



In 2018, CCE worked with two New York farms to begin to understand nutrient

dynamics in the production of edible hemp.

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Here are 5 key strategies that can reduce risks and improve the sustainability of farms in the face

of increasingly frequent weather extremes.

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The CSA model is changing to accommodate changing markets. Trends in the United

States are echoed in Eastern NY.

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The meeting season is upon us! Come to one of our upcoming events to hear the latest research

results, food safety updates, and general production best practices.

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VEGEdge

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● Volume 15 | ● Issue 01 | ● January 1, 2019

Cornell Cooperative Extension
Cornell Vegetable Program

Edible Hemp Foliar Sampling Project 2018

Judson Reid and Lindsey Pashow, CCE Harvest New York

Hemp, a multi-use crop that has been cultivated for centuries, is increasingly cultivated in New York. ‘Industrial hemp’ is a non-intoxicant version of *Cannabis sativa* with potential use as fiber, grain or processed consumer products. Hemp is a controlled substance, regulated by the US Drug Enforcement Agency. The previous Farm Bill allowed states to develop pilot programs to research industrial hemp. New York is one of the states with a sanctioned program to study growth, cultivation and marketing of the crop. In NYS permits to grow hemp are regulated by Ag and Markets under close supervision. Any person interested in growing hemp must become familiar with the pertinent regulations prior to considering growing, and a permit is required. The NYSDAM website is a good place to begin this process: www.agriculture.ny.gov/PI/PIHome.html

In 2018 CCE worked with two farms in Central and Northern New York to begin to understand nutrient dynamics in the production of edible hemp. The end product may be a microgreen for salad style consumption, juice or smoothies; or formulated into other edible products. Although we initially began to work with microgreens, farmers have found interest in edible portions of later stages of crop growth too. In both situations the crop was grown inside a greenhouse; one in mineral soil, the other in potting soil.



Figure 1. Field crop of industrial hemp. Photo: J. Reid, CCE Harvest NY

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VegEdge newsletter is exclusively for enrollees in the Cornell Vegetable Program, a Cornell Cooperative Extension partnership between Cornell University and CCE Associations in 14 counties.

The newsletter is a service to our enrollees and is intended for educational purposes, strengthening the relationship between our enrollees, the Cornell Vegetable Program team, and Cornell University.

We're interested in your comments. Contact us at:
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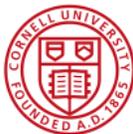
VegEdge is published 25 times per year, parallel to the production schedule of Western New York growers. Enrollees in the Cornell Vegetable Program receive a complimentary electronic subscription to the newsletter. Print copies are available for an additional fee. You must be enrolled in the Cornell Vegetable Program to subscribe to the newsletter. For information about enrolling in our program, visit cvp.cce.cornell.edu. Cornell Cooperative Extension staff, Cornell faculty, and other states' Extension personnel may request to receive a complimentary electronic subscription to VegEdge by emailing Angela Ochterski at aep63@cornell.edu. Total readership varies but averages 700 readers.

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Help us serve you better by telling us what you think. Email us at cce-cvp@cornell.edu or write to us at Cornell Vegetable Program, 480 North Main Street, Canandaigua, NY 14424.



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The next issue of VegEdge newsletter will be February 4, 2019.



Foliar sampling is a common crop management tool, particularly for greenhouse and high tunnel vegetables. Coupling a soil test with regular foliar tests, farmers can observe nutrient trends within the crop and make mid-stream adjustments before deficiencies or toxicities become visible and cause a yield loss. The process is simple; leaf tissue samples are sent to a lab for analysis and results are returned, hopefully within 1 week, indicating macro, secondary and micronutrients as % foliar mass or parts per million. These values are plotted within known sufficiency ranges for the crop. In our situation there are no established ranges for hemp, so we are beginning with spinach, another edible greens crop. Farmers and crop advisors can adjust fertilizer or irrigation practices based on these results to keep the crop between upper and lower limits for each nutrient. We collected soil and foliar samples on these two farms on 5 dates from March through August 2018. Foliar samples were collected between 14 to 18 days after seeding on plants from 4 to 6 inches in height. Leaves were collected randomly throughout the trays or beds. Remaining samples were collected at around 60 days to gain mature leaves (5 leaves) on pre-flower to lowering stage plants. Samples were analyzed by Agro-One Laboratory in Ithaca, NY.



Figure 2. Edible hemp grown in potting media. Photo: L. Pashow, CCE Harvest NY

The data shared here is an average of foliar nutrient values throughout the growing season. In this initial year of testing we observed the following trends:

- Both farms were near the lower range of sufficiency for nitrogen.

- Hemp grown in potting media tested lower in magnesium and calcium.
- The farm with mineral soil was deficient in foliar levels of phosphorus and potassium, due to low soil phosphorus and potassium levels, high soil calcium and lack of fertilization.
- Both farms showed lower levels of the micronutrient manganese; likely due to high water pH/alkalinity and soil calcium levels.

Low foliar nitrogen will decrease hemp yield and leaf tissue quality by decreasing photosynthesis, growth rate, leaf color and size. Phosphorus is particularly critical for root growth, which is tied to uptake of all other nutrients. Low potassium will also decrease total yield, vigor and leaf color. Nitrogen is highly mobile and in most greenhouse situations must be replenished each cropping cycle. Total N rates per acre do not need to be very high for a microgreens crop; 50 lbs/ac may be sufficient. However, if the crop is being grown to maturity this rate could go above 125 lbs/ac. Greenhouses with bench or floor heating may lose nitrogen more rapidly due to volatilization. In these cases smaller, soluble doses of N may be most appropriate. Acidification of irrigation water with acid may help foliar manganese levels. Rarely is manganese fertilization required. Rate of acid to inject will depend on a water test of pH and alkalinity. Both soluble N and acid injection require an injector pump within the irrigation system.



Figure 3. Beneficial insects in New York hemp planting. Photo: J. Reid, CCE Harvest NY

This work is based on spinach sufficiency ranges and is a starting point as we learn how to best grow an edible hemp crop. We also see an increase use of hemp transplants (vs. direct seed) for other target uses. Our continued work will contribute to understanding appropriate fertilization of transplanted hemp crops grown for non-edible purposes. If you need help calculating fertilizer application or injection rates please contact us.

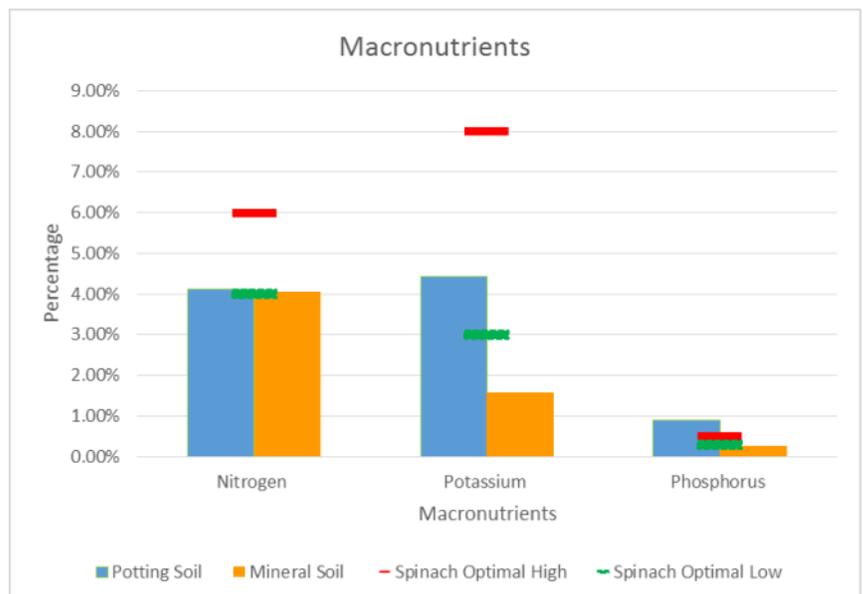


Figure 4. Macronutrients at two farms growing edible hemp crops. Red represents upper levels of sufficiency and green the lower limit, based on spinach data. Both farms border the lower acceptable foliar range of nitrogen.

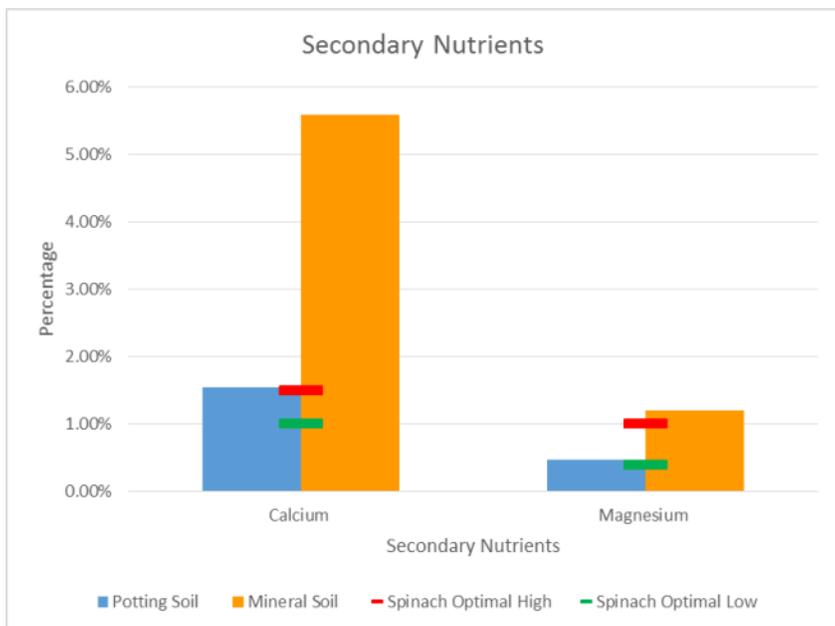


Figure 5. Calcium and magnesium were acceptable at both farms, although the potting media showed lower levels.

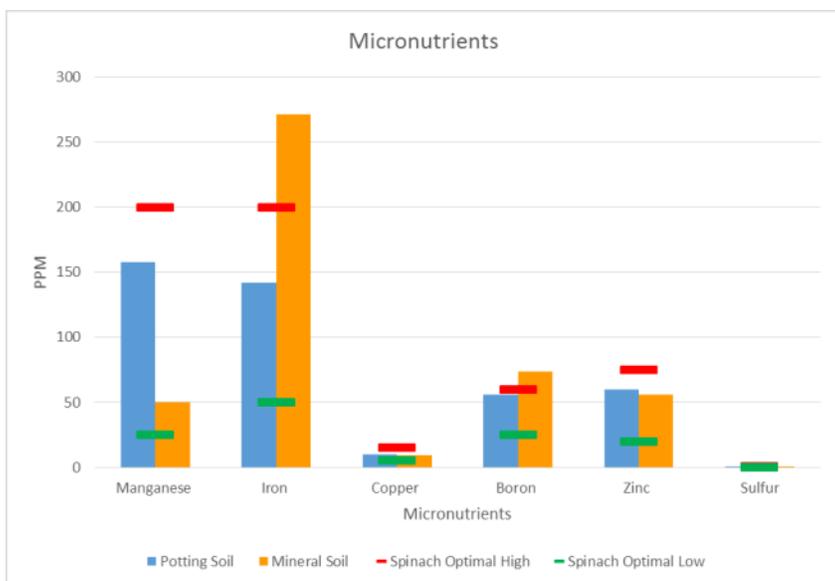


Figure 6. Foliar micronutrient levels at both farms were within acceptable ranges. ●

Strategies to Improve Farm Resiliency to Environmental Risks

Adapted from the [Cornell Climate Smart Farming: Six Key Strategies Factsheet](#) by Elizabeth Buck, CCE Cornell Vegetable Program

In the Northeastern United States, climate-related risks such as extreme rainfall, drought, heat stress, changing disease and pest pressure, and unpredictable weather patterns pose serious threats to farmers’ livelihoods. The average annual temperature in the Northeast has increased by approximately 2.4°F, and annual precipitation has increased by 4.9 inches over the last 120 years. The frequency of extreme rainfall events (e.g., 2 inches of rain in a 24-hour period) has increased 71% from 1958 to 2012 (NOAA/NCDC). The length of the frost-free growing season has increased by 10 days, on average. These changes are projected to continue and increase in the future, and will pose threats to crop productivity and quality, soil conditions, and farm infrastructure.

Farmers can adjust their practices and systems to reduce the severity of climate impacts. Climate change may lengthen the growing season and create opportunities for new crops to be grown, but the variability of seasons will remain a challenge to consistent, economical production.

Five Key Strategies that can reduce risks and improve the sustainability of farms in the face of increasingly frequent weather extremes are listed on the next page. Many of these best management practices are things growers already do, or are recommended for other agronomy and farm management reasons. When put together, these practices can also help increase weather and climate related resiliency over the short and long-term.

Strategy #1: Build Soil Health

Warming temperatures, extreme rainfall, and drought will increase the potential for soil moisture stress to affect all crops. Healthy, well-structured soil that is high in organic matter and protected by vegetation captures more water and is less susceptible to surface runoff, erosion, and compaction

continued on next page

during and after heavy rain events. The following actions build soil health and resiliency to climate-related risks:

- Reduce tillage frequency and intensity, and transition to low-till or no-till planting methods where feasible. Cabbage and winter squash, for example, can do well in reduced tillage systems on lighter textured soils.
- Increase organic matter inputs through cover crops, crop residues, manures, and compost.
- Use winter and summer cover crops between main crops to maximize soil surface protection. Cover crop use can also help reduce weed pressure and improve soil health.
- Use tillage methods which preserve plant residues on the soil surface to minimize time with no plants covering the field. Pumpkins can be grown in fields of roll-crimped or herbicide-killed and rolled rye to realize dual benefits of less muddy fruit and better soil protection.
- Reduce soil compaction by minimizing equipment passes over fields, using controlled traffic patterns, and avoiding traffic until the soil is friable in the first several inches (not just the surface). Often times, compaction limits the effectiveness of tile lines by slowing down the movement of water through the soil profile. Avoid fall tillage and bare winter fallow whenever possible.

Strategy #2: Prepare for Inconvenient Amounts of Water

Effective water management is critical to better handle the increased frequency of extreme precipitation events, storms, floods, and lengthening periods of short-term drought that are hitting the Northeast. Actions to improve water management include:

- Improve irrigation efficiency by using micro-, subsurface, or drip irrigation. Contact your local Soil and Water district to see if programs to help install these types of irrigation are available in your area.
- Install tile drainage in fields to remove excess water and control runoff.
- Expand or improve water supply systems to meet future demand, and increase water storage capacity by constructing deeper wells and ponds.
- Time fertilizer and manure applications based on weather forecasts. Avoid applying N and P before rain is forecast or when you're likely to get a heavy thunderstorm.
- Plant or manage riparian buffers along streams and ponds to capture remaining runoff, and integrate agroforestry into farming systems to increase water-use efficiency during drought.

Strategy #3: Go Pro-active for Crop Protection

Competition from weeds and increased threats from known and new invasive insects, weeds, and pathogens have increased in the warming climate. Employ these strategies to manage risks of pests and disease:

- Stay abreast of new threats and be aware of life cycles and how pests spread.
- Regularly scout for weeds, insects, and pathogens, and control them with proven strategies.

- Use crop varieties with resistance to pests and pathogens
- Implement cultural and biological controls for pests and diseases whenever possible.
- Correctly use appropriate pesticides when pest or pathogens exceed economic thresholds.
- Practice sanitary farming practices (e.g. clean equipment in-between fields, destroy crop residues in a timely manner) to reduce the spread of pests and pathogens.

Strategy #4: Reduce Risk via Diversification

Diversifying farm enterprises, crops, and animals is a self-insurance policy for managing uncertainty in a constantly-changing environment. Crop diversification can build financial resiliency by reducing overall losses due to extreme weather events and market fluctuations. The following recommendations can to reduce the financial risks associated with extreme weather:

- Be open to change. Choose a variety of commodities, farm products and services that insulate against weather, environmental, and market risks.
- Diversify crop production by extending crop rotations and intercropping with multiple species or varieties.
- Select crop varieties based on maturity dates and genetics to match anticipated season length, rainfall and drought patterns, and pest/pathogen pressures. Staggered plantings can help, too.
- Consider controlled environment agriculture to extend the growing season, diversify operations, and decrease weather risks. Floating row cover, for example, can protect against cool nights, help reduce hail damage, and mitigate pests.

Strategy #5: Make the Most of Your Infrastructure

Building resilience against climate-related threats requires careful planning and review of farm operations and the whole business. Baseline data is required to make whole-farm management decisions. These practices can help increase the sustainability of the farm:

- Develop an adaptation plan to identify your risks and practices to remediate them.
- Conduct a whole-farm energy audit to increase energy efficiency and identify opportunities for renewable energy sources. State or local programs may be in place to help with these efforts.
- Utilize precision farming apps and weather and climate tools (such as climatesmartfarming.org) to make more informed crop production decisions.
- New and renovated farm buildings should be energy efficient and designed to withstand predicted weather conditions, including severe heat, heavy rainfall, wind, and snow loads.
- When purchasing new farm equipment, select options to maximize fuel efficiency and decrease labor and time constraints.
- Consider purchasing crop insurance to reduce economic risks. ●

The Changing CSA – Data from CSAs in the US and Eastern New York

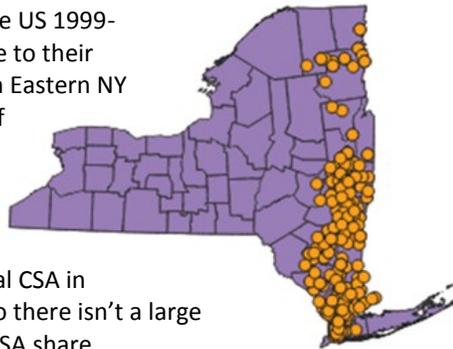
Elizabeth Higgins, Ag Business Management Extension Specialist, ENY Commercial Horticulture Program

“When CSAs were first around, it seems like it was more like customers saying, ‘We really believe in you, the farmer, and how can we make this work for you?’ Now, it seems like it has shifted and the farmers are saying, ‘How can we make the CSA work better for you, the customer?’”¹

– CSA Farmer interviewed in “Community Supported Agriculture – New Models for Changing Markets

A 2017 report by USDA-AMS and the University of Kentucky is highlighting key trends in CSAs (Community Supported Agriculture) in the United States and these trends are echoed in data I have collected on CSA farms in Eastern New York. In *Community Supported Agriculture – New Models for Changing Markets* the authors Timothy Woods, Matthew Ernst, and Debra Tropp surveyed 495 CSAs in the USA and then conducted case-studies of six CSAs. They found several changes compared to a national CSA survey, conducted in 2001.² They found (1) increasing competition, from other CSAs and from other market channels (2) increasing focus on customer service and choice and (3) growth of multi-farm and alternative types of CSAs. They also found a decline in the number of certified organic CSAs. In 2001 49% of CSA farms were certified organic. In the 2017 survey only 27% were certified organic. These trends are echoed in data I collected on 106 CSAs in Eastern NY in 2017 and 2018.³ For example, I found that 26% of Eastern New York CSAs were USDA Certified Organic, like the national percentage.

In some ways CSAs have not changed much from the early 2000s. The typical CSA farm in the US 1999-2001 provided 22-24 weeks of produce to their shareholders. This is the same today in Eastern NY where the median number of weeks of a traditional CSA was 22. The median share price for a full share in the US in 2001 was \$400, which adjusted for inflation is \$571 in 2018 dollars. The median share price for a traditional CSA in Eastern New York in 2018 was \$585, so there isn't a large difference in the cost of a traditional CSA share.



What has changed is what farms are doing to reach those customers. Like the 2017 USDA survey, I found that many CSA farms in Eastern NY were making the CSA share more accessible to their customers. There is an increasing focus on home or workplace delivery, especially among the larger CSAs, for whom the CSA model is their primary business. The mean number of drop-off sites in 2017 was 3.4 and that increased in 2018 to 3.7. The total number of drop-off sites also increased in Eastern NY. There were 319 sites in 2017 and 364 sites in 2018. 11 of those “sites” were door to door regional home deliveries, so the total number of drop-off sites is actually larger. Many farms are now advertising that they will offer to create a CSA drop off if a critical number of subscribers is reached.

However, despite this increase in customer service, I observed a downward trend in CSA share price between 2017 and 2018. 22% of CSAs in Eastern New York low-

ered their share price between 2017 and 2018. Overall the median share price was flat between 2017 and 2018. One possible reason is competition for customers. The 2017 USDA survey found that only 39% of CSA farmers in the Northeast expected their share #s to increase in the future. They cited competition from other market channels, but especially competition from other CSA farms as their primary competitor for customers. Anecdotally CSA farms in Eastern New York reported challenges in recruiting and retaining new CSA members. This could be reflected in the additional effort to reach customers and the downward trend on prices.

The 2017 survey found that there was growth in the number of alternative product CSAs (meat, processed food, flower) and the number of multi-farm subscription CSAs. We have seen this change in Eastern New York. About 10% of the CSAs in our study do not offer vegetables. The USDA study voiced a concern that multi-farm CSAs risked the loss in perceived value to consumers by moving from a farm estate product to an aggregated “local” product that was not as identified with a specific farm. But these concerns were outweighed by the benefits of offering more diverse products, allowing growers to specialize and reducing production risk by spreading production over more farms. In Eastern New York many farms are adding products from other farms to their CSA. 28 of the 99 farms were explicitly including products from at least 1 other farm on their CSA share in 2018. There are also two farmer-owned “CSA weekly subscription box” multi-farm CSAs, where customers can order CSA boxes with the product provided by multiple farms

¹ Timothy Woods, Matthew Ernst, and Debra Tropp. *Community Supported Agriculture – New Models for Changing Markets*. U.S. Department of Agriculture, Agricultural Marketing Service, April 2017. Web.

² Lass, Bevis, Stevenson, Hendrickson, Rhuf. *Community Supported Agriculture Entering the 21st Century: Results from the 2001 National Survey*. University of Wisconsin Center for Integrated Systems available at: http://cias.wisc.edu/wp-content/uploads/2008/07/csa_survey_01.pdf 29 pages.

³ The New York data was collected directly from the farm’s websites and subscription forms.

continued on next page

and can place weekly orders for specific products. Twenty-five farms in the region participate in these two CSAs. Most of these farms also have their own individual CSA so apparently see this subscription box as an additional marketing outlet. Both of these CSAs have a minimum order size or a minimum balance requirement.

The most significant change in Eastern New York CSAs is the rapid movement from the traditional share box CSA to the declining balance card CSA. In this model, customers pre-purchase a card for a specific amount that then has a value that can be used either at the farm's farm stand or farmers market during the season. Most CSA farms add 10% value of the purchase price onto the card (e.g. a \$600 card is worth \$660 in value of product). The average initial payment required in 2018 was \$350. This was a small decrease from the 2017 average price, but most farms held their price the same between 2017 and 2018. This model is increasingly popular, in 2017 13% of CSAs offered some form of the declining balance card but this increased in 2018 to 18%. Farmers I spoke to like the reduced labor of packing boxes and that it allows them to focus on one mar-

keting channel (their market) but provides the benefit of customer loyalty and advanced payment. They report that their customers like the flexibility.

Although this model has many benefits for CSA farms that focus on farmers markets or a farm stand; it has some potential pitfalls. First it could make the consumer more price aware. Using the card at the market a customer sees the exact cost of all their produce selections and can compare those prices directly to other farms at the market. The traditional CSA box is less price transparent. Another issue could be more competition from other market vendors as this model is much easier to adopt than a traditional CSA. Finally, very few farms in Eastern New York that offer this model have an option for reduced cost for limited resource consumers and none of the farms using this had a volunteer requirement, two hallmarks of the traditional CSA. What are the implications for the "community" aspect of the CSA if the model transitions from the on-farm share to cards that are essentially a discount for prepayment or retail loyalty card?

We will continue to collect data on the CSAs in Eastern New York to have a

better sense of how the model is changing over time. In addition, the ENYCH team is planning to offer a program on CSAs at the winter fruit and vegetable school in February. To echo the farmer quoted in the beginning of the article, it is clear that the CSA model has been successful for many farms, but continued growth is requiring farmers to adopt more of a customer-focused orientation and competition from other farms and other marketing channels may reduce overall profitability for some farms. ●



WE'RE HIRING

VEGETABLE CROPS SPECIALIST

The CCE Cornell Vegetable Program seeks a highly qualified candidate to lead research and educational programming in commercial vegetable production. A focus will be in potato and dry bean production. Additional emphasis will be placed on production and harvest handling practices that impact post-harvest vegetable quality. The Extension Educator will work as part of our regional agriculture team that serves commercial vegetable growers throughout a 14-county region of western and central NY. This position is full-time and will be located in western NY.

Applicants are required to hold a Master's degree, and should have a solid background in vegetable crop production. Experience in potato production and post-harvest handling and storage through formal education and work experience are desired.

For more information, visit http://tiny.cc/Vegetable_WDR_00017327

Cornell Cooperative Extension | Cornell Vegetable Program





Upcoming Events

view all Cornell Vegetable Program upcoming events at CVP.CCE.CORNELL.EDU

Finger Lakes Produce Auction Educational Meeting

January 3, 2019 | 8:30 AM - 3:00 PM

Finger Lakes Produce Auction, 3691 NY-14A, Penn Yan, NY 14527

This meeting is our annual winter educational event for Finger Lakes Produce Auction growers. This year we will focus on disease management in cole crops, strawberries, food safety and greenhouse flowers. 2.0 recertification credits in private vegetable category.

For more information, contact Judson Reid at 585-313-8912.



Ontario Produce Auction Growers Meeting

January 9, 2019 | 9:30 AM - 2:30 PM

Ontario Produce Auction, 4860 Yautzy Rd, Stanley, NY 14561

This meeting is our annual winter educational event for Ontario Produce Auction growers. This year we will focus on disease management in high tunnel tomatoes, vine crops and greenhouse flowers. Grower and buyer panels will be presented as well irrigation and plastic mulch. DEC pesticide applicator recertification credits have been requested.

Lunch provided by OPA. For more information, contact Judson Reid at 585-313-8912.



2019 Empire State Producers EXPO

January 15-17, 2019 | sessions throughout each day

SRC Arena & Events Center, Onondaga Community College, 4585 West Seneca Turnpike, Syracuse, NY

The 2019 Empire State Producers Expo combines the major fruit, flower and vegetable associations of New York State in order to provide a comprehensive trade show and educational conference for New York producers, as well as the surrounding states and Eastern Canada. Session topics include commodity specific programs in berries, cole crops, cut flowers, tree fruit, Christmas trees, sweet corn, tomato, onions, root crops, vine crops, and emerging markets (hard cider and hemp); and multidisciplinary programs in weed management, precision ag, soil health, biopesticides, ag labor, forecasting and climate tools for agriculture, marketing, and high tunnels. DEC pesticide recertification credits and Certified Crop Advisor (CCA) credits will be offered during the appropriate educational sessions. The complete Expo program is available on the [NYS Vegetable Growers Association website](http://NYSVegetableGrowersAssociation.com). See pages 10-11 for information on some of the sessions.



2019 Chautauqua-Cattaraugus Produce Meeting

January 28, 2019 | 9:30 AM - 3:45 PM

CCE Chautauqua County, 3542 Turner Rd, Jamestown, NY 14701

This annual winter educational event for the Chautauqua Produce Auction will educate produce growers on pest management, variety selection, and marketing issues in fresh market crops grown for auction. Specific topics include season extension techniques and high tunnels, growing good onions and preventing early die-back, Strawberries 101, managing worms and Alternaria in Cole Crops, lessons learned at the Buffalo Valley Produce Auction, strategic crop management for increased profitability, Spotted Lantern Fly updates, and updates on FSMA, GAPS, and On-Farm Readiness Reviews. This is a multi-discipline produce meeting featuring expert speakers in vegetable and fruit production and a Q&A panel of experienced, successful growers.

\$20/person if pre-registered by 5pm on January 21 (includes lunch). \$25 late online registration or at the door (lunch cannot be guaranteed). Register online at <https://cvp.cce.cornell.edu/event.php?id=1070> This event is hosted by CCE Chautauqua County. For more information, contact Elizabeth Buck at emb273@cornell.edu or 585-406-3419.



2019 Pesticide Training and Recertification Series - Ontario County

Wednesdays, February 6, 13, 20, 27, 2019 | 7:00 - 9:30 PM

Exam Wednesday, March 6, 2019 | 6:30 PM - 11:00 PM

Cornell Cooperative Extension-Ontario County, 480 N Main St, Canandaigua, NY 14424

Anyone interested in obtaining a pesticide certification and meets the DEC (Department of Environmental Conservation) experience / education requirements OR current applicators seeking pesticide recertification credits should attend. 2.5 recertification core credits will be available for each class. These trainings are hosted by CCE Ontario County.

Cost: \$175.00 for certification which includes the training manuals and all 4 classes. Does not include the \$100.00 exam fee.

Recertification is \$25.00 per class. Contact CCE Ontario County, 585-394-3977 x427 or x436 or email nea8@cornell.edu or rw43@cornell.edu Registration form will be available on the website www.cceontario.org





Upcoming Events

view all Cornell Vegetable Program upcoming events at CVP.CCE.CORNELL.EDU

Produce Safety Regulations (FSMA) 1-Day Grower Training Courses

February 13, 2019 | 8:30 AM - 5:00 PM

CCE Orleans County, 12690 State Route 31, Albion, NY 14411

March 21, 2019 | 8:30 AM - 5:00 PM

CCE Wayne County, 1581 Route 88 North, Newark, NY 14513

Do you need to be implementing farm food safety practices? Does your farm need certification to meet compliance with the new federal food safety regulations for the 2019 growing season? Two upcoming trainings opportunities are for you. Cost and registration TBD. For more information, contact Robert Hadad at rgh26@cornell.edu or 585-739-4065.

Wayne County Fresh Market Growers Meeting

February 21, 2019 | 1:00 - 3:30 PM

CCE Wayne County, 1581 Route 88 North, Newark, NY 14513



This course will educate fresh market growers on current pest management, food safety, and marketing issues in fresh market crops. Specific topics covered include: managing the weed seedbank, Farm to School marketing opportunities, Late Blight updates, FSMA On-Farm Readiness Reviews, Biopesticides, Biostimulants, and how they work, wash line equipment cleaning checklist, and a discussion of production problems throughout the 2018 growing season. DEC pesticide applicator recertification credits have been requested.

Cost: \$15/person, pre-registration requested by February 18th. Register online at https://cvp.cce.cornell.edu/event_preregistration.php?event=1083 Walk-ins accepted. For more information, contact Elizabeth Buck at 585-406-3419 or emb273@cornell.edu

Produce Wash/Pack Line Basics

March 6, 2019 | 9:00 AM - 12:30 PM

Yates County location TBD

Join Robert Hadad, CVP vegetable specialist, to learn about how to design a produce packing line that fits your budget and maximizes efficiency and food safety. This workshop will cover what you need to take into account when designing your line, along with how you can modify an existing system to for increased sanitation and efficiency. Robert will also discuss how packing line and packing house design fits in with the new Food Safety Modernization Act requirements.

This event is hosted by CCE Yates County. Cost: \$10/person. For more information and to register, contact Caroline Boutard-Hunt, Agricultural Educator, CCE Yates County, 315-536-5123 x4375, cb239@cornell.edu.

2019 Garlic School

March 19, 2019 (snow date 3/20) | 9:00 AM - 2:30 PM

First United Methodist Church, 8221 Lewiston Rd (Rt 63), Batavia, NY 14020

Save the date for the 2019 Garlic School! Hear about the latest research trial results and insect and disease issues. Open discussion encouraged! Cost: \$15 CVP enrollees; \$25 all others. Registration will soon be available online. Lunch included. For more information, contact Christy Hoepfing at cah59@cornell.edu, 585-798-4265 x38, or Robert Hadad at rgh26@cornell.edu or 585-739-4065.

Produce Safety School

March 27, 2019 | 9:00 AM - 4:30 PM

Cornell AgriTech (formerly known as the NYS Ag Experiment Station), Jordan Hall, 630 W North St, Geneva, NY 14456

This is a full-day program focusing on putting farm food safety into daily production practices. Topics:

- Surface water testing (how-to) and understanding the results (then what?)
- How to conduct farm assessments (wildlife, pre-harvest, post-harvest...), why, and next steps
- Wash/pack line set up
- Wash equipment and food contact surface clean up
- Using sanitizers in the wash line

And much more! Stay tuned for further updates. Cost: \$20 CVP enrollees; \$30 all others. Register online at https://cvp.cce.cornell.edu/event_preregistration.php?event=1084 Lunch included. For more info, contact Robert Hadad at rgh26@cornell.edu or 585-739-4065.

HARD CIDER SESSIONS**Tuesday, January 15, 2019 | afternoon sessions with optional networking and tasting to follow****Sessions organized by Craig Kahlke, CCE Lake Ontario Fruit Program**

The explosion in hard cider production in NY continues to fuel the increasing attendance for sessions at the statewide educational conference. Session 1 kicks off with Dr. Greg Peck and Shanthanu Krishna Kumar of Cornell discussing *Cider Apple Diversity in the USDA Malus Germplasm Collection*. Attendees will be amazed at the sheer number of varieties and their associated fruit and juice characteristics suitable for making ciders with complex and diverse flavors. We are very pleased to have Professor Bri Ewing from Washington State University, to present on *Managing Apple Maturity & Post-Harvest Storage to Increase Polyphenols in Cider*. Our young hard cider industry needs guidance in this area, and Bri's talk should prove to be very insightful. Lindsey Pashow from CCE Harvest NY will be introducing *2019 Hard Cider Supply Chain Survey*, a follow up to the inaugural survey put together by Lindsey and the Cornell Hard Cider PWT. With such a with near-explosive growth in the cider industry, it is critical to have accurate supply chain information.

Between educational sessions, Cornell will be hosting their Hard Cider Program Work Team (PWT) meeting. The Hard Cider PWT is a multi-disciplinary group of Cornell researchers, instructors, extension educators, and industry stakeholders who collaborate on statewide hard cider activities. Everyone is invited to attend the meeting, which will include research updates and promotion of upcoming events.

The final educational session of the afternoon has Cornell AgriTech's Chris Gerling with *Updates from the Vinification & Brewing Laboratory*. The popularity of the Cider Production classes highlights the excitement over the cider industry. Following this, we have Professor Bri Ewing with another presentation, *Dropping Knowledge: Using Ground-Harvested Fruit for Cider Production in Compliance with the FSMA Produce Safety Rule Cider*. With the compliance of the federal food safety rule upon us, the timing is perfect for this topic. We are pleased to have two NY cider-makers and growers, Liz and Warner Heppner of StoneyRidge Orchard & Winery, to discuss their experience with a mechanical harvester they bought from Europe that they are using to harvest their cider apples. The educational portion of the final session will wrap up with a representative from the New York Cider Association leading us through a *Cider Tasting for Apple Growers: Bittersharps and Bittersweets*. Education of consumers is needed in the types of cider and their associated tannin and acid levels, and NYCA is spearheading this initiative in NY. Following this, attendees are welcome to stay and try a myriad of excellent hard ciders from producers around the state!

The Hard Cider sessions are in afternoon in the Otis Suite 10 on Tuesday, January 15. Session I runs from 2-3:15 PM, the Cornell Hard Cider PWT Intersession is from 3:15-3:45 PM, and Session II runs from 3:45-5 PM (educational portion), with an optional networking and tasting to follow from 5-6 PM.

MIGRANT LABOR AND TRANSITIONING TO H2A IN TREE FRUIT**Tuesday, January 15, 2019 | 3:45 PM - 5:00 PM****Session organized by Mary Jo Dudley, Cornell Farmworker Program**

In response to concerns over farm labor instability and shortages, this session will provide useful tools for retaining workers and promoting labor satisfaction for workers and employers alike drawing from research with both migrant and H2A workers.

BITTER PIT MANAGEMENT IN HONEYCRISP APPLES**Wednesday, January 16, 2019 | 10:45 AM - 12:00 PM****Session organized by Craig Kahlke, CCE Lake Ontario Fruit Program**

We are pleased to have Dr. Lee Kalcits from Washington State University giving three talks during the annual Empire Producers Expo at the SRC Arena & Events Center in Syracuse. Lee's talk in the Bitter Pit Management session is *"Moving beyond Calcium Sprays: Integrated Bitter Pit Management in Honeycrisp"*. Following this, Dr. Yosef Al Shoffe, a Postdoctoral Researcher from Cornell, will discuss his *"Prediction Model for Bitter pit in Honeycrisp Apples and Implications for Storage Management"*. Honeycrisp is a high value apple variety that suffers from a myriad of disorders, and bitter pit is the costliest for the majority of growers in NY. Come hear two experts give valuable information that could help reduce this costly disorder. This session is in the Allyn Gym from 10:45-noon on January 16.

BIOPESTICIDES SESSIONS**Wednesday, January 16, 2019 | 10:45 AM - 12:00 PM and 3:45 PM - 5:00 PM****Sessions organized by Amara Dunn, NYS IPM, Cornell**

Are you already using biopesticides on your farm? Could you be getting more out of them? Are you thinking of trying biopesticides for the first time? These two sessions (morning and afternoon) on Wednesday, January 16 will offer useful information for everyone – whether you've been using biopesticides for years, or just getting started. Cornell faculty will provide updates on which products have been effective against some vegetable disease and insect pests, and a local grower will share his experiences transitioning to using primarily biopesticides (and cultural controls) in grapes. Industry representatives will offer insight into how these products work and how you can use them most effectively.

The [full program](https://nysvqa.org/expo) is posted on the NYS Vegetable Growers Association website at <https://nysvqa.org/expo>

GROWING CHRISTMAS TREES

Thursday, January 17, 2019 | 10:45 AM - 12:00 PM
Session organized by Warren Halladay, Christmas Tree Farmers Association of New York

Growing and harvesting Christmas Trees can be a single vocation or an attractive additional product line for agricultural enterprise looking to expand business and grow revenues. The growing awareness of the ecological, economic social benefits of supporting local agriculture has fostered a resurgence of interest in fresh natural Christmas Trees and associated fresh greens Holiday decorations. Our session on Thursday morning will introduce the business of growing and marketing Christmas Trees from both a wholesale and a retail perspective. The presenters have experience with Wholesale operations, Retail Lot operations and Choose & Cut Agritainment operations. It will include information on opportunities for business support through the New York State Grown & Certified Program. It will also provide information on the industry support available through The Christmas Tree Farmers Association of New York.

CHRISTMAS TREE PEST MANAGEMENT: IPM THROUGH THE GROWING SEASON

Thursday, January 17, 2019 | 2:00 PM - 3:15 PM
Session organized by Warren Halladay, Christmas Tree Farmers Association of New York

Having a plan in place for your planting allows for efficient pest management. In this session we'll review the first pests to appear in early spring to late season scouting that wraps up the year. We'll look at the symptoms and management considerations for pests such as: white pine weevil, Douglas fir needle casts, twig aphids, spruce adelgids, root rot, gypsy moths and more. With a focus on scouting we'll discuss the optimum timing for pesticide treatments if they're necessary.



EXPO [online registration](https://nysvqa.org/expo) is available from the NYS Vegetable Growers Association at <https://nysvqa.org/expo>

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VegEdge is the award-winning newsletter produced by the Cornell Vegetable Program. It provides readers with information on upcoming meetings, pesticide updates, pest management strategies, cultural practices, marketing ideas and research results from Cornell and Cornell Cooperative Extension. VegEdge is produced every few weeks, with frequency increasing leading up to and during the growing season.



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Cornell Vegetable Program

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