunteers logged 11,201 hours at 102 projects making 30,589 contacts with the public about home gardening, pesticide reduction, water quality, sustainable landscapes.

**MG Helpline:** 1,061 questions answered, 88 specimens resolved through the Helpline, 1.1.17-12.31.17

**Master Gardener Advanced Training IPM Webinars:** Two: Soil Tests and Tree Diseases and Pests.

**Impacts**

**Master Gardener Course IPM Lectures:** 46% of 2017 students did not know what IPM was before the course; 98% intended to adopt a new IPM practice

**Master Gardener Helpline:** 93% of 2017 MG Helpline clients indicated the information they received helped them use IPM to manage their pest problem; 70% were able to reduce the use of pesticides.

**Plant Diagnostic Clinic Accomplishments/Outputs**

**Plant Diagnostic Clinic Samples**

* ~500 samples diagnosed with IPM information provided to commercial growers, Master Gardeners, general public; ~100 pictures of plant issues diagnosed for commercial growers.

**Plant Diagnostic Clinic Extension Presentations/Workshops**

* IPM presentations at 15 meetings/workshops >500 attendees.
* Across the Fence Extension Television programs-Six on IPM/pests/diseases.
* Two radio public service announcements (PSA) on pest/disease issues
* Plant Disease, IPM and Pesticide lecture for Master Gardener Course. 100 students.

**Contribution to Newsletters/Publications**

* Bi-weekly VT Vegetable and Berry Newsletter column on current/emerging disease/insects/weeds and IPM. 750 New England growers.
* Contribution of Vermont pest and disease info for the weekly UMASS Veg Notes.
* Quarterly columns on disease and pests for the Vermont Nursery and Landscape Association.

**Impacts**

**Plant Diagnostic Clinic disease/insect/weed diagnostics**

* Home Garden PDC Survey: 97% of clients indicated their pest issue was identified; 93% chose an IPM practice; 70% reduced their use of a pesticide as a result of diagnosis.
* Commercial Grower PDC Survey: 96% of clients indicated their pest issue was identified; 92% adopted the use of an IPM practice; 73% reduced use of pesticides as a result of the diagnosis.

**Plant Diagnostic Clinic Extension presentations/workshops**

* 72% of field/forage pest specialists indicated increased IPM knowledge as a result of presentations.

**WEST VIRGINIA**

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

Significant outputs of past 12 months:

1. Establishment of cost-share program between commercial orchardists and NRCS

2. Termination of a 3-yr mating disruption study to control clearwing borers in peach

3. Organization a successful regional Fruit IPM Workshop (March, 2018)

4. Continued outreach success with our quarterly newsletter (National Winner – NACAA)

5. Hiring of a part-time IPM Associate (1 FTE split between NPDN and EIP project)

6. Initiation of a Citizen Science Project

7. Release of disease resistant Tomato variety (Mountaineer Delight)

8. Determination of a degree-day model to manage the invasive weed jointhead Arthraxon

(*Arthraxon hispidus*),

9. Excellent support from Extension Communication Team

10. Successful deployment of biocontrol agents for Greenhouse IPM

Challenges:

1 Website makeover and related concerns to relay pest prediction/outbreak information

2. Continued emergence of resistant pests

3. Spotted Lantern fly detected in Winchester VA (close to WV orchards) – extensive

spraying in orchards?