The Center for Agriculture, Food and the Environment

UMass Extension
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Title: Vegetable Integrated Crop Management

Project Leader: Katie Campbell-Nelson

Project Overview

Vegetable farming in Massachusetts and New England has remained vital in recent decades through constant and creative change: new approaches to direct marketing, increased diversification, establishment of new farms, adaption of existing farms, and adoption of new technologies. The 18,000 acres in Massachusetts used to produce vegetables worth over $80 million in market value, are a resource for food, open space, environmental quality, economic vitality, and quality of life in the Commonwealth. Census of Agriculture data indicated 400 more vegetable farms, and 2000 more acres growing vegetables in 2012 compared to 2007. Vegetable farmers are key players in the state's 300 farmers markets, 150 farmstands, Community Supported Agriculture farms, as well as in the growing wholesale food distribution system within the state and region. Producers of other commodities including dairy, livestock, ornamentals and fruit are diversifying by growing more vegetable crops. Season extension and long term storage have expanded to meet growing demand for local food throughout the winter months, bringing a need for new production and storage technologies and new markets.

Sustainable vegetable production requires new solutions to problems of cropping systems and rotations, crop nutrition, soil health, water use and conservation, energy sources and needs and pest management. As Massachusetts undergoes cultural, economic and climactic changes, both new and established growers must learn to use practices that are environmentally and socially sustainable, and to adapt cropping systems to new market opportunities in Massachusetts. The Sustainable Vegetable Management project will undertake research and extension to address key problems and opportunities facing the industry and the public.

Activity Summary – 2019

- Articles and Factsheets written by Vegetable Program staff (18)
- Grants submitted/awarded (5)
- New England Vegetable Management Guide - Print version (28)
- On farm consultations (190)
- Regional Pest Scouting Network (43)
- Research Trials (8)
- UMass Vegetable and New England Vegetable Management Guide Website (9837)
- Educational Programs and Presentations (44)
- Vegetable Notes Newsletter (24)

Grants Awarded:

Principle Investigator Scheufele, Susan:

- Patel, Jaimin (PI) and Scheufele (Co-PI). NE-SARE Novel Approaches. $5,000. 3/1/2019-2022. "Nighttime application of ultraviolet light before and after infection for control of cucumber downy mildew."--FUNDED
- Frost, Edmund (PI) and Scheufele (Co-PI). Organic Farming Research Foundation. $6,000. 3/1/2019-8/31/2020. "Development and Assessment of Bacterial Wilt and Downy Mildew Resistant Cucumber Seedstocks – Year Two."--FUNDED
- Scheufele, Susan (PI). NEVBGA and Johnny's Seeds. $3,500. "Evaluating cucumber cultivars for downy mildew resistance in the field."—FUNDED
- Scheufele, Susan (PI). NE-SARE R&E. $90,000. 3/1/2020-12/31/2022. "Improving Production and Profitability of Winter-Grown Spinach in the Northeast."
- Scheufele, Susan (PI). MA-SCBG. $84,000. 10/1/19-9/31/22. "Increasing production of MA-grown winter greens by improving grower access to high quality resistant varieties."—NOT FUNDED

- Gift: New England Vegetable and Berry Grower's Association. Title: *Evaluating Varieties for Cucurbit Downy Mildew Resistance and Yield*, Total Award: *$2,000*

Principle Investigator Hilary Sandler

- Prime Sponsor: Nat'l Institute of Food and Agriculture (NIFA) *Supporting IPM on Diverse Massachusetts Farms through the Integration of Applied Research and Extension Outreach*Total Award: $857,427.00 Expiration: 8/31/2020

Collaborations:

- SARE – Katie Campbell-Nelson serves as state coordinator and helps applicants submit successful grant proposals.
- MDAR – We worked with MDAR staff to provide educational programming on Nutrient Management and Food Safety.
- SEMAP, NEVBGA, NRCS, CRAFT, Master Gardeners, NOFA, MA Horticultural Society, Cornell Cooperative Extension, New Entry, CISA, Berkshire Grown, Harvest New England, Kimball Fruit Farm, Langwater Farm, and Ward's Berry Farm we gave presentations at workshops and conferences hosted by these farms and agricultural organizations at multiple locations around the region.

Services: We treated seeds for 6 farms this year from ID, MA, and VT through our Hot Water Seed Treatment service. We submitted 105 soil and tissue tests to the UMass Soil Lab and submitted 47 plant samples to the UMass Diagnostic lab on behalf of farmers to provide valuable diagnostic support.

Total Educational contacts

Direct	11829
Indirect Contacts (Print, Web, etc…)	14025

Narrative Summary and Impact

The UMass Extension Vegetable Program delivers research-based educational programming and conducts applied research to meet the needs of vegetable farmers statewide and to enhance the economic, human, and environmental health and sustainability of the vegetable industry in Massachusetts. This year was a time of transition for our team, with several important personnel changes and unforeseen absences, yet we still maintained a broad range of projects and activities and even increased our output in several key areas. Our team started the year by gaining a fourth educator, Genevieve Higgins, who had served as an administrative and research assistant for four years prior. In April, Lisa McKeag went on an extended family medical leave through August, and in September our team leader, Katie Campbell-Nelson resigned to take a position with Northeast SARE as their Professional Development Program coordinator. Despite these changes, we continued to deliver effective educational programs, publish our weekly newsletter, conduct a record setting number of research trials and make a record setting number of on-farm consultations. Our success this year was due in part to hiring a record number of summer field assistants (3), who made weekly scouting visits to help us increase our state-wide coverage of farms and helped with managing crops and collecting data in our research trials. This year we made an attempt to do more community engagement, getting more stakeholders, consumers, and students to learn about UMass Extension and research activities happening at the UMass Crop and Animal Research and Education Center in South Deerfield, MA.

Below are outlined several key outcomes and accomplishments from the last year.

Education

190 on-farm consultations were provided to 22 farms over the 2019 growing season by 5 Vegetable Program Staff. That's an increase of two farms and 70 on-farm consultations compared to last year. At least 22 growers adopted new IPM practices this year as a result of working with our team through the EIP Mentor Farm Program. We also responded to stakeholder requests for assistance by phone and email, sometimes making follow-up visits but we do not have numbers to report this year—we hope to track these next year.

We **organized workshops or gave presentations** at 45 educational programs and workshops were given for 1,382 growers and agricultural service providers. Of these meetings, three were on-farm Twilight Meetings organized by the Vegetable Program including: High Tunnel Management in Berlin, MA (35 growers attending); Research Tour in South Deerfield, MA (45 growers and ag service providers attending); and Pest and Pets in the Packhouse in Amherst, MA (31 growers and ag service providers attending). At least 71 growers increased their knowledge of IPM practices as a result of direct contact at educational programs, and 100% of people who attended our 45 educational programs and completed evaluations reported that they increased knowledge in IPM topics.

165 growers attended **food safety trainings** delivered by Lisa McKeag and Mike Botehlo from MDAR and 154 of those received Produce Safety Alliance Grower Training Certificate. *This certification allows growers to meet their training requirement under the federal Food Safety Modernization Act.* Comments from program evaluations were strongly favorable and included such comments as: “Very knowledgeable trainers. Kept it interesting and didn’t lose my attention. Leaving here much more confident and informed in food safety. Job well done.” “Loved the format, engaging.” “Presenters were down-to-earth and clear. Great preparation.” “Very practical.”

We also organized a “**Vegetable Winter School**” this year, consisting of 5 full-day workshops held on the UMass Amherst campus to address important crop and farm management topics in-depth. We had 64 attendees and generated $1,590 in revenue. >90% of attendees said they would like to attend similar events in future. 100% of attendees increased their knowledge of IPM, crop production, and food safety topics, and these quotes on lessons learned from program evaluations demonstrate the clear understanding of key principles that growers took away from these workshops: “IPM plan - make and use it to be better prepared in the season.” “Soil testing and soil health management is not as intimidating as it appears.” “Nicely organized. Good mix of classroom and hands-on work.” “IPM concepts and the overwhelming need to assess crop insect population early and frequently.” “Scout and keep records to analyze and help make better decisions outside of the season.” “Pay more attention to timing of pesticide applications based on life cycles.”

This year we learned to organize and publish webinars, and hosted **5 webinars** on Brassica pest management with collaborators in NH, NY, and CT reaching 834 growers, gardeners and agricultural service providers. These are posted on our “Brassica Pest Collaborative” website and will continue to be viewed by growers, gardeners and ag service providers including Extension personnel across the Northeast region.

This year we hosted the following groups at the UMass Crop and Animal Research and Education Center in South Deerfield, MA : 4H Youth Development (10 youth and families), MA Food Policy Council (8 legislators and aides), Northeast SARE, Amherst College Learn, Explore, Activate, Participate (LEAP) Program (30 students).

Publications: The **New England Vegetable Management Guide** was edited this year by 28 Extension specialists across New England and will be re-printed and distributed to 1,300 growers and agricultural service providers across the Northeast region. UMass Extension Vegetable Program Educators Katie Campbell-Nelson and Lisa McKeag were General Editor and Production Manager, respectively. The NEVMG also exists as a website which received 9,837 unique page views between September 30, 2018-October 1, 2019.

Our newsletter, **Vegetable Notes**, is arguably our most important output every year. It delivers timely information about weather, crop production practices, pest activity, and so much more to over 2,800 commercial growers, Extension personnel, ag service providers, and home gardeners/consumers. This year, 24 issues were published, and our readership increased from <2,500 to >2,800 growers and **5 new articles** were published.

We **published 10 new factsheets** or other new resources for the website this year.

The **Vegetable Program website**, ag.umass.edu/vegetable, is another critical place for stakeholders to access a wide range of educational materials including factsheets, project outcomes, resources, and access services. According to Google Analytics, there were 213,782 page views and 178,519 unique page views originating from different machines/devices to this site between September 30, 2018-October 1, 2019. Our factsheets were accessed 192,521 times, with 161,792 of those visit originating from different machines/devices. During the reporting period from September 30, 2018 to October 1, 2019, our new "Brassica Pest Collaborative" page has 721 page views with 614 of those originating from unique machines/devices and our relatively new "Food Safety for Farmers" page has 94 views and 74 unique page views originating from different machines/devices.

Research: 8 research trials were conducted at the UMass Crop and Animal Research and Education Center, South Deerfield, MA on the following topics:

- Attracting Beneficial Insects to Reduce Cabbage Aphid Population Size (1 trial)
- Using Mulches to Reduce Flea Beetle Damage and Improve Crop Yield (3 trials)
- Beneficial Nematodes to Reduce Flea Beetle Population Size (1 trial)
- Evaluating Varieties for Cucurbit Downy Mildew Resistance and Yield (2 trials)
- Evaluating Varieties of Spinach for Winter-Production and Resistance to Downy Mildew (1 trial)

We published results of some of these trials on our “Brassica Pest Collaborative” Website (linked above) and others were published in the Extension journals Plant Disease Management Reports and/or Arthropod Management Tests, listed below:

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).

Scheufele, S.B., and G. Higgins., 2018. Evaluation of fungicides to reduce chlorothalonil use for powdery mildew on squash, 2018. Plant Disease Management Reports. Volume 13:081. https://www.plantmanagementnetwork.org/pub/trial/pdmr/reports/2019/V078.pdf

Scheufele, S.B., and G. Higgins., 2018. Evaluation of resistant cultivars for management of downy and powdery mildews in fall cucumbers, 2018. Volume 13: V078. https://www.plantmanagementnetwork.org/pub/trial/pdmr/reports/2019/V078.pdf

Regional Collaboration:

43 Extension educators from across the Northeast region participated in weekly pest alert calls, sharing updates about activity of common pests and getting support identifying new and uncommon pests or production issues. This information is used to inform our weekly Pest Alerts column in our newsletter, Vegetable Notes. The group also shares information by email, and helps to facilitate priority setting and collaborative, regional grant writing.

We also hosted the SARE Summer Tour, bringing 75 SARE staff and agricultural service providers and Extension staff from across the Northeast region to visit the UMass Crop and Animal Research and Education Center, South Deerfield, MA to see current research there as well as learn about agriculture in MA by visiting other farms and ag businesses across the state.

This year, we participated in regional planning resulting in generation of new IPM priorities for Vegetables and Fruit in the Northeast. These priorities can now be referenced for use in grant-writing and policy-making initiatives.

Program Sustainability

Professional Development: Our team is dedicated to professional development and supporting staff to continue to pursue expertise. Through our state SARE Professional Development Program, Katei Campbell-Nelson organized 6 SARE Professional Development Workshops with 15 Extension staff attending on topics such as making videos, creating effective evaluations, facilitating group discussion and more. Participants had access to financial support to attend conferences, trainings, bring in experts from outside the state to conduct trainings, and more.

Fundraising: We raised $8,750 in sponsorships and $1,700 in donations this year, an increase of 15% and 78%, respectively, compared to our fundraising levels last year.

Collaborating Organizations

- **South Eastern Massachusetts Agricultural Partnerships SEMAP**
- **New England Vegetable and Berry Growers Association NEVBGA**
- **Massachusetts Department of Agricultural Resources MDAR**
- **Master Gardener Association**
- **Northeast Organic Farming Association NOFA**
- **Sustainable Agriculture Research and Education SARE**
- **Farm Service Agency FSA**
- **Natural Resources Conservation Service NRCS**
- **Massachusetts Farm Bureau**
- **Northeast Vegetable Extension Programs, ME. NH. VT. CT. RI. NY.**