

The Cornell Vegetable Program is a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties: Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Monroe, Niagara, Ontario, Orleans, Oswego, Seneca, Steuben, Wayne and Yates in 2019.

The team of Vegetable Specialists provides educational programs and information to growers, processors and agri-business professionals, arming them with the knowledge to profitably produce and market safe and healthful vegetable crops.



Three Weeks of Broccoli!

Cornell Vegetable Program Harvests and Completes a Broccoli Variety Trial

In early September, the Cornell Vegetable Program finished their massive 0.6 acre on-farm largescale broccoli variety trial. This trial is part of the <u>Eastern Broccoli Project</u>, which seeks to develop new varieties that can tolerate the hot nights of the Eastern US and not get all stressed out and produce unmarketable heads. The Cornell Vegetable Program has been a part of this project since its inception 7 years ago.

This year, the variety trial was hosted by Bauman Farms in Webster, NY with cooperation from Farm Manager, Bob Treier. Every 3-4 days for 3 weeks straight, the Cornell Vegetable Program Onion Specialist and technicians harvested broccoli. Data (weight and culls) was collected on each and every head. This year, all of the varieties looked good and did not fall apart in the heat!







Muck Onion Growers Question Excessive Fertilizer Use After Touring Cornell Field Trials

Luxurious use of fertilizer by muck onion growers is "cheap insurance" to ensure large onions and high yields. It is a tradition passed down through generations of successful muck onion growers that is very hard to change because small-sized onions from lowered fertilizer rates is not worth the risk. Interestingly, for over a decade now, Cornell researchers have struggled to find any onion yield responses to reduced fertilizer rates in their on-farm muck trials. Undeniably, this is an indication of excessive fertilizer use in muck onion production. To capture the attention of onion growers regarding this matter, this summer the Cornell Vegetable Program Onion Specialist took 45 onion growers and allied industry representatives into their own fields to see for themselves.

At the Elba Muck Onion Twilight Meeting, participants walked through sections in a commercial field treated with standard and half rates of nitrogen, phosphorous and potash (NPK) fertilizer, and no applied NPK. When asked to guess which section had no NPK applied, growers' responses were mixed because there were no obvious visual differences among the three treatments. In disbelief during the demonstration, a grower asked the grower cooperator, *"Did you really not apply any fertilizer?"*, and he responded, *"No, I really didn't."*

Growers also viewed the Big Fat Onion Variety Nitrogen Rot Project in Elba and Oswego. For this project, eight varieties were grown with nitrogen rates of one-tenth, one-quarter and one-half of typical grower rates, and with rates of phosphorous and potassium that were only one-third of typical grower rates. Again, onion plants showed no signs of malnourishment and there were no apparent differences among them, or compared to the growers' onions adjacent to the trial sites. The Cornell Vegetable Program shared the previous research results, which suggested that excessive fertility may be contributing to abundant growth of weeds and to bacterial bulb decay without any boost to onion yield. In the Elba meeting evaluation, 60% of the onion growers indicated that they would reduce their rates of nitrogen/fertilizer in the next growing season.

Making WAVES!

Monthly "Women in Agriculture: Voices, Experience, Skills" Discussion Group Makes a Splash!

It is hard to overstate the essential work and skill sets women provide the local farm economy. Many of the new farmers in our region are women, while other women with previous growing experience are moving into the area and have difficulty connecting with their colleagues. Western NY is also fortunate to have many farms anchored by long-time, highly-skilled and innovative "Farm-Hers". We have noticed at our Cornell Vegetable Program meetings that women:

- are underrepresented at meetings
- seek out longer-term networking opportunities
- desire research-based best management practices that meet their specific farming needs
- highly engage in discussion and field tour based educational programming
- tend to be underrecognized for their agricultural roles and accomplishments

The Cornell Vegetable Program and CCE Erie County teamed up to create a monthly workshop series tailored to the needs and interests of local women working on horticultural operations. Thanks to funding from Farm Credit East's AgEnhancement program, we have so far conducted six workshops covering greenhouse production (nursery and transplant vegetables), urban farming, maple production and sugar bush management, organic small fruits & vegetables, apple production, and compaction management.

Vegetable production was a feature of five of the six workshops thus far. Every workshop included a tour and hands-on lessons in crop scouting, pest and disease management, and cultural techniques. Every guest speaker was also female. Guest speakers had expertise in biocontrol, woodlot management, berries, integrated pest management, and tree fruit.

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The Cornell Vegetable Program's Elizabeth Buck (center) with farm-her Mayda Pozantides (left) at the GroundWork Market Garden, a 2-acre certified organic farm in Buffalo, NY. Elizabeth is emphasizing the importance of soil pH testing.

Grower host and expert farm-her Gayle Thorpe (left) discusses the differences and strengths between each of her blueberry varieties. Esther Kibbe of CCE Harvest NY (in red) is identifying the source of feeding damage.

The success of this series was pinned upon our expert host Farm-Hers: Karyn Sullivan (Agle's Farm Market), Mayda Pozantides (Groundwork Market Garden), Lynn Gabel (Gabel's Maple Syrup), Gayle Thorpe (Thorpe's Organic Family Farm), Bree Woodbridge (McCollum Orchards), and Megan Burley (Burley's Berries). Thank you to each of our hosts!

Not only did each host share her production approaches, she also candidly discussed the business management aspects that made each of the farms standout. Business management topics included establishing management teams, community relations, agri-tourism, CSAs, family farm transitions, niche marketing, business planning, and auxiliary farm income streams. Specifically to increase farm resiliency, the August meeting theme was "Building the Farm Support Network". Farm service providers joined the WAVES group for an informational, networking picnic.

Our objective was to enhance the knowledge, skill set, confidence, and professional network of women working in horticultural crop production. Already, women participating in this program have found new mentors and peer resources, and report feeling better prepared to manage their crops next year.

As a true testament to the value of this program, regular participants drive in from a four-county area, often travelling more than an hour to attend. New women continue to join each meeting. The few men who accompanied their female farming partners enjoyed the dynamic of the WAVES discussion group format. The Cornell Vegetable Program is currently seeking out funding to continue (and hopefully expand!) this program next year.



Abby Seaman of the NYS IPM Program demonstrates how to examine corn for worm pests as part of a biocontrol and scouting program.

Liz Tee, Lake Ontario Fruit Team, (right, holding apple) teaches growers how to identify the cause of fruit spots and identify fruit pests based on old feeding patterns.



Improving Produce Storage Quality through Forced Air Cooling

Rapid Cooling of Produce Reduces Loss Due to Field Heat Related Physiological Breakdown

For 2+ years, the Cornell Vegetable Program has been collaborating with the University of Vermont on a Precooling and Curing Fruits & Vegetables for Improved Quality and Profit project. Field heat can have a huge effect on the quality of produce in storage. It is estimated that nearly 20% of produce going into short-term cold storage from summer harvest is lost due to field heat related physiological breakdown. This equates to hundreds of thousands of dollars lost each season simply because the produce is not cooled down quickly enough. The project focused first on design, then operation of a model device that growers could easily incorporate in their post-harvest handling of fresh produce.

Once satisfied with a design, units were built and put into action on-farm. The precooler is a simple unit that acts by forcibly pulling cold air through the produce (forced air cooling). Our device is used in conjunction with a grower's walk-in cooler. Using a small-sized yet quite powerful barrel fan and a framed pallet-sized structure with a plastic sheeting cover, boxes, baskets, or harvest bins are placed inside the unit parked inside a cooler and in a few minutes of operation, cold air is forced through the produce quickly removing field heat.

Costing under \$350, the improvement of shelf life for summer produce returns the investment more than 10 fold. We built a unit on a WNY grower's farm in order for him to try it out in real time under real field conditions. The grower was hugely impressed with the simplicity of the design yet being able to reduce field heat over 30°F in under 20 minutes. He said his cooler would have taken most of the day to get that kind of temperature reduction. *"The savings in minimizing produce loss is well worth the small investment in materials and a half day's work in putting it together. This translates to \$1000s in my pocket."*

An instructional fact sheet, <u>Forced Air Cooling On The</u> <u>Farm</u>, is available from the UVM website and an updated version of the model built on-farm here in NY will be available on the CVP website this fall. The use of the precooler will be discussed at farmer winter meetings and copies of the instructions and how to use the precooler will be available to the attendees. Followup visits/assistance with growers will take place next season for those who wish to build and use a unit.



First Steuben County Twilight Meeting: A Success for Potato and Dry Bean Growers

New to the Cornell Vegetable Program in 2019, CCE Steuben County worked with our team to cohosted our first twilight meeting in the county at Cory Mark Farms. The August meeting allowed the Cornell Vegetable Program to connect with growers in the region and provide educational material on two important crops in the county: potatoes and dry beans. Cornell faculty, a NYS IPM Educator and several area Educators pulled together to make it an informative, successful event.

Nice weather made it possible to have the dry bean portion of the meeting in the field. Cornell Plant Pathologist Sarah Pethybridge gave an informative talk on white mold, sharing information about its lifecycle and management recommendations. Marion Zuefle, New York State Integrated Pest Management Vegetable IPM Extension Educator, provided hands-on education about western bean cutworm, showing growers insect samples and trapping options for pest monitoring in dry beans. Growers also had the opportunity to practice using a sweep net for locating leaf hoppers, while Cornell Entomologist, Brian Nault, presented on leaf hopper management in beans.

The second half of the twilight meeting focused on potatoes, and was more discussion based between potato growers and Cornell faculty. Walter De Jong, who heads Cornell's potato breeding program, shared updates about new potato varieties being tested as well as successes in the past few years that are available for growers. Growers also provided feedback on late blight monitoring and tracking systems to Cornell Plant Pathologist Chris Smart, who presented on late blight strain management and development, and yearly disease progression. Lastly, Brian Nault discussed management options for Colorado potato beetle, and talked through possible future insecticide rotations with growers in order to avoid insecticide resistance.

Overall, 20 registrants attended, including dry bean and potato growers as well as industry members from across the western New York region.

High tunnels allow for extended salad greens production during the shoulders of the season in the Northeast. In the Cornell Vegetable Program (CVP) region spinach can be planted in high tunnels in early fall for harvest throughout the winter.

As this industry develops we continue to research best management practices including fertilizer rates for optimal economic return.

Research on Nitrogen Rates Could Save Growers Thousands Per Acre

Nitrogen applications for overwintered tunnel greens varies widely farm-to-farm. Although the recommended nitrogen rate for field spinach is 100-125 lbs N/acre, anecdotally, we have heard reports of growers applying 200-600 lbs N/acre for high tunnel spinach. Initial CVP research has shown little yield benefit of high fertilizer rates. Working with Elisabeth Hodgdon and Andy Galimberti of the ENY Commercial Horticulture Program, we are conducting a controlled trial on appropriate nitrogen fertilization rates for high tunnel greens.

For our experiments, we used an unheated, moveable 22 x 48 ft high tunnel with a single layer of plastic at Cornell's Willsboro Research Farm. Within the tunnel, we examined differences in spinach yield and foliar nutrients across two planting dates with four N fertility treatments, for a total of 8 treatment combinations (Table 1). We applied nitrogen in rates of either 0, 65, 130, or 200 lbs N/ac to our research plots within the tunnel approximately one week prior to transplanting.

Table 1. Seeding dates and fertilizer rates for a high tunnel greens trial.

Seeding Date	Nitrogen (lbs/ac)
August 27 ("early")	0
	65
	130
	200
September 10 ("late")	0
	65
	130
	200

Initial Results

Overall, nitrogen rates did not significantly affect yield (Figure 1). Control plots with no added nitrogen yielded as much spinach as plots treated with 200 lbs/acre N. This was consistent within both planting dates, and across harvest dates. Planting date did affect yield in the fall and winter, with the earlier planting producing significantly greater yields than spinach planted two weeks later. However, the later planting caught up to produce similar yields. **If a grower is paying \$20/lb of nitrogen, this could result in a savings of \$4000/ac!** The Cornell Vegetable Program continues to work with ENY team to advance this research and we expect to share more data as we enter another winter growing season.



Why Do I Still Have White Mold in My Beans?

Sclerotinia white mold is one of the most serious diseases of all types of beans. Overwintering structures in the ground produce tiny mushroom cups which, in turn, release huge numbers of spores into a field. The spores infect bean flowers and the mold can spread to pods, leaves, and stems. At its worst, plants are defoliated and pods are rotted and moldy, causing loss of quality and yield. When there is risk for the disease, protective fungicides are applied to the plants at flowering.

However, some growers are left asking why the disease still shows up despite fungicide application and if it is really worth the costly fungicide sprays. One possibility is that the fungus has developed resistance to the products being used. With grant funding from the NYS dry bean and processing snap and lima bean industries, Cornell Vegetable Specialists have collected samples of white mold from 37 fields across the region this summer. Pure fungal isolates are being cultured in the lab of Dr. Pethybridge at Cornell AgriTech in Geneva and will be tested for sensitivity to commonly used fungicides over the winter months. Growers will have this information before the start of the next growing season to assist with the decision about the best products to use on their farm.

On the more than 30,000 acres of dry, snap and lima beans across NYS, processors estimate that more than \$500,000 is spent on fungicide sprays annually. Additionally, thousands of dollars are spent on crop scouting to attempt to manage this disease. Despite this effort, crop and quality losses continue, with an average of 3 to 4% of the acreage lost (value of \$800,000) annually.

GREENHOUSE TOMATOES Did you know?

According to the 2017 Census of Agriculture, there are 7,949 farms growing tomatoes under protected settings (i.e. greenhouses, high tunnels) in the United States with a total value of \$418,960,362.

How does New York rank?

#2 in the U.S. for the number of farms growing under protected settings with a total of 489 farms

#3 in the nation for square feet under protection at 4,188,563 sq ft

> #4 in the nation in value of sales at \$28,590,555!

Newly Funded Grants & Projects

Your Trusted Source for Research-Based Knowledge

This quarter, we are pleased to have received the following grant funds allowing us to advance our commitment to the New York vegetable industry.

Stop the Rot: Combating Onion Bacterial Diseases with Pathogenomic Tools and Enhanced Management Strategies, United States Department of Agriculture – National Institute of Food and Agriculture (USDA-NIFA) Specialty Crops Research Initiative – Standard Research and Extension Project (SCRI-SREP), 9/30/19-9/29/23, \$4,000,000 + \$4,200,000 matching funds (du Toit, L.J., Dutta, B., Kvitko, B., **Hoepting, C.**, Aegerter, B., Uchanski, M., and collaborators). Read more about this award in the Vegetable Grower News article, <u>\$4M given for onion bacterial disease research</u>

Postharvest Handling of Garlic Control of Pests and Disease, Northeast Sustainable Agricultural Research and Education (NESARE), 8/1/19-7/31/22, \$29,968 (Stewart, C., **Hoepting, C.**, Callahan, C.)

Building Resilient Foliar Disease Management Strategies for the Organic Table Beet Industry, NIFA Organic Agriculture Research and Extension Initiative (OREI), 1/1/20-12/31/21, \$500,000 (Pethybridge, S., Taylor, A., **Kikkert, J.**, Gadoury, D., Rea, M., Radetsky, L.)

Optimizing Industrial Hemp Production for CBD in New York, New York Farm Viability Institute (NYFVI), \$124,298 (Smart, L., **Reid, J.**, et al.)

This project, led by PI Larry Smart, strives to meet the needs of an emerging NYS hemp industry. We will directly compare four production methods - greenhouse, high tunnel, horticultural fields, and field crop fields for production of industrial hemp for cannabidiol (CBD). Our research will provide growers with comparative data on CBD yield, impact of pests and diseases, capital and labor resources, and input costs. Extension materials will be developed describing crop management methods, cultivar traits, harvesting methods, and postharvest handling procedures to deliver information on the rapid advancement of the hemp research and development. Field trial objectives are to collect yield and economic data to model the economics of different production systems, which will be extended to growers and processors to stimulate the hemp industry. The success of those trials will be evaluated based on conventional standards for agronomic production - proper stand establishment, weed control, and accurately measured harvest. Judson Reid will help evaluate the potential doubling of annual output by trying to grow two cycles of high CBD hemp under high tunnels.

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