CORNELL COOPERATIVE EXTENSION

CORNELL VEGETABLE PROGRAM

Re•view 2017

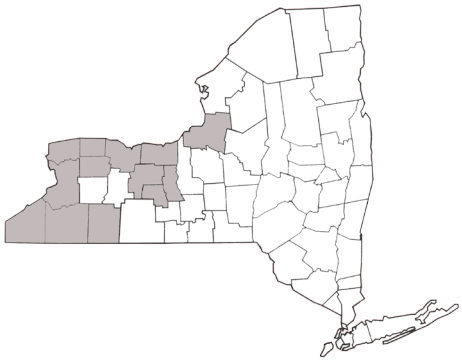
KNOWLEDGE IS POWER

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.

CORNELL UNIVERSITY FOUNDED A.D. 1865

Highlights



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%.

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

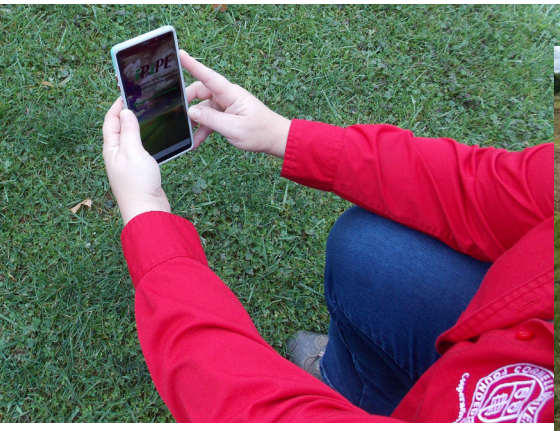
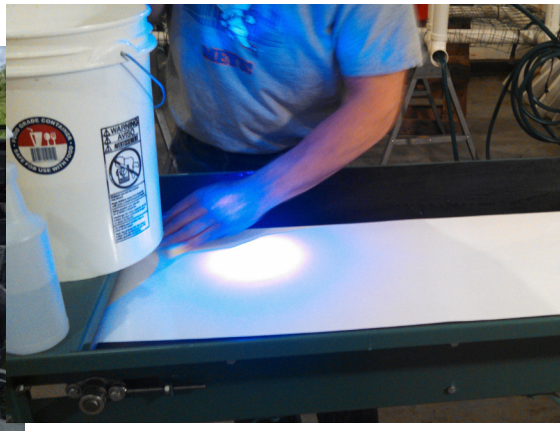


Photo courtesy of R.I.T.



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.

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

Transforming White Mold Management in Snap Bean Using Remote Sensing Via Unmanned Aerial Systems, USDA AFRI Critical Agricultural Research and Extension (CARE) Program, (Pethybridge, van Aardt, Salvaggio, Kikkert), $299,692, 2/1/17- 8/31/18

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

> 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

ON TOP OF MUCK ONION PRODUCTION IN NEW YORK

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.

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

Duyssen Farms, Bob Duyssen, Dan Duyssen – 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

Happenchance 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

Joe Bezon & Sons, Jim Vogt – Evaluation of Bicyclopyrone for Crop Tolerance on Muck-Grown Direct Seeded Onions

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

50

Research grants and projects managed by the Cornell Vegetable Program*

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 2 (UM2) 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
Henry W. Agle & Sons, James and William Agle
Kreher's Poultry Farm, Brett Kreher
Mortensen Farm, Karl Mortensen
Root Brothers Farms, Robin and R. Scott Root
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

PEST MANAGEMENT

VARIETY EVALUATION

CULTURAL PRACTICES

MARKET DEVELOPMENT

FARM FOOD SAFETY

TRUSTED SOURCE FOR RESEARCH-BASED KNOWLEDGE

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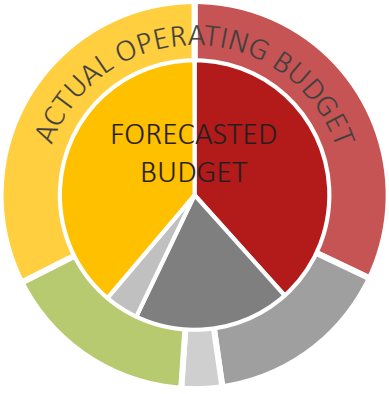
AMY CELENTANO, JOHN GIBBONS, AUDREY KLEIN, CORDELIA MACHANOFF, Program Assistants

ANGELA PARR, Administrative & Communications Lead

2017 OPERATING BUDGET



- Supporting County Association Shares, $262,166
- Cornell University Federal Funds[1], $128,000
- Harvest New York[2], $27,708
- Cornell Vegetable Program Grants and Funds[3], $265,260
- In-Kind Contributions, $134,606

[1] USDA National Institute of Food and Agriculture Smith Lever Funds
[2] New York State funds
[3] Includes funds from industry, state and federal grants, event registrations, sponsor support, and Cornell Vegetable Program reserve accounts

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