United States Department of Agriculture

Progress Report

Title:	Multi-Level Extension Delivery to Support IPM for MA Vegetable and Fruit Growers		
Sponsoring Agency	NIFA	**Project Status**	ACTIVE
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Submitted By	William Miller	**Date Submitted to NIFA**	06/03/2016

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

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Co-Project Directors

{NO DATA ENTERED}

Departments

{NO DATA ENTERED}

Non-Technical Summary

Farmers steward over 523,500 acres, more than 10% of the Massachusetts land base. In 2012, MA farms generated over $490 million in total sales, 42% of which came from sales of fruits, berries, vegetables, and potatoes. These specialty crop growers operate on a narrow profit margin; the net cash income in MA was $5,093 per farm in 2012. MA farms are highly diversified; this trait mandates that growers have and maintain a high degree of working knowledge and expertise in pest biology and management across multiple crop systems. Lack of pest control could easily translate into loss of long-term sustainability for specialty crop agriculture in the Commonwealth. The appropriate use of pesticides, in combination with cultural and biological controls, will maintain the longevity of available pesticides, conserve natural enemies, and maximize environmental stewardship. This project will connect "boots on the ground" support that educates growers with hands-on instruction and traditional workshops with the development of an interactive web site that will be used for scouting and reporting.
We will use a multi-level approach where we work intensively with individual growers to implement IPM practices on their diversified vegetable and fruit farms, work with multiple farms on IPM field trials to address specific issues, host growers meetings for large audiences on the farms where we work, and extend the information we gain from on-farm work to reach a large multi-state audience. We will implement an educational program focused on monitoring and managing emerging and established insects, weeds and diseases. To do this, we will establish mentoring and partnering relationships with individual farms, provide diagnostic services, develop traditional and web-based tools to deliver information, and establish participatory and demonstration research for crop/pest complexes identified by growers as presenting challenges for IPM implementation. As a result of our whole-farm and grower-directed collaborative approach to IPM problem solving, growers will gain understanding and confidence in cutting-edge, crop-specific strategies. They will learn how to 'put it all together' to have success in both crop health and profitability.

Accomplishments

Major goals of the project

GOAL: Use a multi-level Extension delivery approach to implement IPM on diversified vegetable and fruit farms in Massachusetts.

1. Work intensively with individual MA growers to implement IPM practices on their diversified farms.

2. Works with multiple farms on IPM field trials to address specific pest management concerns.
3. Host grower meetings to exchange and extend information gathered through individual and farm level interactions.
4. Promote and sustain collaborations with other organizations at state, regional, and federal levels to further IPM adoption.

GOAL: Implement an educational program focused on monitoring and managing emerging and established insects, weeds, and diseases.

1. Establish mentoring and partnering relationships with individual farms.
2. Provide accurate diagnostic services.
3. Develop traditional and web-based tools to deliver information.
4. Establish participatory and demonstration research for crop/pest complexes important to MA growers.
5. Support educational efforts across commodities.

GOAL: Evaluate program success and measure impacts.

1. Conduct periodic surveys and interviews to document changes in pest management efforts.
2. Ensure that appropriate pest management information is extended to target audiences.
3. Hold regular meetings with the stakeholder advisory committee to ensure the program is on the right track.

What was accomplished under these goals?

Work intensively with individual growers to implement IPM practices. The EIP Project Team worked with 8 diversified fruit and vegetable farms to identify pests and problems and set Integrated Pest Management (IPM) goals. Growers identified a total of 99 pests or problems they wanted to address using IPM, each associated with a specific crop. Throughout the growing season, we visited participating farms on a bi?weekly basis and worked with growers to implement various IPM practices. A total of 313 specific management practices were recommended to address these 99 IPM issues. 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.

Work with multiple farms on IPM field trials to address specific pest management concerns. The EIP Project Team conducted on-farm trials on growing mustard as a biofumigant to manage Phytophthora capsici in peppers and plant parasitic nematodes in strawberry and 4 research farm trials on Brassica IPM for cabbage root maggot. The EIP Project Team worked with 9 MA growers to help them increase their adoption of apple scab management alternatives. These included assessing scab inoculum in the Fall, performing leaf-chopping and urea applications between leaf fall and the green tip bud stage in the Spring, delaying early spring scab sprays when possible, using decision support systems (AgRadar and NEWA), and improving their resistance management. The team coordinated this work at 15 additional sites in neighboring states.

The EIP project scientists and growers monitored for the following pests during the period from July 1, 2015 to April 30, 2016: codling moth, oriental fruit moth, oblique-banded leaf roller, and dogwood borer (pheromone traps in apples); greater peach tree borer, lesser peach tree borer; apple maggot (sticky traps in apple). The team also monitored for pest or pest damage incidence for the following: plum curculio (apple), pear psylla (pear), apple scab (apple), fire blight (apple), sooty blotch and flyspeck (apple), San Jose scale (apple), tarnished plant bug (apples and small fruit), two species of sawfly (apples), and various stinkbugs and pest mites (apple). The EIP project worked with 2 MA and 1 VT growers on a field experiment testing beneficial nematodes and the trap tree approach for managing plum curculio in apples (directed by T. Leskey, USDA/ ARS, Kearneysville, WV).

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. Winter moth continues to be a pest of concern on cranberry. Three sites were visited in the fall that had suffered near total loss of crop due to undiagnosed winter moth infestations in the spring. Crop insurance claims were supported. Continued education for cranberry growers about the problem included presentations at January and April meetings.

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 but at present we cannot proceed towards registration due to environmental profile concerns, additional environmental fate work, and re-registration issues.

Establish mentoring and partnering relationships with individual farms. In 2015, the EIP Project Team identified and began working with 8 MA farms as mentor farms and 9 as partner farms.

Provide accurate diagnostic services. Each Mentor and Partner farm received 2 diagnostic samples (fee supported by the grant) submitted to the UMass Disease Diagnostic Lab. The Diagnostic lab reported processing 35 vegetable and 48 small fruit samples. The Cranberry Diagnostic Lab processed approximately 40 samples.
Develop traditional and web-based tools to deliver information. We continue to make good progress. We began the year with working versions of a Grower Intake Form, which collects the basic information for partner farms and defines IPM goals and actions, and a Basic Scouting Form that scouts can use on farm visits. Each scouting form includes a section for recommendations, as well as image or video uploads, and basic data such as scout name, weather conditions, crop stage, etc. All forms can be easily exported to PDF to allow for printing or emailing to growers.
During this reporting year, in addition to many revisions and improvements to the existing forms, we added an end-of-season Reporting Form where Extension personnel can collect data and measure the impact of their work in terms of changes in grower knowledge, changes in behavior, and the impact of both on the farm. These data can then be exported as a (comma separated value; csv) data file for further analysis. This last addition completes the basic functionality of the application. In the current year, we are focusing on support, stability, and improvements. Improvements will likely include a system of notes/reminders/to-do items for scouts, some usability enhancements to the existing forms, better sorting and filtering of the impacts data to ease reporting, additional reporting of summary statistics (number of growers, number of plans, scouting visits per grower, etc). If time permits, we will work with growers to help them log in and access their own scouting reports and IPM plans.
Conduct periodic surveys and interviews to document changes in pest management efforts .
At the Annual Advisory Meeting on March 1, 2016, stakeholders identified the following topics as the highest priorities for research: Bird damage in sweet corn, organic late blight management, cabbage aphids in Brussels sprouts, spotted wing drosophila management, and soil fertility for plant health. On-farm and research trials are planned for the 2016-2017 growing seasons to address cabbage aphids in Brussels sprouts and soil fertility and plant health.
At the beginning of the 2015 growing season, members of our team worked with 8 farms to identify pests and problems and set Integrated Pest Management (IPM) goals. Growers identified a total of 99 pests or problems they wanted to address using IPM, each associated with a specific crop. Throughout the growing season, we visited participating farms on a bi?monthly basis and worked with growers to implement various IPM practices. A total of 313 specific management practices were recommended to address these 99 pests and problems.
During Fall 2015 and Winter 2016, we interviewed growers to evaluate the extent to which recommended practices were adopted and how successful they were in helping farmers achieve their goals. 83% of the practices were adopted by growers as recommended; an additional 10% were adopted with some modification and for those practices that were adopted, 96% were rated by growers as either "moderately" or "largely" successful (79% ? largely successful, 17% moderately successful)
As a result of working with our team and implementing recommend IPM management practices, growers reported on whether 3 specific goals were attained for the 99 separate crop?problem combinations. Growers responded according to a 4?point scale (1 = not at all, 2 = minimally, 3 = moderately, 4 = largely): 74% resulted in changes in pesticide use consistent with IPM practices; 86% resulted in reductions in crop loss; and 81% resulted in improvements in crop quality.

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

Establish mentoring and partnering relationships with individual farms. In 2015, the EIP Project Team identified and began working with 8 MA farms as mentor farms and 9 as partner farms.
Provide accurate diagnostic services. Each Mentor and Partner farm received 2 diagnostic samples (fee supported by the grant) submitted to the UMass Disease Diagnostic Lab. The Diagnostic lab reported processing 35 vegetable and 48 small fruit samples. The Cranberry Diagnostic Lab processed approximately 40 samples.
Hosted grower meetings to exchange and extend information gathered through individual and farm level interactions. Number of attendees in parentheses.
May 2015
Bogside Workshop, Carver, MA (16)
June
Bogside Workshop, E. Wareham, MA (22)
July
Field walk, Matunuk Vegetable Farm, Matunuk, RI (12)
Field walks on growers' farms in Waltham, MA (8) and Amherst, MA (12)
MA Fruit Growers Association, IPM/BMSB, Phillipston, MA (107)
August
4 Field walks on growers' farms in Amherst, MA (46)
Field Walk, South Royalton, VT (12)
Weed identification workshop, E. Wareham, MA (22)
Weed identification workshop, Jonesboro, ME (11)
October

Twilight meeting on Nutrient Management, Soil and Crop Fertility, N. Easton, MA (40)
December
Cranberry Summit meeting, E. Wareham, MA (39)

January 2016
Cranberry Research and Extension Update, Wareham, MA (220)
Weed IPM, American Cranberry Growers Association, Bordentown, NJ (42)
March
IPM Advisory Group Annual Meeting, North Grafton, MA (28)
Weather-based Uncertainty and Apple Production Workshop, Amherst, MA (26)
April
Pesticide Safety and IPM training, Wareham, MA (65)
Fruit IPM Twilight Meeting: Apple scab, winter moth, Belchertown, MA (45)
Fruit IPM Twilight Meeting: Apple scab, winter moth, Wrentham (55)

Presenting and/or attending local, regional, and national conferences:
August 2015
Brassica IPM meeting at the NOFA Summer Conference, Amherst, MA (25)
Decision Support Systems Evaluation in MA, Ventura, CA (23)
October
MA Fruit IPM Report, New England/New York/ Canada Fruit Pest Management Conference, Burlington, VT (50)
Decision Support Systems for Apple Scab: Models, Outputs, and Implementation, Burlington, VT (50)
Advanced IPM for apples: Managing apple scab, fire blights, plum curculio, summer disease and apple maggot, Holyoke Community College, Belchertown, MA (16)
November
Vegetable Program Annual Report for NOFA, Rutland, MA (30)
Vegetable Program Annual Report for SEMAP, Easton, MA, (60)
2 Resistance Management Webinars, NE-SARE Professional Development Grant Program (9)
December
Vegetable Program Annual Report for CRAFT, Hillsdale, NY (25)
2 Resistance Management Webinars, NE-SARE Professional Development Grant Program (9)
New England Vegetable and Fruit Conference, Manchester, NH (~1700)

January 2016
Cranberry Weed Management Update, Northeastern Weed Science Society meeting, Philadelphia, PA (45)
Presentation at NEVBGA on Growing Mustard as a Biofumigant, Hadley, MA (60)
Disease update, NOFA, Worcester, MA (35)
February
Disease update, Carovail, Northampton, MA (40)
Disease update, SEMAP, Dighton, MA (25)
March
Tactics for apple scab management, Hyde Park, NY (70)

Establish participatory and demonstration research for crop/pest complexes important to MA growers. See items mentioned under "IPM field trials" above.

Promote and sustain collaborations with other organizations at state, regional, and federal levels to further IPM adoption.
The EIP Project team:
Hosted a weekly Vegetable Pest Alerts call with 15 Extension Educators and field scouts from around the Northeast (RI, MA, VT, NY, NH, ME). We used information from these calls to write pest alerts for over 2,000 readers in the region.
Hosted weekly Tree Fruit Pest Alert Calls with growers, Extension Educators, and other industry leaders to [approx. 8 callers per week; used information to write Healthy Fruit and other pest messages]
Participated in a weekly Berry Pest Alert Call-in with Extension and Industry Colleagues from the Northeastern US and Eastern Canada (PA, NJ, NY, CT, RI, MA, NH, VT, ME, Ontario).This information is used to inform IPM Berry Notes and other regional pest messages going out to fruit growers in the region.
Partnered with NRCS, SEMAP, NOFA, and CRAFT (public or non-profit organizations) to promote educational activities and give presentations.

Partnered with Massachusetts Fruit Growers' Association, New England Vegetable and Berry Growers' Association, Massachusetts Blueberry Growers Association, and the Cape Cod Cranberry Growers to promote educational activities and give presentations.
Participated in a regional research project on management of plum curculio in apples, with Massachusetts Fruit Growers' Association, New England Vegetable and Berry Growers' Association, directed by T. Leskey, USAD/ ARS, Kearneysville, WV.
Coordinated efforts for a regional apple scab project that included Extension Educators and growers in ME, NH, CT, and VT.
Hosted and participated in four Resistance Management Webinars offered through the NE-SARE Professional Development Grant Program.
Contributed efforts as Members of the Steering Committee to organize the New England Vegetable and Fruit Conference, a 3.5 day conference, held every two years and attended by approximately 1500 growers.
Participated in a multistate workshop on weather-based uncertainty and apple production discussing concept mapping apple production issues related to weather.
The Team collaborated with UME and UNH and Extension in ME and NH to extend the apple scab project to 10 growers in those states. Tree fruit team collaborated with Skybit, AgRadar, and NEWA to maintain and expand access to weather data and pest management forecasting models for MA and New England growers (> 100 growers). Fruit team cooperated with MDAR, 2 regional IPM consultants, the Arnold Arboretum, and Barnstable County Extension to trap and to track brown marmorated stink bug in MA. Tree fruit team collaborated with USDA scientists on plum curculio project. Tree fruit team collaborated with CT Extension on project to collect plant tissue damaged by fire blight and test for resistance to antibiotics.

How have the results been disseminated to communities of interest?

Support educational efforts across commodities. We make biweekly farm visits with fruit and vegetable Extension specialists meeting together with the farmer to provide IPM training in collaboration.
Ensure that appropriate pest management information is extended to target audiences. We write recommendations for both organic and conventional growers in our newsletters. We regularly host events and give recommendations based on audience attending.
Hold regular meetings with the stakeholder advisory committee to ensure the program is on the right track. Sixteen farmers, seven Extension fruit and vegetable program educators, two private IPM field scouts, and three agricultural service providers (NRCS, one non-profit farm and MA Farm Bureau) attended our annual advisory meeting on March 1, 2016.
Newsletters
Berry Notes: Vol 27-28, 2015-2016. S. Schloemann, ed. Published monthly year-round with seasonal crop checklists, research articles, timely topics and event announcements. Subscription list is approximately 500 with unlimited online access to archived issues (http://ag.umass.edu/fruit/).
IPM Berry Blast: Volume 4-5, 2015-2016. S. Schloemann, ed. Published as needed (weekly or more frequently) during major pest management periods for all small fruit. Contains timely pest identification, life cycle, IPM scouting notes and management recommendations for organic and conventional growers. Distributed electronically to approximately 500 subscribers (http://ag.umass.edu/fruit/ipm-berry-blast).
Cranberry Station Newsletter: In 2015-2016, 5-6 issues/ year. Sandler, H.A., M. Sylvia, A. Averill, eds. http://www.umass.edu/cranberry/pubs/newsletter.html. Approximately 325 subscribers, primarily in MA but also national and international. http://ag.umass.edu/cranberry/newsletters.
Healthy Fruit: Healthy Fruit, Vol. 23-24, 2015-2016. J. Clements, ed. Published weekly April-October and periodically in off season. Contains crop phenology, pest development and alerts and articles for a broad spectrum of fruit growers in Massachusetts and New England. Distributed electronically to a subscription list of 100 growers (https://ag.umass.edu/fruit/healthy-fruit-archive). https://ag.umass.edu/fruit/publications/healthy-fruit.
Fruit Notes: Fruit Notes, Vol. 80-81, 2015-2016. W. Autio, Ed. Published quarterly, with refereed research articles on IPM related topics in fruit production. Distributed electronically to 330 subscribers. https://ag.umass.edu/fruit/publications/fruit-notes.
Vegetable Notes: Volume 27-28, 2015-2016. K. Campbell-Nelson, S. Scheufele, & L. McKeag, eds. Published weekly May-September and monthly in winter, with timely pest alerts and articles to a broad spectrum of vegetable farmers state and region-wide. Email subscription list exceeded 2200. https://ag.umass.edu/vegetable/newsletters.
New England Grape Notes. Vol. 10-11, 2015-2016. S. Schloemann, ed. 6-10 issues published yearly from April-November with horticultural and pest management information for grape growers in New England. Approximately 300 subscribers. https://ag.umass.edu/fruit/grape-notes.
UMass Extension Cranberry, Tree Fruit, Small Fruit and Vegetable FACT SHEETS
Cranberry: http://ag.umass.edu/cranberry/fact-sheets
Fruit: https://ag.umass.edu/fruit/fact-sheets
Vegetable: https://ag.umass.edu/vegetable/vegetables/fact-sheets
Smartphone app series tackles fruit diseases and pests developed in concert with Clemson University. Clements and Saalau-Rojas. MyIPM-NED. Free on iPhones and androids.

Tweeting by UMass Extension
https://twitter.com/jmcextman?ref_src=twsrc^tfw
Websites & pest alerts
To provide a portal to IPM information on diverse commodities, our IPM website https://ag.umass.edu/integrated-pest-management was updated to serve as a gateway to IPM information on vegetable (https://ag.umass.edu/vegetable), fruit (https://ag.umass.edu/fruit) and other commodity websites.
Invasive Pest IPM: Fruit/Spotted Wing Drosophila and Brown marmorated stink bug network and alert system: Data from the statewide reporting network is gathered into a centralized web page which disseminate alerts and management updates to multiple channels automatically (email, cell phone, web page posting, facebook, etc.).
Cranberry IPM Message: Weekly IPM pest alerts were issued from May to August as a phone message and at http://ag.umass.edu/cranberry/newsletters.
Webpages located at:
https://extension.umass.edu/fruitadvisor/brown-marmorated-stink-bug
https://extension.umass.edu/fruitadvisor/spotted-wing-drosophila

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

We will continue our outreach in publication efforts, workshops, and one-on-one mentoring. We will conduct end-of-season interviews to assess the activities of Mentor Farmers in achieving their established (pre-season) goals. We will work with IT consultant to implement and improve the software package that is being developed. We will meet with our Stakeholder Advisory Group in the winter to adjust activities as needed, based on their input. We will meet with our regional collaborators to make plans for the 2017 season. We will collect and analyze data from our on-farm field trials.

Participants

Actual FTE's for this Reporting Period

Role	Non-Students or faculty	Students with Staffing Roles			Computed Total by Role
		Undergraduate	Graduate	Post-Doctorate	
Scientist	0.5	0	0	0	0.5
Professional	2	0	0	0	2
Technical	1.5	0	0	0	1.5
Administrative	0	0	0	0	0
Other	0.4	0	0	0	0.4
Computed Total	4.4	0	0	0	4.4

Student Count by Classification of Instructional Programs (CIP) Code

{NO DATA ENTERED}

Target Audience

Beginning and women farmers, diversified growers, conventional and organic growers, Extension staff, IPM consultants and scouts, Ag service providers, farm managers and decision-makers, newsletter subscribers, workshop and meeting attendees, industry representatives

Products

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2015	NO

Citation

Cooley, D. R. and J. Clements. Preliminary evaluation of four decision support systems for management of apple scab in the northeastern U.S. 2015. Phytopathology 105 (Suppl. 1):S1.6.

Accession No. 1005350 **Project No. MASN00102**

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

Citation

Morrison, W., D. Lee, B. Short, W. Reissig, D. Combs, K. Leahy, A. Tuttle, D. Cooley, and T. Leskey. 2015. Inclusion of Specialist and Generalist Stimuli in Attract-and-Kill Programs: Their Relative Efficacy in Apple Maggot Fly (Diptera: Tephritidae) Pest Management. Env. Entomol. (accepted)

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

Citation

Scheufele, S.B. and K. Campbell-Nelson, and A. Zolondick, 2017. Insecticides for control of cabbage root maggot in organic systems, 2015. Arthropod Management Tests. (Submitted).

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

Citation

Scheufele, S.B. and K. Campbell-Nelson, and A. Zolondick, 2017. Insecticides for control of cabbage root maggot in direct-seeded root crops, 2015. Arthropod Management Tests. (submitted).

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

Citation

Scheufele, S.B., L. McKeag, K. Campbell-Nelson, and 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.

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

Citation

Scheufele, S.B., 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

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2015	NO

Citation

Scheufele, S.B., K. Campbell-Nelson, and R. Hazzard. 2015. Evaluation of biological fungicides to control Alternaria leaf spot of Brassicas, 2014. Plant Disease Management Reports. Volume 9: V004.

Type	Status	Year Published	NIFA Support Acknowledged
Journal Articles	Published	2015	NO

Citation

Scheufele, S.B., K. Campbell-Nelson, and R. Hazzard. 2015. Evaluation of copper fungicides to control basil downy mildew, 2014. Plant Disease Management Reports. Volume 9: V001

Other Products

Product Type

Other

Description

Cooley, D.R. Development of more sustainable disease management tactics for apple production in the Northeast. MAS 00407. Expt. Sta. Hatch Rept. http://www.reeis.usda.gov/web/crisprojectpages/225216.html (10/1/2010 – 9/30/2015).

Product Type

Protocols

Description

Cooley, D. R., A. F. Tuttle. 2015 Eco-apple Protocol. v. 1.6. IPM Institute of North America. http://www.redtomato.org/eco-apple/

Product Type

Educational Aids or Curricula

Description

Cooley, D. R. and W. R. Autio. 2015. An Annual Fire Blight Management Program for Apples: An Update. Fruit Notes, Vol. 80, No. 2. Pages 18-26. http://umassfruitnotes.com/v80n2/a4.pdf.

Product Type

Educational Aids or Curricula

Description

Garofalo, E., D.R. Cooley, J.M. Clements and A.F. Tuttle. 2016. Discrepancies Between Direct Observation of Apple Scab Ascospore Maturation and Disease Model Forecasts in the 2014 and 2015 Growing Seasons. Fruit Notes 81(2) 7-18. (http://umassfruitnotes.com/v81n2/a2.pdf)

Product Type

Educational Aids or Curricula

Description

Moran, R., G. Koehler, C. Smith, G. Hamilton, W. MacHardy, L. Berkett, H. Faubert, M. Concklin, A. Tuttle, J. Clements, and D. Cooley. 2016. The New England Apple Scab Control Practices Survey. Fruit Notes 81(1): 1-6. (http://umassfruitnotes.com/v81n1/a1.pdf)

Product Type

Educational Aids or Curricula

Description

Madeiras, A. 2016. Strawberry anthracnose. https://ag.umass.edu/fact-sheets/strawberry-anthracnose.

Product Type

Educational Aids or Curricula

Description

Madeiras, A. 2016. Strawberry mottle virus and strawberry mild yellow edge virus. https://ag.umass.edu/fact-sheets/strawberry-mottle-virus-strawberry-mild-yellow-edge-virus.

Product Type

Educational Aids or Curricula

Description

Madeiras, A. 2016. Nematode pests of raspberries. https://ag.umass.edu/fact-sheets/nematode-pests-of-raspberry.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. and S.G. Schloemann. 2016. Foliar diseases of strawberry. https://ag.umass.edu/fact-sheets/foliar-diseases-of-strawberry.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. and R. Wick. 2016. Root Knot nematodes in vegetable crops. https://ag.umass.edu/fact-sheets/root-knot-nematodes-in-vegetable-crops.

Product Type
Educational Aids or Curricula

Description
Schloemann, S. 2016. Tarnished plant bug fact sheet. https://ag.umass.edu/fact-sheets/strawberry-ipm-tarnished-plant-bug.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. and S.G. Schloemann. 2015. Blueberry shock virus. https://ag.umass.edu/fact-sheets/blueberry-shock-virus.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. and S.G. Schloemann. 2015. Gray mold of strawberry. https://ag.umass.edu/fact-sheets/strawberry-gray-mold.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. 2015. Purple blotch of onion. https://ag.umass.edu/fact-sheets/onion-purple-blotch.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. 2015. Garlic bloat nematode. https://ag.umass.edu/fact-sheets/garlic-bloat-nematode.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. 2015. Northern corn leaf blight. https://ag.umass.edu/fact-sheets/corn-northern-corn-leaf-blight.

Product Type
Educational Aids or Curricula

Description
Madeiras, A. 2015. Potato blackleg. https://ag.umass.edu/fact-sheets/potato-blackleg.

Product Type
Educational Aids or Curricula

Description
Sandler, H.A. and K.M. Ghantous. 2015. Poverty grass. http://ag.umass.edu/cranberry/fact-sheets.

Product Type
Educational Aids or Curricula

Description
Sylvia, M. and A. Averill. Winter moth basics 2015. http://ag.umass.edu/cranberry/fact-sheets.

Product Type
Educational Aids or Curricula

Description
Berry Notes: Vol 27-28, 2015-2016. S. Schloemann, ed. Published monthly year-round with seasonal crop checklists, research articles, timely topics and event announcements. Subscription list is approximately 500 with unlimited online access to archived issues (http://ag.umass.edu/fruit/).

Product Type
Educational Aids or Curricula

Description

IPM Berry Blast: Volume 4-5, 2015-2016. S. Schloemann, ed. Published as needed (weekly or more frequently) during major pest management periods for all small fruit. Contains timely pest identification, life cycle, IPM scouting notes and management recommendations for organic and conventional growers. Distributed electronically to approximately 500 subscribers (http://ag.umass.edu/fruit/ipm-berry-blast).

Product Type
Educational Aids or Curricula

Description
Cranberry Station Newsletter: In 2015-2016, 5-6 issues/ year. Sandler, H.A., M. Sylvia, A. Averill, eds. http://www.umass.edu/cranberry/pubs/newsletter.html. Approximately 325 subscribers, primarily in MA but also national and international. http://ag.umass.edu/cranberry/newsletters.

Product Type
Educational Aids or Curricula

Description
Healthy Fruit: Healthy Fruit, Vol. 23-24, 2015-2016. J. Clements, ed. Published weekly April-October and periodically in off season. Contains crop phenology, pest development and alerts and articles for a broad spectrum of fruit growers in Massachusetts and New England. Distributed electronically to a subscription list of 100 growers (https://ag.umass.edu/fruit/healthy-fruit-archive). https://ag.umass.edu/fruit/publications/healthy-fruit.

Product Type

Educational Aids or Curricula

Description

Fruit Notes: Fruit Notes, Vol. 80-81, 2015-2016. W. Autio, Ed. Published quarterly, with refereed research articles on IPM related topics in fruit production. Distributed electronically to 330 subscribers. https://ag.umass.edu/fruit/publications/fruit-notes.

Product Type

Educational Aids or Curricula

Description

Vegetable Notes: Volume 27-28, 2015-2016. K. Campbell-Nelson, S. Scheufele, & L. McKeag, eds. Published weekly May-September and monthly in winter, with timely pest alerts and articles to a broad spectrum of vegetable farmers state and region-wide. Email subscription list exceeded 2200. https://ag.umass.edu/vegetable/newsletters.

Product Type

Educational Aids or Curricula

Description

New England Grape Notes. Vol. 10-11, 2015-2016. S. Schloemann, ed. 6-10 issues published yearly from April-November with horticultural and pest management information for grape growers in New England. Approximately 300 subscribers. https://ag.umass.edu/fruit/grape-notes.

Product Type

Educational Aids or Curricula

Description

UMass Extension Cranberry, Tree Fruit, Small Fruit and Vegetable FACT SHEETS
Cranberry: http://ag.umass.edu/cranberry/fact-sheets
Fruit: https://ag.umass.edu/fruit/fact-sheets
Vegetable: https://ag.umass.edu/vegetable/vegetables/fact-sheets

Product Type

Software or NetWare

Description

Smartphone app series tackles fruit diseases and pests developed in concert with Clemson University. Clements and Saalau-Rojas. MyIPM-NED. Free on iPhones and androids.

Product Type

Audio or Video

Description

Tweeting by UMass Extension
https://twitter.com/jmcextman?ref_src=twsrc^tfw

Product Type

Audio or Video

Description

Websites & pest alerts
To provide a portal to IPM information on diverse commodities, our IPM website https://ag.umass.edu/integrated-pest-management was updated to serve as a gateway to IPM information on vegetable (https://ag.umass.edu/vegetable), fruit (https://ag.umass.edu/fruit) and other commodity websites.

Product Type

Audio or Video

Description

Invasive Pest IPM: Fruit/Spotted Wing Drosophila and Brown marmorated stink bug network and alert system: Data from the statewide reporting network is gathered into a centralized web page which disseminate alerts and management updates to multiple channels automatically (email, cell phone, web page posting, facebook, etc.).

Product Type

Audio or Video

Description

Cranberry IPM Message: Weekly IPM pest alerts were issued from May to August as a phone message and at http://ag.umass.edu/cranberry/newsletters.

Product Type

Audio or Video

Description

Sample Alerts:
https://www.facebook.com/umassipmteam

Product Type

Audio or Video

Description

Webpages located at:
https://extension.umass.edu/fruitadvisor/brown-marmorated-stink-bug
https://extension.umass.edu/fruitadvisor/spotted-wing-drosophila

Changes/Problems

{Nothing to report}