

Progress Report

Title:	Supporting IPM on Diverse Massachusetts Farms through the Integration of Applied Res & Ext Outreach		
Sponsoring Agency	NIFA	Project Status	ACTIVE
Funding Source	Non Formula	Reporting Frequency	Annual
Accession No.	1013932	Grants.gov No.	
		Award No.	2017-70006-27137
Project No.	MASN00105	Proposal No.	2017-04501
Project Start Date	09/01/2017	Project End Date	08/31/2019
Reporting Period Start Date	09/01/2018	Reporting Period End Date	08/31/2019
Submitted By	William Miller	Date Submitted to NIFA	06/07/2019

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

Hilary Sandler
508-295-2212
hsandler@umass.edu

Recipient Organization

UNIVERSITY OF MASSACHUSETTS
COMMONWEALTH AVE
Amherst, MA 010030000
DUNS No. 153926712

Performing Department

Cranberry Station - Extension

Co-Project Directors

Clements, Jon
Campbell-Nelson, Katherine

Departments

U of Massachusetts Extension
Extension

Non-Technical Summary

Massachusetts is the 3rd most densely populated state; MA farm land is very valuable and often sought after for development. Despite this pressure, farmers steward over 523,500 acres, >10% of the MA land base. There are 7,755 farms (of which 2,651 are vegetable, berry, and fruit farms) in the state. The total number of farms has been steady since 2007, however the number of vegetable farms increased by more than 400 (28%) in the same time frame. Averaging 68 acres in size, 95% of MA farms easily fit the USDA definition of small farms, bringing in less than \$64,000 annually. Even with constant economic and biological pressures, MA farmers are committed to being efficient business owners and effective pest managers, optimizing the output of their small-scale specialty crop farms to meet consumer demands. MA farms generate over \$490 million in total sales per year with 47% from sales of specialty crops such as apples, strawberries, and cucurbits. MA has almost 300 farmers' markets and ranks 1st nationally by percentage of farms with Community Supported Agriculture (CSA).

Through increased adoption and implementation of effective IPM strategies, this EIP Project will support National Integrated Pest Management (IPM) Road Map goals of achieving increased profitability while reducing human health and environmental hazards. We will address stakeholder-identified priorities by integrating applied research and outreach activities for specialty crop growers in Massachusetts. Massachusetts produces more than 70 types of specialty crops and many of the farmers we work with grow more than 30 different crops on their farms. This project will focus on whole-farm IPM approaches tailored to fit diverse specialty crop growers. Specific commodity issues identified as high priorities by growers will be addressed through our applied research and demonstration trials and outreach programs.

We will promote IPM implementation by working closely with individual growers to adopt and apply IPM practices on their farms, conduct applied research trials to address grower-identified issues, host hands-on training and education, and collaborate with state agencies and Northeastern Extension personnel to develop and disseminate innovative educational and training resources. Evaluation and economic specialists on our team will provide expertise to increase our understanding of the influence of environmental and socioeconomic factors that affect farming decisions. We will use our current working relationships with individual stakeholders to engage Mentor, Partner, and Collaborator farmers, an outreach model we have successfully deployed over the past 6 years. Our leadership and partnership roles with Extension colleagues in New England

Progress Report

Accession No. 1013932

Project No. MASN00105

and industry and regulatory organizations will continue to further IPM implementation for specialty crop farms in MA. Responding to stakeholder-identified needs, we will expand our skill capacity by participating in professional development programs to improve technical and educational support for MA specialty crop growers.

Accomplishments

Major goals of the project

Our Project has Three Overall Goals:

1. Improve IPM practices and strategies related to emerging, invasive, and established pests of specialty crops;
2. Increase IPM implementation and promote whole-farm sustainability through outreach and training activities and demonstrating effective technological strategies; and
3. Promote adoption of IPM by expanding and improving the skill capacity of Extension personnel, IPM practitioners, and growers.

Specific objectives for Goal 1 include establishing research and demonstration trials on Partner Farms, including University research stations, and obtaining monitoring data from Collaborator Farms that will direct management decisions and improve outcomes for the grower community at-large. Goal 2 objectives include training Mentor Farmers, providing timely diagnostics, bridging language barriers, and participating in regional digital reporting systems. Goal 3 objectives include acquiring skills in farm business management and information technology as well as obtaining and providing expanded capacity in weed research/outreach for vegetable and fruit farmers.

What was accomplished under these goals?

Goal 1: Improve IPM Practices and Strategies for Emerging and Established Pests

Emerging Pests that Affect Multiple Specialty Crops (50% complete).

- For **BMSB**, MA sites were checked weekly in 2018. All data were shared with MA Dept. of Agricultural Resources (MDAR) and UMass Extension. 'Ghost' traps, an attract-and-kill strategy consisting of the BMSB pheromone and insecticide-treated netting, were deployed where BMSB numbers exceeded apple management threshold levels.
- SWD** monitoring, research, and demonstrations took place at various farms. Findings were reported via IPM Berry Blast and Healthy Fruit newsletters as well as social media platforms.
- Due to successful establishment of parasitoids, **winter moth** infestations were not a concern in 2018-19. **Scale** populations in cranberry continue to escalate at rates of high concern. We diagnosed 24 samples and made 10 site visits to diagnose scale in 2018. Scale pressure for 2019 is high; we have already collected 60 samples and made 30 bog visits. We have a visiting expert to assist in documenting species and distribution (June 2019). We continue to monitor for **Japanese knotweed** infestations.

Advanced Apple IPM (50% complete).

- Five sites with weather stations were set up in MA, CT and VT to validate apple scab models used in Decision Support Systems (DSS); it compared spore and infection observations.
- Growers were trained on model output use. Spore observations are on-going.

Brassica IPM (50% complete).

- 3 replicated field trials were conducted at the UMass Agronomy Farm. Trials included: mulches to reduce flea beetle damage and improve yield and attracting beneficial insects to reduce cabbage aphid population size.
- A website was setup through another grant program to house factsheets, research reports, webinars (415 views), and other resources.
- Scouting of brassicas occurred regularly on 11 farms in 2018.
- 8 factsheets and research reports were published online. 3 articles were published in Veg Notes and pest alerts were published weekly, and 1 field day was held (45 attendees).

Efficacy of Organic Pesticides (50% complete).

- 1 replicated study was conducted at UMass Agronomy farm using beneficial nematode products for control of flea beetle compared to an OMRI-approved standard treatment.
- 3 presentations were given on organic pesticide efficacy focus, 24 issues of Vegetable notes and 3 Plant Disease/Arthropod Management Reports were published.
- 6 on-farm demonstrations of the effectiveness of entomopathogenic nematodes (EPN) for biological control of plum curculio larvae in the soil were conducted in 2018.

Goal 2A: Increase IPM Implementation and Promote Whole-Farm Sustainability through Outreach and Training Activities

Training scouts and IPM implementation on Mentor Farms (50% complete).

- We hosted our annual Advisory Group meeting for the EIP grant, March 29, 2019 (28 attendees). We recruited Mentor and

Progress Report

Accession No. 1013932

Project No. MASN00105

Partner Farms.

•Intake interviews and evaluations with 11 Mentor Farms were done in 2018. Intakes and scouting has started with 10 farms for 2019.

•Employees were trained in scouting procedures during biweekly visits.

Provide timely and accurate specialty crop disease/pest diagnostics (50% complete).

•Cranberry scale identification was a high diagnostic priority in 2018-19.

•Pest diagnostics, fungicide efficacy, and forecasting are consistently the focus of our outreach programs and field day events. Please see REEport for the full list of presentations.

Conduct Workshops and Training on Special Topics (50% complete).

•We held 5 train-the-trainer sessions with 278 attendees.

•We provided 35 one-on-one consultations to receive Pesticide Certification.

•We provided hands-on respirator training and fit tests to 14 growers and made presentations on regulations regarding respirators to 175 attendees.

•We trained 57 workers on Worker Protection Standards (11 workshops).

•We conducted one workshop at UMass Agronomy Farm regarding bee conservation, covering insectary plantings and reducing use of chlorothalonil, 45 attendees.

•We conducted 6 workshops on nutrient management, 353 attendees.

•We provided one-on-one consulting for 28 growers regarding resistance management.

•We conducted one workshop on SWD management, 50 attendees.

•We conducted 3 workshops on organic pesticide efficacy, 190 attendees.

Bridge Language Barriers (40% complete).

•We conducted a needs survey but the response was low (13). We started development on a plan to create new resources, translate existing resources, and compile existing resources.

Promote Commonwealth Quality Program (CQP) (40% complete).

•We worked with MDAR to make improvements to the CQP audit checklist.

•MDAR inspectors attended 5 Vegetable Winter School workshops.

•We made 5 presentations regarding CQP, 74 attendees.

Goal 2B: Increase IPM Implementation and Promote Whole-Farm Sustainability through Demonstrating Effective Technological Strategies**Digital Recordkeeping (This objective cannot be completed).**

•Use of a difficult programming language and security hurdles within the UMass system hampered the transfer of the program maintenance to UMass IT as well as the development, promotion and use of the electronic scouting system. Key personnel left the project.

Optimizing Technology Utilization on Specialty Crop Farms (50% complete).

•A fact sheet was produced to introduce specialty crop farmers to FAA regulations and unmanned aerial systems (UAS).

•1 presentation was made to blueberry farmers regarding use of precision agriculture and UAS on their farms. 159 attendees.

•3 presentations were given to cranberry growers regarding the use of thermal cameras and UAS, 315 attendees.

•We published a fact sheet on the use of solar technology on cranberry farms.

Using Integrated Pest Information Platform for Extension and Education (iPIPE) (50% complete).

•30 Farms participated in a pest scouting network of sweetcorn pests and squash vine borer.

•3 interns were trained in iPIPE and provided support for the project.

Weather Stations and Sensors (50% complete).

•We coordinated a network of 26 RainWise and Onset weather stations.

•Communications with growers about stations and data were accompanied with advice and questions about IPM and decision support systems (DSS).

•Many tree fruit growers are steady users of models for apple scab disease, fire blight disease, and summer diseases as well as plum curculio, apple maggot, and other insects.

Goal 3: Promote IPM Adoption by Improving and Expanding Skill Capacity and Evaluating Progress**Business Management and IPM Decision Making (50% complete).**

•Resource economists provided mentoring to extension members to include economic analysis in 2 research trials, and worked with 2 growers to include IPM goals related to business management through our Mentor program mentioned above.

Weed Management (50% complete).

•We conducted a weed management workshop for organic vegetable farmers, 40 attendees.

•We held a program on weed management in no-till systems, 50 attendees.

Progress Report

Accession No. 1013932

Project No. MASN00105

Information Technology (IT) Professional Development (50% complete).

- Team members were trained in MyIPM app development and worked with other IPM specialists to disseminate the information to stakeholders.
- 5 webinars were held on Brassica IPM.
- We participated in the App guy update: MyIPM, Malusim, EcoApple, and NETFMG, New England, New York and Canada IPM Working Group.

Assessing Change in Behavior and Condition from IPM Extension Efforts (25% complete).

- Due McKeag's departure, activities around evaluation were reduced.

Total peer-reviewed publications: 6

Total non-peer-reviewed publications: 13

Total presentations: 78

Total people reached: 2,904 (via meetings); 4,200 via newsletter/alert subscriptions

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

The EIP team participated in the Vegetable and Fruit Working Group with all New England state extension educators, organized by University of Vermont. Lake Morey, VT December 17-18, 2018, 28 attendees.

The EIP team held our advisory group meeting on March 29, 2019, Grafton, MA with 28 attendees. We use this forum to generate feedback for the project, provide training on special topics, and to recruit mentor and partner farms as needed.

The Tree Fruit team attended MyIPM app content development sessions in Clemson, SC, Oct 8-10, 2018.

Schloemann did a demonstration of Exclusion Netting for control of Spotted Wing Drosophila by constructing a low cost tunnel with a pvc frame and double-doored entry way covered with 80-gram exclusion netting. The tunnel was approximately 85' long and the cost of construction was approximately \$1,000. SDW monitoring traps were checked twice/week and no SWD were captured. Fruit was evaluated for SWD infestation and no infested fruit were found. 400 half-pints of fruit were harvested at a value of \$4/half-pint, or a value of \$1,600.

Schloemann and Sandler participate regularly in Regional IPM "call-ins", which help to strengthen our Extension network and re-focus our educational efforts as needed. Occasionally experts join the call to share on a pest of interest (e.g., spotted lantern fly, SWD). We started having these session on Zoom, which allows us to share photos and slide presentations.

Garofalo, Piñero, Clements, and Cooley attended the New York/New England/Canadian Fruit Pest Management Working Group, 79th Annual New England, New York, and Canadian Fruit Pest Management Workshop. Burlington, VT. October 22-24, 2018. The IPM team produced the Massachusetts IPM Report for 2018. Clements gave an App guy update at this WG meeting and presented additional app information at the Massachusetts Fruit Growers' Association Annual Meeting held in Leominster, MA.

Garofalo attended Great Lakes Fruit Workers Meeting. Ithaca, NY. November 7-9, 2018, the SIVAL Expo; International Apple Pathology Working Group 25. Montabazon, FR. January 15-19, 2019, and the Eco Apple Meeting. Hyde Park, NY. February 28- March 1, 2019.

Garofalo dispatched Spensa/DTN (mytraps.com) camera pheromone traps for monitoring/setting first catch biofix of Oriental fruit moth, codling moth, and oblique banded leafroller at Nicewicz Farm, Bolton, MA.

Sylvia attended a presentation by Dr. Joe Elkington on winter moth 3/28/19 and a presentation by Heather Faubert on 2/26/19. This allowed her to consult with growers regarding winter moth. She also worked with MDAR and UMass pesticide program to host WPS train-the-trainer sessions. Sylvia trained growers on WPS and respirator fit tests. She tutored 35 growers to help them study for their pesticide certification exam. Sylvia provides diagnostic services, usually in the range of 70-100 samples per year.

Campbell-Nelson was the EIP Team's resource person providing training to stakeholders regarding nutrient management compliance.

Ghantous worked with vegetable and cranberry growers to improve their weed ID skills. She provides diagnostic services for

Progress Report

Accession No. 1013932

Project No. MASN00105

weed ID for cranberry and vegetable growers. She and Sylvia are part of a subcommittee on Maximum Residue Limits (MRL) that involves 4 conference calls/year, 100 emails and review of pesticide options for growers.

Sandler obtained her recurrent Part 107 Unmanned Aerial Vehicle pilot's license after attending a training session with Dr. David Price, President of Association of Professional Drone Pilots.

Piñero conducted on-farm demonstrations of the effectiveness of odor-baited trap trees as an attract-and-kill strategy for management of plum curculio, a key pest of apple in eastern North America. This behaviorally-based approach to management of adult plum curculios was integrated with entomopathogenic nematodes (EPN) for biological control of plum curculio larvae in the soil. Evaluations took place in six commercial orchards (five in MA, one in NH) from May to August 2018.

Piñero and Garofalo demonstrated the effectiveness of pheromone-baited ghost traps for attract-and-kill of the invasive Brown Marmorated Stink Bug at three commercial farms (September-October 2018).

Campbell-Nelson and Scheufele hosted a weekly Vegetable Pest Alerts call using Zoom including 30 Extension Educators from all New England States and New York to share timely IPM issues occurring on farms through the season, and to share expertise.

Scheufele attended the 2019 APS Northeastern Division Meeting in April 2019 at PennState to gain insight on current research in plant pathology. She also hosted a Grant Writing workshop with Sandler to Extension educators, faculty and staff as part of a professional development program. She coordinated a 4-state SARE Research and Education grant on ecological pest management in brassicas, which has led to valuable peer learning opportunities for members of the resulting 'Brassica Pest Collaborative'.

Campbell-Nelson hosted a Professional Development Program for UMass Extension funded by Northeast SARE, which included monthly peer-facilitated professional development workshops, and provided \$500 stipends to participants for subsidizing their own professional development activities. Garofalo, Piñero and Scheufele made use of these funds to travel to conferences, present at meetings, and bring outside expertise to visit with us.

Scheufele attended a one-on-one mentoring session with UMass' Statistical Consulting Service in order to improve data analysis skills.

Scheufele hosted an international expert on spinach downy mildew, Dr. Jim Correll of University of Arkansas, for a 2-day visit to learn about pathogen biology and disease management, and to introduce Dr. Correll to our unique winter spinach production systems and the challenges they bring for managing spinach downy mildew effectively. Dr. Correll's visit brought expertise to our region and UMass Extension is now well-poised to provide superior education about this disease to growers and industry across the region. Furthermore, the visit sparked a collaboration that led to the development of a new grant proposal which is being submitted now to conduct research and education on this emerging disease.

How have the results been disseminated to communities of interest?

We have positive and consistent contact with our stakeholders throughout the year. As listed in Box 1, we delivered an extensive array of workshops, presentations, and training sessions throughout the reporting period. We published 5 newsletters (69 issues total) that reached more than 4,000 specialty crop growers. We participate in Regional IPM "call-ins" and working groups, which help to strengthen our Extension network and re-focus our educational efforts as needed. We bring unknown crop damage issues to the table for discussion and the knowledge we gain is transferred directly to our growers.

Almost all of the EIP Team members are part of the organizing committee for the New England Vegetable and Fruit Conference, a bi-yearly event that attracts more than 1,500 growers from across New England. This 3.5 day event offers multiple opportunities for Extension personnel and growers to share experiences and information on specialty crop production. We are invited speakers (by our Extension colleagues) throughout the Northeast to present and train specialty crop growers. We are well networked with our colleagues and this facilitates exchange of information that helps our grower community.

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

Goal 1: Improve IPM Practices and Strategies for Emerging and Established Pests Emerging Pests that Affect Multiple Specialty Crops.

•We will continue to monitor emerging pests (SWD, BMSB) and will provide training to growers on invasive pest identification, monitoring, and management.

Progress Report

Accession No. 1013932

Project No. MASN00105

- We will collaborate in an augmented mapping information distribution network through cooperation with iPiPE and UMassIT.
- We will monitor scale and Japanese knotweed populations on cranberry farms and provide management information via newsletters and IPM alerts.

Advanced Apple IPM.

- The transition of growers handling their own fire blight risk management will be monitored.
- We will engage 5 sites in southern New England for the purpose of validating apple scab predictive models used in DSS.
- The effectiveness of semiochemically based attract-and-kill strategies for plum curculio and other key pests of stone and pome fruit will be demonstrated within and outside MA.
- Team members will hold field workshops to demonstrate IPM tools, such as attracticidal spheres for apple maggot management, and control options for fire blight-sensitive crops.
- Results from applied research projects will be presented to growers at state and regional meetings and through UMass Extension publications (e.g., Healthy Fruit, Fruit Notes).

Brassica IPM.

- We will work with growers and researchers in 4 states to design and conduct trials at the UMass Agronomy Research Farm and on Partner Farms.
- We will use results from trials and demonstrations to develop newsletter articles, web-based fact sheets, and workshops.
- New invasive pests will be monitored through our scouting efforts, Collaborator Farms, and in Brassica pest trials; best management practices will be developed and shared with growers.

Efficacy of Organic Pesticides.

- We will conduct at least 1 study on a Partner Farm and/or University facilities on organic pesticide efficacy. Results will be shared with growers through field days, newsletter articles web-based factsheets, and peer-reviewed articles.
- Training to undergraduate students on organic pest management will be provided at the UMass Agriculture Learning Center. Focus will be on monitoring and organic management of key pests of apples.

Goal 2A: Increase IPM Implementation and Promote Whole-Farm Sustainability through Outreach and Training Activities**Training scouts and IPM implementation on Mentor Farms.**

- We will regularly visit 10 Mentor Farms to scout, assess problems, and provide hands-on training for IPM techniques and pest identification. Invasive pests will be monitored.
- We will interview all Mentor Farmers at the end of the season to determine implementation success and challenges. We will seek new Mentor Farmers, if necessary, in Spring 2020.

Provide timely and accurate specialty crop disease diagnostics.

- We will conduct a training session and produce 1 video on proper plant and insect sample collection and how to interpret diagnostic reports.
- Diagnostic outreach activities will focus on hands-on activities to properly identify and manage plant disease, insect, nutritional, and weed problems during field days.
- We will share this information through disease alerts, articles for vegetable, fruit and horticulture newsletters, and fruit and vegetable websites.

Conduct Workshops and Training.

- Workshops and trainings (targeting organic growers, WPS, nutrient compliance, bee conservation and weed management training, with other subjects addressed as dictated by grower needs) are a mainstay of our education outreach efforts and will continue for 2019.

Bridge Language Barriers.

- We will evaluate survey responses and work with organizations that can provide expertise.
- We will develop language resources such as factsheets, vocabulary and phrase guides, produce 1 short video, and to host IPM related workshops such as WPS training in Spanish.

Promote Commonwealth Quality Program (CQP).

- Our Vegetable and Fruit Teams will foster our partnership with MDAR in on-farm trainings, field walks and twilight meetings to prepare inspectors/auditors to use the IPM checklists.
- Work will continue in launching the Cranberry CQP audit document in 2019-20.

Goal 2B: Increase IPM Implementation and Promote Whole-Farm Sustainability through Demonstrating Effective Technological Strategies**Digital Recordkeeping.**

- We will not pursue this objective for the remainder of the project, as described above.

Optimizing Technology Utilization on Specialty Crop Farms.

- Members of the EIP team are part of UMassAir, a collaborative of scientists and educators dedicated to increasing outreach

Progress Report

Accession No. 1013932

Project No. MASN00105

of unmanned aerial systems (UAS); we will bring agricultural expertise to this group.

- We will continue to share our experience using UAS and image sensing with growers via workshops and meetings.
- We will pursue interest in dual-use of solar energy on working specialty crop farms.

Using Integrated Pest Information Platform for Extension and Education (iPiPE).

- We will install monitoring systems and gather information on Collaborator farms.
- Information will be shared with our regional Extension colleagues to inform IPM decisions across state lines.

Weather Stations and Sensors.

- We will continue to coordinate a network of 26 RainWise and Onset weather stations.
- We will conduct outreach about DSS and encourage the use of the expanded HELP features on the NEWA site.
- We will continue to test the efficacy of disease-risk forecasting models for management of fire blight and disease-risk forecasting models for management of summer disease complex.
- We will produce 1 video on using NEWA and forecast models.

Goal 3: Promote IPM Adoption by Improving and Expanding Skill Capacity and Evaluating Progress**Business Management and IPM Decision Making.**

- Extension Team Members will work with resource economists and growers to guide our examination of factors that influence whole-farm management decisions.
- We will host a workshop on enterprise budget development.

Weed Management.

- We will interview growers to assess specific needs of vegetable and small specialty crop farms to determine the frequency and intensity of problematic annual and perennial weeds.
- We will screen herbicides (greenhouse) to identify products for priority IR-4 projects.
- We will conduct at least 1 workshop to promote use of effective IPM techniques for managing weeds on specialty crop farms.
- 1 Partner Farm project will be developed and weed IPM support will be provided to fruit and vegetable growers via field walks, newsletter articles, pest alerts, fact sheets and workshops.

Information Technology (IT) Professional Development.

- Extension personnel will conduct one 1 webinar.
- We will expand our knowledge, use and development of web-based applications.

Assessing Change in Behavior and Condition from IPM Extension Efforts.

- We will use the IPM Toolkit as a guide to improve our evaluation process.
- We will highlight cost-benefit as part of our evaluation program and engage growers willing to explore this aspect in more detail.

Participants**Actual FTE's for this Reporting Period**

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Scientist	1.5	0	0	0	1.5
Professional	6.2	0	0	0	6.2
Technical	0.8	3	1	0	4.8
Administrative	0.8	0	0	0	0.8
Other	0	0	0	0	0
Computed Total	9.3	3	1	0	13.3

Student Count by Classification of Instructional Programs (CIP) Code

Undergraduate	Graduate	Post-Doctorate	CIP Code
3	1	0	01.11 Plant Sciences.

Target Audience

Progress Report

Accession No. 1013932

Project No. MASN00105

Specialty crop growers, Conventional and organic growers, Spanish and English speaking farm workers, Beginning and women farmers, Commonwealth Quality growers, UMass Extension staff, Regional Extension IPM specialists, IPM consultants and scouts, Agricultural service providers, Farm managers and decision makers, Newsletter subscribers, Workshop and meeting attendees, Industry representatives, including drone pilots and trainees

Products

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Awaiting Publication	2019	NO

Citation

Scheufele, S.B., and G. Higgins., 2018. Evaluation of fungicides to reduce chlorothalonil use for powdery mildew on squash, 2018. Plant Disease Management Reports. (In Press).

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Awaiting Publication	2019	NO

Citation

Scheufele, S.B., and G. Higgins., 2018. Evaluation of resistant cultivars for management of downy and powdery mildews in fall cucumbers, 2018. . Plant Disease Management Reports (In Press).

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Awaiting Publication	2019	NO

Citation

Scheufele, S.B., and G. Higgins., M. Meder. 2018. Evaluation of mulches to reduce feeding damage by flea beetles in fall broccoli, 2018. Arthropod Management Tests. (In Press).

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2018	YES

Citation

Averill, A.L., M.M. Sylvia, N. Hahn, and A.V. Couto. 2018. Bees (Hymenoptera: Apoidea) foraging on american cranberry in Massachusetts. Northeastern Naturalist 25(3):502-512.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2018	YES

Citation

Xu, G. E. Palmer-Young, K. Skyrn, T. Daley, M. Sylvia, A. Averill and S. Rich. 2018. Triplex real-time PCR for detection of Crithidia mellificae and Lotmaria passim in honey bees. Parasitol Res. 117(2):623-628.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2018	YES

Citation

Hoshide, A.K., F.A. Drummond, T.H. Stevens, E. Venturini, S.P. Hanes, M.M. Sylvia, C.S. Loftin, D.E. Yarborough, and A.L. Averill. 2018. What is the value of wild bee pollination for wild blueberries and cranberries, and who values it? Environments 2018, 5(9): 98.

Other Products

United States Department of Agriculture
Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Scheufele, S.B. 2019. Disease Biology and Management. UMass Extension Vegetable Winter School. Amherst, MA March 19, 2019. 15 attendees

Product Type

Other

Description

Scheufele, S.B. 2019. Key Pests of Brassicas. Southeastern MA Agricultural Partnership Annual Ag & Food Conference. Dighton, MA, February 24, 2019. 25 attendees

Product Type

Other

Description

Scheufele, S.B. 2019. Growing fall cucumbers; Efficacy and economics of downy mildew resistant varieties. New England Vegetable & Berry Growers Assoc. Winter Meeting, January 4, 2019. 100 attendees.

Product Type

Other

Description

Scheufele, S.B. 2018. Managing cucurbit downy mildew in fall cucumbers and Managing brassica insect pests using mulches, nematodes, and insectary plantings. UMass Extension Agricultural Field Day 2018, South Deerfield, MA. August 16, 2018. 45 attendees (2 talks presented).

Product Type

Audio or Video

Description

Scheufele, S.B., Sideman, B. and A. Wallingford. Brassica Pest Collaborative: Cabbage aphid biology, management and research updates. March 22, 2019. 55 attendees live and 12 online views.
<https://www.youtube.com/watch?v=NgODzHoBZUI>

Product Type

Audio or Video

Description

Scheufele, S.B. and D. Gilrein. Brassica Pest Collaborative: Cabbage looper and diamondback moth biology, management and research updates. March 22, 2019. 57 attendees live and 70 online views.
<https://www.youtube.com/watch?v=gglY3tgXIQE&t=8s>

Product Type

Audio or Video

Description

Scheufele, S.B. and A. Legrand. Brassica Pest Collaborative: Imported cabbageworm and cross-striped cabbageworm biology, management and research updates. March 29, 2019. 43 attendees live and 12 online views.
<https://www.youtube.com/watch?v=Y8mkjyv9bEc>

Product Type

Audio or Video

Description

Scheufele, S.B. Zaman, F. and D. Gilrein. Brassica Pest Collaborative: Cabbage root maggot biology,

Progress Report

Accession No. 1013932

Project No. MASN00105

management and research updates. April 5, 2019. 29 attendees live and 29 online views.

<https://www.youtube.com/watch?v=-bz13nfiThA>

Product Type

Audio or Video

Description

Scheufele, S.B. Zaman, F. and D. Gilrein. Brassica Pest Collaborative: Flea beetle biology, management and research updates. April 12, 2019. 47 attendees live and 61 online views. https://www.youtube.com/watch?v=qMqjCw_4szQ&t=77s

Product Type

Other

Description

Garofalo, E. RI Fruit Grower's Assoc. Extension Fruit Twilight Meeting, Barden Family Orchard, RI. Summer disease considerations June 14, 2018. 45 attendees.

Product Type

Other

Description

Garofalo, E. Stockbridge Centennial Orchard Visit & Tour. September 6, 2018. UMass Cold Spring Orchard, Belchertown, MA. Weather station's role in agriculture; Invasive insect overview; Hard cider cultivars and tasting, 30 attendees (2 talks).

Product Type

Other

Description

Garofalo, E. Apple scab and other nonsense; Here's Johnny! BMSB update 2018; and J. Clements: Apps for growers including MyIPM; and J. Pinero: 1-2-3 approach to SWD management; and Attract-and-kill of plum curculio and apple maggot fly. Massachusetts Fruit Growers Association meeting, Fitchburg, MA. January 10, 2019. 120 attendees (4 talks)

Product Type

Other

Description

Garofalo, E. Pruning flash mob; Kielbasa Orchard Hadley, MA.; Outlook Farm Westhampton, MA. February 14, 2019, 10 total attendees

Product Type

Other

Description

Garofalo, E. Mass Aggie. Park Hill Orchard Easthampton, MA. Pruning Fruit Trees February 23, 2019. 45 attendees.

Product Type

Other

Description

Garofalo, E. 16 Acres Seminar Series for Homeowners. Springfield, MA. Cider Apple orchard establishment. March 2, 2019. 6 attendees

Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Garofalo, E. Fruit Twilight Meeting, April 11, 2019, C.N. Smith Farm, East Bridgewater, MA in cooperation with Rhode Island Fruit Growers' Associations and University of Rhode Island Extension. Timely disease considerations and a walkthrough of the NEWA apple scab model; and J.Pinero: Mating Disruption for Oriental Fruit Moth and Codling Moth. 65 attendees (2 talks).

Product Type

Other

Description

Garofalo, E. Greenfield Community College Introductory Horticulture class. Introduction to IPM. UMass Cold Spring Orchard, Belchertown, MA. April 17, 2019. 20 attendees

Product Type

Other

Description

Garofalo, E. Fruit Twilight Meeting. Red Apple Farm, Phillipston, MA. Timely disease considerations and a walkthrough of the NEWA apple scab model; Invasive insect update. May 15, 2019. 55 attendees

Product Type

Other

Description

Garofalo, E. Fruit Twilight Meeting. Sweetberry Farm, Middletown, RI in cooperation with Rhode Island Fruit Growers' Associations and University of Rhode Island Extension. Timely disease considerations; Invasive insect update. May 16, 2019. 35 attendees

Product Type

Other

Description

Garofalo, E. New York/New England/Canadian Fruit Pest Management Working Group, 79th Annual New England, New York, and Canadian Fruit Pest Management Workshop. Burlington, VT. October 22-24, 2018. Burlington, VT. Talk title: Decision support system accuracy. 50 attendees

Product Type

Other

Description

Garofalo, E.W. and Cooley, D.R. 2018. When Weather Goes Wrong: Managing Apple Scab Under a Changing Climate. American Phytopathological Society. Plant Health Instructor Case Study. <https://bit.ly/2GHLgmf>

Product Type

Other

Description

Garofalo, E.W. Cooley, D.R. and Clements, J.M. 2018. RIMpro and Apple Scab in New England: Accuracy and Grower Adoption. New York Fruit Quarterly. New York State Horticultural Society. Vol. 26. No. 4. pp. 29-32.

Product Type

Other

Description

Garofalo, E.W. and Clements, J. M. 2019. Small Steps to a Big Future for Massachusetts Cider Apples. Fruit

Progress Report

Accession No. 1013932

Project No. MASN00105

Notes Vol. 84, No. 2. pp. 14-16.

Product Type

Other

Description

Schloemann, S.G and H. Sandler. 2017-18 New England Small Fruit Pest Management Guide
<https://ag.umass.edu/fruit/ne-small-fruit-management-guide>

S. G. Schloemann - General Editor. 900 hard copies Online access – 1,600+ page-views

Product Type

Other

Description

Schloemann, S.G. Berry Notes <https://ag.umass.edu/fruit/berry-notes-archive>. 12 issues, 446 subscribers.

Product Type

Other

Description

Schloemann, S.G. Grape Notes/Northern Grapes Project. <https://ag.umass.edu/fruit/grape-notes>. 23 issues, 146 subscribers.

Product Type

Other

Description

Cooley, D. R., J. M. Clements, E. W. Garofalo, S. G. Schloemann and A. F. Tuttle. University of Massachusetts Fruit IPM Report for 2017. Fruit Notes 83 (3) 8-13.

Product Type

Other

Description

Schloemann, S.G. 5/24/18. Spotted Wing Drosophila Management Update, RI Fruit Grower's Assoc. Twilight Meeting, Ward's Berry Farm, Sharon, MA, 40 attendees.

Product Type

Other

Description

Schloemann, S.G. 7/10/18. Use of Exclusion Netting for Control of Spotted Wing Drosophila (SWD) in Black Raspberries; and E. Gafofalo: Summer disease considerations; Cider apple varieties and grafting; Invasive insects update; and J. Pinero: Plum Curculio Research Update and Summer Arthropod Pests. Massachusetts Fruit Growers Association, UMass Extension Fruit Program, UMass Cold Spring Orchard Belchertown, MA. 60 attendees (3 talks).

Product Type

Other

Description

Clements, J. App Mash-up: MyIPM, NETFMG, Eco Apple App, and Malusim. Massachusetts Fruit Growers' Association Annual Meeting, January 10, 2019, Leominster, MA (100 attendees)

Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Clements, J. Massachusetts IPM Report for 2018 and App Guy update with MyIPM; and J. Pinero: Plum Curculio Research Update, New England New York and Canada IPM Working Group, October 2018, Burlington, VT, 50 attendees (3 talks).

Product Type

Other

Description

Pinero, J.C. RI Fruit Grower's Assoc. Extension Fruit Twilight Meeting, Barden Family Orchard, RI. Title of presentation: "Plum Curculio Research Update". June 4, 2018. Attendance: 45 growers.

Product Type

Other

Description

Pinero, J.C. CT Pomological Society Twilight Meeting, Bishops Orchard, Guilford, CT. "Plum Curculio Research Update and Summer Arthropod Pests". June 13, 2018. Attendance: 60 growers.

Product Type

Other

Description

Pinero, J.C. New England Vegetable & Berry Growers Association meeting, Hadley, MA. "The 1-2-3 approach to Spotted Wing Drosophila management". January 4, 2019. Attendance: 105 growers.

Product Type

Other

Description

Pinero, J.C. Empire State Producers Expo, Syracuse, NY. "Regenerating Orchard IPM: Managing key apple pests with ecologically-based IPM approaches". January 16, 2019. Attendance: 90 growers.

Product Type

Other

Description

Pinero, J.C. Eastern New York Fruit and Vegetable Conference, Albany, NY. "Managing key apple pests with ecologically-based IPM approaches". February 20, 2019. Attendance: 125 growers.

Product Type

Other

Description

Pinero, J.C. Red Tomato Annual Growers Meeting, Hyde Park, NY. "Managing key apple pests with ecologically based IPM approaches". March 1, 2019. Attendance: 45 growers.

Product Type

Other

Description

Pinero, J.C. Northeast Harvest Agricultural Conferences, Topsfield, MA. "Managing Plum Curculio and Apple Maggot Fly with Ecologically-Based IPM". March 21, 2019. Attendance: 26 growers.

Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Pinero, J.C. Fruit Twilight Meeting, Belchertown, MA (Cold Spring Orchard). Discussion on Mating Disruption systems. April 16, 2019. Attendance: 33 growers.

Product Type

Other

Description

Pinero, J.C. Small Fruit Twilight Meeting, Narrow Lane Orchard, North Kingstown, RI. Title of presentation: "1-2-3 approach to Spotted Wing Drosophila Management". May 23, 2019. Attendance: 36 growers.

Product Type

Other

Description

Pinero, J.C. Mass Aggie Workshop, UMass Extension Fruit Program. Red Apple Farm, Phillipston, MA. Home Orchard Pest Management- a Hands-on Workshop. April 6, 2019. 70 attendees.

Product Type

Other

Description

Piñero, J.C., Cooley, D.R., Clements, J., Schloemann, S., and Garofalo, E. 2019. Massachusetts Fruit IPM Report for 2018. Fruit Notes 84: 1-9. <http://umassfruitnotes.com/v84n2/Cover842.html>

Product Type

Other

Description

Piñero, J.C., Leskey, T.C., and Shapiro-Ilan, D. 2019. Entomopathogenic Nematodes Are Effective at Killing Plum Curculio Larvae in the Soil. Fruit Notes 84: 9-11. <http://umassfruitnotes.com/v84n1/Cover841.html>

Product Type

Other

Description

Piñero, J.C. and Leskey, T.C. 2019. Managing Plum Curculio Using an Attract-and-kill Approach: 2018 On-farm Research Results. Fruit Notes 84: 1-4. <http://umassfruitnotes.com/v84n1/Cover841.html>

Product Type

Other

Description

Piñero, J.C. Foley, N. 2018. Evaluation of diluted grape juice as an inexpensive attractant for the invasive fruit pest spotted wing Drosophila. Fruit Notes 83(3) 1-7. <http://umassfruitnotes.com/v83n4/a1.pdf>

Product Type

Other

Description

Foley, N., and Piñero, J.C. 2018. Evaluation of plant-based materials for attractiveness to the invasive spotted wing Drosophila, *Drosophila suzukii*. CAFE Summer Scholar Program Posters & Presentations (12 September 2018).

Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Cranberry Newsletter (230 subscribers). Ghantous, Sylvia, and Sandler. Vol 19-20, 7 issues during reporting period.
<http://ag.umass.edu/cranberry/newsletters>

Product Type

Other

Description

Fruit Notes. (330 subscribers). Autio, editor. Cooley, Clements contributors. 4 issues per year.
<https://ag.umass.edu/fruit/publications/fruit-notes>.

Product Type

Other

Description

Healthy Fruit (175 subscribers). Clements and Garofalo. 18 issues during this reporting period (26:10-27:4):
<https://ag.umass.edu/fruit/healthy-fruit-archive>.

Product Type

Other

Description

IPM Berry Blast (456 subscribers) – Schloemann. 16 issues during this reporting period (2018 #7- 2019 #9)
<https://ag.umass.edu/fruit/ipm-berry-blast>.

Product Type

Other

Description

Veg Notes. (>2800 subscribers). Campbell-Nelson, Scheufele and Higgins. Vol 30(9)-31(7), 24 issues during this reporting period. <https://ag.umass.edu/vegetable/newsletters>.

Product Type

Other

Description

Sandler, H.A. 2019. Using unmanned aerial systems in specialty crops.
https://scholarworks.umass.edu/cranberry_factsheets/39.

Product Type

Other

Description

Sandler, H.A. Using Unmanned Aerial Systems for monitoring pests and stress in cranberry. UMaine Blueberry Conference, Orono, ME. Feb 28, 2019. 159 attendees.

Product Type

Other

Description

Sandler, H.A., G. Mupambi, and P. Jeranyama. 2019. Expectations for cranberry growth and productivity under solar (photovoltaic) panels. https://scholarworks.umass.edu/cranberry_factsheets/41.

United States Department of Agriculture
Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Website development. <http://ag.umass.edu/vegetable/resources/brassica-pest-collaborative>

Product Type

Other

Description

Campbell-Nelson, K. 2018. Nutrient Management for Vegetable Farmers, New Entry Sustainable Farming Project Dracut, MA. June 19, 2019. 30 attendees.

Product Type

Other

Description

Campbell-Nelson, K. Growing our Own Nitrogen, Understanding & Utilizing Cover Crops, Worcester Conservation District Northborough, MA. October 11, 2018. 45 attendees

Product Type

Other

Description

Campbell-Nelson, K. 2018 Soil Testing and Management in High Tunnels. High Tunnel Conference. University of New Hampshire, Manchester, NH. December 3, 2018. 150 attendees.

Product Type

Other

Description

Campbell-Nelson, K. 2019 High Tunnel Soils Survey. Berkshire Grown Networking Meeting Berkshire Grown / Indian Line Farm, Great Barrington, MA. April 4, 2019. 20 attendees.

Product Type

Other

Description

Campbell-Nelson, K. 2019. High Tunnel Soils Survey. NEVBGA Winter Grower Meeting Hudson, MA. February 9, 2019. 78 attendees.

Product Type

Other

Description

Campbell-Nelson, K. 2019. Phosphorus and Nitrogen Management for Vegetable Farmers. University of Vermont, Burlington, VT. February 11, 2019. 30 attendees.

Product Type

Other

Description

Campbell-Nelson, K. and Ghantous, K. 2018. Organic weed Management Twilight meeting, Langwater Farm North Easton, MA. July 24, 2018. 40 attendees

Progress Report

Accession No. 1013932

Project No. MASN00105

Product Type

Other

Description

Campbell-Nelson K. Reduced Tillage and Transplanters Twilight Meeting, Wards Berry Farm, Sharon, MA, August 28, 2018. 50 attendees.

Product Type

Other

Description

McKeag, L. 2018 Fruit and Vegetable Twilight Meeting, Kimball Fruit Farm, Pepperell MA. June 25, 2018 50 attendees.

Product Type

Other

Description

Scheufele, S.B. 2019. Insect Diagnostics and Management. UMass Extension Vegetable Winter School. Amherst, MA February 19, 2019. 19 attendees.

Product Type

Other

Description

Campbell-Nelson, K. 2019. Nutrient Management for Vegetable Farmers. UMass Extension Vegetable Winter School, Amherst, MA February 26, 2019. 16 attendees.

Product Type

Other

Description

Campbell-Nelson, Katie. 2019. Funding Opportunities for your Farm. UMass Extension Vegetable Winter School. Westborough, MA March 5, 2019. 11 attendees.

Product Type

Other

Description

McKeag, Lisa 2019. Farm Food Safety Plan. UMass Extension Vegetable Winter School, March 11, 2019. Westborough, MA. 13 attendees.

Product Type

Other

Description

Priorities for IPM: Vegetable And Fruit Working Group all New England States Extension Educators. Organized by UMass Extension/University of Vermont. Lake Morey, VT, December 17-18, 2018. 28 attendees.

<https://www.northeastipm.org/neipm/assets/File/Priorities/Priorities-VegetableIPMWG-2018.pdf>.

Product Type

Other

Description

Ghantous, K.M. and H.A. Sandler: Herbicide research update; Sandler, H.A. and K.M. Ghantous: Weed Science update; Ghantous, K.M.: Climate change and cranberries; Brennan, R.J., C. Kennedy, H.A. Sandler, and P. Jeranyama: Using Drones to infer soil moisture from imagery; Sandler, H.A.: Revisiting adjuvants-Spreader, stickers, and NIS; Averill, A.L. and M. Sylvia: Scale not made simple; Sylvia, M.: The latest in federal and state

Progress Report

Accession No. 1013932

Project No. MASN00105

regulations. UMass Cranberry Management Update Meeting, January 30, 2019, Plymouth, MA. 180 attendees (7 talks presented).

Product Type

Other

Description

Sylvia, M.M.: WPS, safety review and respirators; Sandler, H.A.: Using water for pest management; Sandler, H.A.: Glyphosate review; Ghantous, K.M. Herbicides 2019, moss, and poverty grass; Averill, A.L. Scale and weevil updates; Sylvia, M. Chemigation myths and dye testing. Pesticide Safety meeting, April 25, 2019, Wareham, MA 68 attendees (6 talks presented).

Product Type

Other

Description

Sandler, H.A., K. Ghantous, and M. Sylvia. Bogside Workshop: IPM issues of the day. June 20, 2018. East Wareham, MA 15 attendees (3 presentations).

Product Type

Other

Description

Sandler, H.A., A. Averill, M. Sylvia, K. Ghantous, P. Jeranyama, S. Uppala, and G. Mupambi Bogside Workshop: Pest management, irrigation, and canopy management. May 29, 2019. East Wareham, MA, 15 attendees (5 presentations).

Product Type

Other

Description

Averill, A.L. Bristol County Beekeeping, Bristol County Ag School, Dighton MA "Cranberry Pollination and bumblebee decline, Sept. 25, 2018. 50 attendees

Product Type

Other

Description

Averill, A.L. MA Tree Wardens and Foresters Annual Meeting, Host Hotel, Sturbridge MA "Shifts in bee species composition: identifying and addressing loss of diversity" January 8, 2019. 125 attendees.

Product Type

Other

Description

Sylvia, M. Respirator Requirements and Bees and Pesticide Toxicity Including Neonics. Cape Cod Landscape Association Professional Education Seminar, February 26, 2019. 175 attendees (2 talks).

Changes/Problems

Personnel: Ms. Lisa McKeag, instrumental in the Commonwealth Quality Program and initiator of evaluation processes for the project, entered graduate school and changed her job focus to food safety. Thus, objectives under her purview were significantly reduced. Mr. Andrew Cavanaugh, IT consultant, had devised our electronic reporting system in a language that is not as universal as other languages. This, along with unforeseen University security issues, hampered the transfer of the program maintenance to UMass IT as originally proposed. In addition, unexpected external employment activities curtailed Mr. Cavanaugh's availability to the EIP program and Ms. Elizabeth Amour (University IT) retired. These events have combined to severely limit our ability to develop and promote the electronic scouting system. On a positive note, Dr. Jaime Pinero has joined our team and will be providing entomological expertise in our fruit team extension efforts. Budget:

Progress Report

Accession No. 1013932

Project No. MASN00105

No adjustments were needed for Year 2 funds. Activities: Activity assignments associated with McKeag, Cavanaugh and Amour were reduced or eliminated.

The remaining efforts and activities of the Team are proceeding on schedule as anticipated for 2019-20.