CORNELL VEGETABLE PROGRAM SPECIALISTS PROVIDE educational programs and information to growers, processors and agribusiness professionals, empowering them with the knowledge to profitably produce and market safe and healthful vegetable crops, contributing to the viability of farms and the economic wellbeing of New York State.
The Cornell Vegetable Program, a Cornell Cooperative Extension regional agriculture team, serves the vegetable, greenhouse, potato and dry bean industries in a 13-county region of New York.

This region accounts for more than half the acres of the New York vegetable industry, with 1,017 vegetable farms and an estimated farm gate value of more than $250 million.

EXTENDING SOIL SUSTAINABILITY IN SEASON EXTENSION: CORNELL VEGETABLE PROGRAM (CVP) LEADING THE WAY TOWARDS FARM PROFITABILITY

High tunnels (soil based greenhouses) have been adopted by New York vegetable farmers to increase yields, quality and market window of crops such as tomatoes, peppers, cucumbers and greens. However, meeting the nitrogen demand of these high yielding crops requires high input levels of compost and fertilizer. Without crop rotation or precipitation inside the structure, soil levels of nutrients such as phosphorus, calcium, magnesium and pH become excessive and decrease yields. This often leads to even greater fertilizer application, decreased yield and profitability for the farmer.

A collaboration between CVP, the Cornell Student Organic Farm, and NOFA-NY resulted in a $10,000 award from the Towards Sustainability Foundation. The project team worked closely with 10 high tunnel operators across Central and Western New York, educated farmers and students, and provided technical assistance in managing soil health in high tunnels for long term productivity. At these farms a total of 20 soil tests and 80 foliar tests were performed, and it was documented that 7 of the 10 farms regularly exceeded recommended soil nutrient levels, often by more than 150%. These excess levels not only indicated a challenge in environmental, but also financial sustainability. Phosphorus, calcium and magnesium from fertilizers build up over time and interfere with uptake of other nutrients, such as potassium. Alkaline irrigation water and fertilizers cause soil pH to rise, limiting micronutrient availability, such as manganese. The CVP worked closely with growers to analyze and respond to the results, focusing on reducing phosphorus and calcium inputs and better supplying the crop with sufficient nutrition.

This approach reduced excess nutrient application in high tunnel soils and led to improved net profitability as input costs decreased and yields increased. The participating growers improved sustainability by optimizing fertilizer inputs, balancing macro-nutrients, decreasing compaction, increasing organic matter levels and other related parameters through the implementation of soil best management practices. After participating in this project, net high tunnel income increased by an average of $1556.61, for an average increase of 26.9%.
NEW PEST OBSERVATION TOOL AVAILABLE FOR THE NEW YORK VEGETABLE INDUSTRY

A new resource focusing on the distribution of pests – pathogens, insects, and weeds – throughout New York and the United States is available for the vegetable industry. The Integrated Pest Information Platform for Extension and Education (iPiPE) is a national program working to enhance integrated pest management (IPM) and food security. The main idea of this platform is to recruit growers and their consultants to submit pest sightings into a database for local and national historical data for a variety of pests. These records can then be used for forecasting future pest occurrences, thus aiding researchers, extension agents, growers and their consultants.

Cornell Vegetable Program Specialist Darcy Telenko is the Crop Pest Program Coordinator for vegetables in New York. During the last two summers, four student interns have assisted Darcy in scouting fresh market vegetable crops on 23 farms and logging over 300 pest observations into iPiPE. This data was used to develop interactive tools to share pest observations, risk maps, and commentary for the vegetable crop pest portion of the iPiPE program. To learn more about iPiPE, or to sign up as a participant, visit IPIPE.ORG.

TESTING DRONES FOR THE MANAGEMENT OF PLANT DISEASE

White mold disease, caused by the fungus *Sclerotinia sclerotiorum*, regularly reduces the profitability of New York’s $80+ million green and wax bean industry. When favorable environmental conditions exist, spores of the fungus infect bean flowers, which may then spread to the pods and foliage. Currently, the disease is managed by application of a protectant fungicide during a narrow window of flowering. Cornell Vegetable Program Specialist, Julie Kikkert, and Cornell University Vegetable Pathologist, Sarah Pethybridge, have partnered with scientists from the Rochester Institute of Technology (RIT) Center for Imaging Sciences to investigate use of digital imaging for improved disease management in snap beans. This year, the team tested the use of drones fitted with multiple types of sensors to determine spectral changes at the onset and progression of flowering in snap beans. This would allow for more well-timed applications of fungicides, critical for disease management. The two-year project also includes the study of disease risk factors, and is funded by a grant from the USDA NIFA Critical Agricultural Research and Extension Grants Program.

RESEARCHING BMPs FOR CLEANING VEGETABLE WASH EQUIPMENT

Given the demand for farmers to reduce the risk of microbial contamination in all aspects of vegetable farming, it is necessary to develop best management practices (BMPs) for efficiently and effectively cleaning vegetable washing equipment. Many of the pieces of wash equipment being used by farmers were designed a half century ago, with a focus on cleaning the vegetables, not on cleaning the equipment itself. The Cornell Vegetable Program (CVP) is conducting a research project, funded by the Northeast Center for the Advancement of Food Safety, to assess current practices of cleaning wash equipment and to develop standard operating procedures for farmers to follow. The CVP is observing where vegetable debris commonly gets distributed within the machines, what happens when the equipment is rinsed and where does the rinse water move the debris to, and how to effectively reach and clean inaccessible parts of the equipment. UV light is being used to locate contamination hidden within the wash equipment. Our BMPs will be reported during upcoming workshops. The next phase of research determine how to sanitize the equipment after cleaning it.

2,373 Farm visits and crop consultations made by the Cornell Vegetable Program team

124 Educational meetings and presentations given by Cornell Vegetable Program Specialists

5,444 People increased their knowledge by attending presentations given by the Cornell Vegetable Program

Photo courtesy of R.I.T.
Research Grants

Funding received October 2016 – September 2017

BEETS
Organic Management of Cercospora Leaf Spot in Table Beets, Cornell Towards Sustainability Foundation, (Kikkert, Pethybridge), $10,000, 2/1/17- 12/31/17
Know Your Enemy! Identification of Plant-pathogenic Fungi Associated with Root Decay on Table Beet, NY Veg Research Association (Processing), (Pethybridge, Kikkert), $17,418, 4/1/17- 3/31/18
Optimizing the Use of Aprovia Top for Management of Cercospora Leaf Spot in Table Beet, NY Veg Research Association (Processing), (Pethybridge, Kikkert), $13,143, 4/1/17- 3/31/18
Novel Seed Treatments for Early Disease Control and Increased Profitability of the Table Beet Industry in New York, New York State Specialty Crops Block Grant, (Pethybridge, Taylor, Kikkert), $99,834, 10/1/17- 9/30/19

CABBAGE & COLE CROPS
Evaluating New Herbicides for Potential Registration in Transplanted Cabbage, NY Cabbage Research and Development Program (CRDP), (Telenko, Hoepting), $8,909, 4/1/17- 3/31/18
Prevention of Brassica Crop Losses from New Invasive Species, Swede Midge on At-Risk Small-Scale Organic Farms: Part III, Cornell Towards Sustainability Foundation, (Hoepting), $10,000, 1/1/17- 12/31/17
Use of Nitrogen Dynamics in Cabbage (Part IV): Use of Nitrogen Stabilizers, Continued, CRDP, (Hoepting), $6,000, 4/1/17- 3/31/18

DRY BEANS
Towards a Durable Management Strategy for White Mold in Dry Beans in New York, NY Dry Bean Endowment, (Pethybridge, Kikkert), $9,000, 4/1/17- 3/31/18

HIGH TUNNEL
Continuing Best Management Practices for Long Term High Tunnel Soil Sustainability, Cornell Towards Sustainability Foundation, (Reid), $10,000, 4/1/17 - 3/31/18
Advancing Veg Production in NNY 2017, NNY Agricultural Development Program (NNYADP), (Ivy, Reid), $5,016, 1/1/17-12/31/17
Nitrogen Dynamics and Yield Response to Minimal Supplemental Heating in High Tunnel Winter Production, Northeast Sustainable Agriculture Research and Education (NESARE), (Grundberg, Reid), $5,500, 2/1/17 - 12/31/18

ONIONS
Weed Management in Muck-Grown Onions, NY Onion Research and Development Program (ORDP), (Hoepting), $10,000, 4/1/17- 3/31/18
Evaluation of Fungicides for Soilborne Diseases in Muck-Grown Direct Seeded Onions, ORDP, (Hoepting), $8,000, 4/1/17- 3/31/18
Trials to Reduce Onion Rot, New York Farm Viability Institute (NYFVI), (Beer, Hoepting, Bonasera, Asselin), $119,715, 4/1/17- 3/31/18
Performance of Fomesafen on Dry Bulb Onion, Inter-region 4 (IR-4), (Hoepting), $5,000, 9/1/17 - 8/31/18

SNAP BEANS
Optimizing the Fungicide-Based Management of White Mold in Two Varieties of Snap Bean, NY Veg Research Association (Processing), (Pethybridge, Kikkert), $20,857, 4/1/17- 3/31/18

GENERAL / OTHER
Weed Science Program, Cornell Horticulture section, (Telenko), $2,000, 12/16/16
Developing BMPs on Cleaning Produce Wash Equipment and Delivering Training to Growers, Northeast Center for Advancement of Food Safety, (Hadad), $15,000, 3/1/17 - 2/28/18
Climate Smart Farming Extension Team, Smith Lever, (Telenko), $6,000, 1/1/17- 12/31/17
Evaluation and Demonstration of Integrated Disease and Weed Management Options for Organic Vegetable Production: Year Two, Cornell Towards Sustainability Foundation, (Telenko, Reid, Hadad), $10,000, 3/1/17 - 2/28/18
Application of Electromagnetic Conductivity Measurements for Precision Agriculture for NYS Vegetable Growers, New York Farm Viability Institute (NYFVI), (Oware- Univ. at Buffalo, Telenko), $84,840, 4/1/17- 3/31/19
Onions are one of the most valuable vegetable crops grown in New York with an average value of $34.6 million. With over 232 million pounds of onions produced, New York accounts for 97% of the production in the northeastern United States and ranks fifth in the Nation. Seventy-four hundred acres of onions are produced on 73 farms, in organically rich muck soils where production practices are unique and intensive. Cornell University and Cornell Cooperative Extension have guided muck onion production in New York for over 100 years. In recent years, Cornell Vegetable Program (CVP) Onion Specialist, Christy Hoepting has been leading the charge in developing novel research-based management strategies for controlling weeds and leaf diseases, and has been instrumental in grower adoption of integrated pest management practices.

Christy’s unique brand of Extension revolves around conducting on-farm research trials to identify solutions to muck onion growers’ pest management challenges under real-world conditions, which gives growers confidence in her results. In the last 5 years, Hoepting has successfully acquired over $226,000 in grant funds and has conducted over 50 on-farm research trials in just weed science and plant pathology alone. But she does not do it alone; Hoepting relies on a team of CVP technicians to assist her and she collaborates with dozens of colleagues from Cornell, CCE, other Universities and private industries.

Onions are very poor competitors against weeds. Herbicide use is a critical first line of defense to manage weeds in large-scale muck onion production. Any weeds that escape the standard herbicide program are hand-weeded costing growers $100- $500 per acre. Research by the CVP has led to:

• Fall use of Dual Magnum® is now labeled for control of yellow nutsedge in onion and is fully integrated into muck onion production with 1,000 acres being treated annually.
• An effective management strategy for perennial sowthistle has been developed. At its worst, this weed cost $500,000 to $675,000 in labor to hand weed 800 acres of infested muck fields in Elba in 2013. Through field trials, Hoepting optimized the use of Stinger® herbicide to provide effective control of perennial sowthistle without harming the onion crop. She worked closely with the IR-4 program and the manufacturer of Stinger to acquire herbicide labelling for this use in onion.
• Previously underutilized herbicide Chateau® has become a standard component of the muck onion herbicide program in New York thanks to Hoepting’s extensive research and demonstration of its optimal use and crop safety.

For disease management, the CVP onion program has focused on developing management strategies for a new onion leaf disease, Stemphylium leaf blight (SLB), a serious disease of onion which was first realized in New York in 2013. Hoepting identified the most effective fungicides for SLB control and discovered that controlling SLB was absolutely critical when managing a downy mildew (DM)-SLB complex. In her trials, effective fungicide programs resulted in 33% yield increase over untreated controls, a value of $1770 per acre in increased revenue. The American Phytopathological Society published the results from these fungicide trials in eight peer-reviewed research reports.

To reduce fungicide resistance and preserve their useful longevity, an educational program was developed by Hoepting’s team nicknamed “spray by number for fungicide resistance”. For simplicity, it uses fungicide resistance numbers instead of their complicated names, includes the popular fungicide “Cheat Sheet” as a resource and is accompanied by newsletter articles and Hoepting’s guidance on a weekly basis through the team’s onion scouting program. Today, onion growers proudly know which resistance groups different fungicide products belong to and how many sprays they may make before rotating to a different resistance group. In 2017, out of the 174 individual fungicide applications made in 20 spray programs representing the majority of CVP onion acreage, an outstanding 99% followed rotation restrictions and maximum use rates for best fungicide resistance management practices.

Christy works tirelessly as both a researcher and educator to bring growers the information they need to make informed and effective disease, pest, and weed control decisions... I consider us very fortunate to have her based in our area.

– Matt Mortellaro, Mortellaro & Sons
Generous Support

Without the financial and in-kind donations by area vegetable producers and agribusinesses, the Cornell Vegetable Program could not offer the level of support that we provide to the New York vegetable industry. Thank you!

IN-KIND DONATIONS

A. Sam Farms, Esau Sam – Minimizing Wildlife Impact in Vegetables
Agrinetix, Rich Wildman, Josh Cawley – Snap Bean UAV Project
Allen Zimmerman – twilight meeting host and speaker
Amon Zimmerman – garlic project
Amos Zittel & Sons, David Zittel – Minimizing Wildlife Impact in Vegetables; Application of Electromagnetic Conductivity Measurements for Precision Agriculture; disease research trial support; Sweet Corn Pheromone Trap Network
Andy Miller – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
BASF – product for research trials
Bayer – product for research trials
Bejo Seeds – seed for research trials
Blowers Farm, Tim Blowers, Earl Blowers – Western Bean Cutworm Survey
Blue Heron Farm – Swede Midge Project
Buzz’s Garden, James Cagle – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Canticle Farm, Mark Printz – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health; Swede Midge Project
Clearview Farm, Kurt Forman – garlic disease trial; Developing BMPs on Cleaning Produce Wash Equipment
Crop Advantage, Don Sweet – beet research projects
CY Farms, Christian Yunker, Chuck Barie, Emma Long – onion disease management trials; precision ag position selection committee
DelMar Farms, Cal Winkstern – beet research projects
Dewey Produce, Mark Dewey, Kim Dewey, Nate Dewey – beet research projects
Dilmun Hill Student Farm, Betsy Leonard – BMPs for Long Term High Tunnel Soil Sustainability
DiSalvo Farms, Joe DiSalvo Jr. – trials to reduce onion rot
DuPont – product for research trials
Duysen Farms, Bob Duysen, Dan Duysen – Western Bean Cutworm Survey
Farm Fresh First, Mike Gardinier, Buzz Lowe, Roger Ward, Steve Lashbrook, Mike Lynch – processing crop research; Snap Bean UAV Project
Fellenz Family Farm, Andy Fellenz – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health; beet research projects
Floyd Zimmerman – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Fraser’s Garlic Farm, Ed Fraser – garlic quality improvement
Fresh Ayr Farm, George Ayres – Sweet Corn Pheromone Trap Network
Gianetto Farms, Nick Gianetto – trials to reduce onion rot
Goodman Farms – pickle variety trial
Growing Family Farms, Paul Loomis – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Growmark FS – product for research trials
Happencance Farm, Jamie Snyder – Advancing Season Extension
Harrington’s Produce, Andy Harrington – Management of Fusarium Disease in Garlic
Harvey Leid – produce auction grower meeting speaker
Henry W. Agle & Sons, David Agle – Minimizing Wildlife Impact in Vegetables
Howard Hoover – tour host and speaker
Hurtgam Farms, Jeff Hurtgam – Application of Electromagnetic Conductivity Measurements for Precision Agriculture for NYS Vegetable Growers; Sweet Corn Pheromone Trap Network
Jacob Hostetler – twilight meeting host and speaker
Jeff Decker – onion weed management trials
Joel Weaver – Advancing Season Extension
John Dunsmoor Farms, John Dunsmoor – onion weed management trials; twilight meeting host
John Stoltzfus – produce auction grower meeting speaker
Johnson Potato Farms, Eric Johnson, Jack Johnson – trials to reduce onion rot
Jonas Yoder – produce auction grower meeting speaker
Journey’s End, Beth Drouhard – Advancing Season Extension
Julia Shirk – Advancing Season Extension
Ken Heinlein – garlic project
Kirby’s Farm Market, Tim Kirby, Chad Kirby – Eastern Broccoli Project; BMPs for Long Term High Tunnel Soil Sustainability; beet research projects
Kludt Brothers, Phil Kludt, Mike Kludt, Gary Kludt – beet research projects
Kreher’s Poultry Farm, Mike Kreher, Brett Kreher, Vaughn Gingerich, Josh Jurs, Peter Martin – beet research projects
L. Art Christensen Farm, Larry Christensen – Sweet Corn Pheromone Trap Network
L-Brooke Farm, R. B. Glazier, Grady Vincent, Patty Dills – beet research projects
Levi Esh – twilight meeting host and speaker
Maple Lane Produce, Nelson Hoover – grafting trial; BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Maple Ridge, Phil Mommeson – Advancing Season Extension
Michael Zimmerman – twilight meeting host and speaker
Monroe Tractor, Seth Conway – precision ag position selection committee
Morgan Brothers Farm, Mark Morgan – Western Bean Cutworm Survey
IN-KIND DONATIONS (continued)

Mortellaro & Sons, Matt Mortellaro – onion disease management trials
Muddy Fingers, Matthew and Liz Martin – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
My-T Acres, Peter Call, Jason Gaylord – beet research projects
Nathaniel Hoover – Advancing Season Extension
Native Offerings Farm, Stew and Deb Ritchie – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Nichols Farm – Sweet Corn Pheromone Trap Network
Northern Orchards, Jesse Mulberry – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
New York Bean, John McCreedy – Dry Bean White Mold Management Project
Obercreek Farm, Tim Heuer, Sam Wildfong – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Partridge’s On the Farm Market, Donald Partridge – CVP Demo Site (Batavia)
Poughkeepsie Farm Project, Leon Vehaba – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
R. L. Jeffres, James Barrett – beet research project
Remembrance Farm, Nathaniel Thompson – graduate student farm tour
Rich Campanile – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Roman Yoder – produce auction grower meeting speaker
Rose Valley Farm, David Stern – garlic project
Rusty Plough, Oleh and Nadia Maczaj – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
S. J. Starowitz Farms, Steve Starowitz – Evaluation of Nitrogen Stabilizers in Summer Cabbage
Seedfolk City Farm, Lisa Barker – Advancing Season Extension
Seedway – seed for research trials
Seneca Foods, Jeff Johnson, Jay Westfall – beet research projects; Snap Bean UAV Project
Siegers Seed – seed for research trials
Slack Hollow Farm, Seth Jacobs, Martha Johnson – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Star Growers, Leo Starowitz Jr. – trials to reduce onion rot
The Berry Patch, Dale Ila Riggs – Advancing Season Extension
Tom Szulist – garlic project
Torrey Farms/Big O, Max Torrey – onion disease management trials
Triple G Farms, Guy Smith – onion disease and weed management trials
W. D. Henry & Sons, Dan Henry – Minimizing Wildlife Impact in Vegetables; Application of Electromagnetic Conductivity Measurements for Precision Agriculture
Wegmans Organic Research Farm, Drew Smith – BMPs for Long Term Profitable High Tunnel Soil Fertility and Health
Werner Farms/Harris Seeds, Jeff Werner – produce auction grower meetings speaker
Williams Farms, John Williams – Cornell Potato Variety Trial
Woodcrest, Jeff King – Advancing Season Extension

134,222
Dollars received in newly funded grants to support vegetable research in our region*

92
Farms and organizations offered land, labor, and supplies to support Cornell Vegetable Program research trials and events

675
Pounds of tomatoes, cucumbers, and sweet corn harvested from Cornell Vegetable Program research plots was donated to the Forestville Food Pantry in Forestville and the United Methodist Missionary in Batavia

CONTRIBUTIONS
Abram G Moll Farms, Abram Moll
Ayers & Gillette, LLC, Thomas Ayers
Bob-Mar Farms, Phillip White
Bowman Farms, Larry Bowman
Breslawski Farms, Nicholas Breslawski
Bruce Reed
Fisher Hill Farm, Phillip Munson
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Sam Kostarellis
Samuel R. Hoover
Spoth’s Farm Market, Kevin and Edward Spoth
Toboggan Hill Farm, Mike and Donna Eisenstat
Vacco Farms, Carmen Vacco
Weiss Farms, Anthony Weiss

* some are multi-year projects

To make a donation to support the Cornell Vegetable Program, visit HTTP://CVP.CCE.CORNELL.EDU/DONATION_INVOICE_PAYMENT.PHP
About

Cornell Cooperative Extension regional Vegetable Specialists work together with Cornell faculty and Extension Educators statewide to address the issues that impact the New York vegetable industry. The regional teams offer educational programs and information to growers, processors and agribusiness professionals.

PRODUCE AND MARKET SAFE AND HEALTHFUL CROPS

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ROBERT HADAD, Vegetable Specialist
food safety & quality, organic, business & marketing, and fresh market vegetables  |  585-739-4065 cell  |  rgh26@cornell.edu

CHRISTY HOEPTING, Vegetable Specialist
onions, cabbage, broccoli, garlic, and pesticide management  |  585-721-6953 cell  |  585-798-4265 x38 office  |  cah59@cornell.edu

JULIE KIKKERT, Vegetable Specialist, Team Leader
processing crops, dry beans, and interim potato contact  |  585-313-8160 cell  |  585-394-3977 x404 office  |  jrk2@cornell.edu

JUDSON REID, Vegetable Specialist
greenhouse production, produce auctions, and fresh market vegetables  |  585-313-8912 cell  |  315-536-5123 office  |  jer11@cornell.edu

DARCY TELENKO, Vegetable Specialist
weed science, soil health, climate change resiliency, and fresh market vegetables  |  716-697-4965 cell  |  dep10@cornell.edu

AMY CELENTANO, JOHN GIBBONS, AUDREY KLEIN, CORDELIA MACHANOFF, Program Assistants

ANGELA PARR, Administrative & Communications Lead

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