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, adaptation 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.

Our team of Extension Educators includes: Katie Campbell-Nelson (Nutrient Management and Team Leader), Lisa McKeag (food safety and New England Vegetable Management Guide co-editor) and Susan Scheufele (plant pathology and applied researcher). Lisa obtained lead trainer status from the Produce Safety Alliance this year and has been travelling around New England providing valuable and required training to producers in preparation for implementation of the Food Safety and Modernization Act. Katie organized Vegetable Winter School and conducted 6 on-farm trials on nitrogen from cover crop this year. Sue has completed a second year of data collection and expanded her research this year to tackle growers questions about cabbage aphid, brassica disease and cucurbit downy mildew management. We were greatly supported by departmental assistants Annalisa Flynn, Genevieve Higgins and Michele Meder this year, without whom we would still be out in the fields shivering and counting aphids, unable to keep up with grower needs!
Activity Summary – 2017

- Plant Disease Management Reports (2)
- Grant Submissions and Awards (5)
- On-site consultations (120)
- Phone/email consultation (30)
- Regional Pest Scouting Network (24)
- Research Trials (7)
- Food Safety for Farmers Website (1)
- Food Safety for Farmers Interactive Flowchart created (1)
- Vegetable Notes Newsletter (24)

Total Educational contacts

<table>
<thead>
<tr>
<th>In person and through</th>
<th>1985</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect Contacts (Print, Web, etc...)</td>
<td>11829</td>
</tr>
</tbody>
</table>

Narrative Summary and Impact

Impact Highlights

Our team of Extension Educators includes: Katie Campbell-Nelson (nutrient management and team leader), Genevieve Higgins (field technician and program support), Lisa McKeag (food safety) and Susan Scheufele (plant pathology and applied research). As a lead trainer with the Produce Safety Alliance, Lisa McKeag has trained 172 farmers this year and began a graduate program in Food and Agricultural Policy. Her educational pursuits have already greatly informed our work! Genevieve Higgins has been tracking spinach and lettuce downy mildews across Massachusetts and is now managing a spinach research trial with downy mildew resistant varieties. She also developed a top-notch ‘Food Safety for Farmers’ website. Katie will be the general editor of the 2020-2021 New England Vegetable Management Guide, and conducted a high tunnel soil survey in MA as part of a New England regional survey. Sue broke her personal record and conducted 6 research trials this summer on management of cabbage aphid, brassica flea beetle, cucurbit downy mildew, and reduced risk pesticides for protecting pollinators in butternut! Sue also launched the Brassica Pest Collaborative with researchers from UNH, UConn, and Cornell and received an award from World Farmers for Supporter of the Year. We were greatly supported by departmental assistants Avi Flynn and Michele Meder. Avi scouted on farms across the state this summer while also managing our pest trapping network, and made the beautiful pest alert maps you saw this year in Vegetable Notes. Michele was our summer field assistant – she did the tractor work to keep our research plots weed-free all summer, kept us geared up and well prepared to collect data, and kept us well-nourished with her mean pies. Following is a report of our activities and impacts this past year.
Impacts:

- 144 people who attended our educational programs and completed evaluations reported that they were confident in implementing a new practice.
- 173 people who attended our educational programs and completed evaluations reported a gain in knowledge.
- 20 Agricultural Extension Educators participated in a professional development program and 11 reported using information they gained in outreach to the farmers they work with.
- We completed construction of a 30’x96’ high tunnel at the UMass Research Farm for conducting trials in.

Research Trials: Project Director Susan Scheufele:

Location: UMass Crop and Animal Research and Education Center, South Deerfield, MA.

- Attracting Beneficial Insects to Reduce Cabbage Aphid Population Size
- Using Mulches to Reduce Flea Beetle Damage and Improve Crop Yield
- Beneficial Nematodes to Reduce Flea Beetle Population Size
- Evaluating Varieties for Cucurbit Downy Mildew Resistance and Yield
- Reduced Risk Fungicides for Pollinator Protection in Cucurbits

Project Director Katie Campbell-Nelson:

- New England High Tunnel Soil Survey. Locations: 5 farms in MA, plus 13 farms in VT, NH and RI.

Grants Awarded:

Principle Investigator Katie Campbell-Nelson

- Prime Sponsor: Nat'l Institute of Food and Agriculture (NIFA) (NESARE), Title: 2018-2020 NESARE MA Professional Development and Outreach Program, Total Award: $60,000, Expiration: 9/30/2020
- Prime Sponsor: Nat'l Institute of Food and Agriculture (NIFA) (USDA), Title: Massachusetts Vegetable Scouting Network, Total Award: $80,000, Expiration: 12/31/2019

Principle Investigator Lisa McKeag

- Prime Sponsor: Food and Drug Administration (FDA), Title: Massachusetts Department of Agricultural Resources Interdepartmental Service Agreement, Total Award: $146,000, Expiration: 6/30/2021
Principle Investigator Susan Scheufele:

- 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.

**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.