

April 2020

# THE PRODUCE PAGES

Serving the fruit and  
vegetable growers of  
Eastern New York

## Feature Story

### Considerations for Fruit & Vegetable Growers Related to Coronavirus & COVID-19

*Chris Callahan, UVM Extension Ag Engineering*  
*Preface by Crystal Stewart-Courtens, CCE ENYCHP*

*It's amazing how many changes can happen in a few weeks, and hard to anticipate how many more will happen in the following weeks and months. All of the members of the ENYCHP team are committed to helping growers navigate the situation by staying up-to-date on emerging research, legislation, and regulations. Sometimes we will have to amend our recommendations as new information becomes available, which makes creating content like this monthly newsletter a particular challenge. The information provided here is the best of what we know now, and we will update*

*you as new information emerges. Of course, we are also here to help get the growing season started, and are happy to provide some information to kick off the growing season in the newsletter as well. As always, please feel free to call, email and text your usual and new questions to us, and we will be happy to assist.*

*The following handful of articles to open the newsletter are about what we as an industry can do to protect ourselves and our customers from the impacts of Covid-19. We are grateful to have resources like Chris Callahan from UVM and Betsy Bihn from Cornell to help navigate these*

*(Continued on page 3)*

Cornell Cooperative Extension  
Eastern NY Commercial Horticulture Program



# The Produce Pages

## Regular contributors:

### Vegetables

#### **Chuck Bornt**

Phone: 518-859-6213 Email: [cdb13@cornell.edu](mailto:cdb13@cornell.edu)

#### **Ethan Grundberg**

Phone: 617-455-1893 Email: [eg572@cornell.edu](mailto:eg572@cornell.edu)

#### **Elisabeth Hodgdon**

Phone: 518-650-5323 Email: [eh528@cornell.edu](mailto:eh528@cornell.edu)

#### **Teresa Rusinek**

Phone: 845-691-7117 Email: [tr28@cornell.edu](mailto:tr28@cornell.edu)

#### **Crystal Stewart-Courtens**

Phone: 518-775-0018 Email: [cls263@cornell.edu](mailto:cls263@cornell.edu)

#### **Maire Ullrich**

Phone: 845-344-1234 Email: [mru2@cornell.edu](mailto:mru2@cornell.edu)

### Fruit

#### **Dan Donahue, Tree Fruit**

Phone: 845-691-7117 Email: [djd13@cornell.edu](mailto:djd13@cornell.edu)

#### **Jim Meyers, Grapes**

Phone: 845-417-8005 Email: [jmm533@cornell.edu](mailto:jmm533@cornell.edu)

#### **Laura McDermott, Small Fruit**

Phone: 518-791-5038 Email: [lgm4@cornell.edu](mailto:lgm4@cornell.edu)

#### **Mike Basedow, Tree Fruit**

Phone: 518-410-6823 Email: [mrb254@cornell.edu](mailto:mrb254@cornell.edu)

### Technicians

#### **Sarah Eve Elone**

Email: [ser37@cornell.edu](mailto:ser37@cornell.edu)

#### **Natasha Field**

Email: [nf257@cornell.edu](mailto:nf257@cornell.edu)

#### **Andy Galimberti**

Email: [ag2422@cornell.edu](mailto:ag2422@cornell.edu)

#### **Sarah Tobin**

Email: [st944@cornell.edu](mailto:st944@cornell.edu)

### Business Specialist

#### **Liz Higgins**

Phone: (518) 949-3722 Email: [emh56@cornell.edu](mailto:emh56@cornell.edu)

#### **Newsletter Layout: Chelsea Truehart**

**Content editor: Crystal Stewart-Courtens**

## IN THIS ISSUE:

Considerations for Fruit & Vegetable Growers Related to Coronavirus & COVID-19.....	1
H-2A Updates .....	5
Key Sources of Information on COVID-19.....	6
Bag Waste Reduction Law.....	7
Statewide Herbicide Resistance Screening.....	8
Tomato Research Adding Wild Resistance Traits .....	9
Heat-Tolerant Lettuce Trials; Results and Insights .....	11
Interim Guidance for Horticulture .....	14
Cornell Small Farms Online Courses .....	15
Calendar of Events .....	16

Follow us on all of our social media channels to stay up-to-date with our program, upcoming events, and COVID-19 updates:

**Facebook: CCE ENYCHP**

**Instagram: CCEENYCHP**

**Twitter: @19\_CCE**

The *Produce Pages* is a monthly publication of the Eastern New York Commercial Horticulture Program. For more information about the program, please visit our website at <http://enych.cce.cornell.edu/>.

*Serving the Educational and Research Needs of the Commercial Small Fruit, Vegetable and Tree Fruit Industries in Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Putnam, Rensselaer, Saratoga, Schoharie, Schenectady, Ulster, Warren and Washington Counties*

(Continued from cover)

issues and to dovetail new practices into our existing food safety practices. We are grateful to have a team including our own Liz Higgins monitoring the regulatory and labor ramifications as well.

Following is a post that Chris put together which nicely summarizes what we know at this point:

The current COVID-19 pandemic is a common concern and many are wondering what they can and should do. The information here is intended to help guide the fruit and vegetable farming community. If you have concerns or additional suggestions please contact the UVM Extension Produce Safety Team ([producesafety@uvm.edu](mailto:producesafety@uvm.edu) / (802) 257-7967) or the VT Agency of Agriculture's Produce Program for additional guidance ([agr.fsma@vermont.gov](mailto:agr.fsma@vermont.gov) / (802) 828- 2433).

## Background

COVID-19 is the disease caused by the SARS-CoV-2 virus ("the novel coronavirus"). Symptoms include fever, cough, and shortness of breath, and may appear 2-14 days after exposure. While the majority of COVID-19 illnesses are mild, it can result in severe and fatal illness, particularly in the elderly and among those with severe underlying health conditions. Federal and State agencies are working hard to better understand the virus, how to control its spread, and how to treat those infected. One of the key things we can all do is to limit and slow the spread of COVID-19 to provide time for this understanding to develop and to not overwhelm the medical system. Much more information is available at the [CDC Situational Summary page](#).

## What Should Growers Do?

- ✓ Stay Away from Produce if Sick – If someone is sick, they should be nowhere near fruit and vegetables that others are going to eat. This is likely already part of your farm's food safety plan and policies, but this is a good reminder to emphasize and enforce the policy. Make sure employees stay home if they feel sick and send them home if they develop symptoms at work. Consider posting signs asking customers not to shop at your farm stand if they have symptoms.
- ✓ Practice Social Distancing – By putting a bit more space between you and others you can reduce your chances of getting ill. This might mean limiting or prohibiting farm visitors or reducing the number of off-farm meetings you attend in person. Avoid shaking hands and other physical contact. This also reduces the risk of your produce coming into contact with someone who is ill before it heads to market.
- ✓ Minimize the Number of Touches – Consider changes in your policies and operations that minimize the number of times produce is touched by different people. This may include workers, distributors, and customers. More examples are provided below in the

Q&A section.

- ✓ Wash Your Hands – Reinforce the importance of washing hands well when arriving at work, when changing tasks (e.g. moving from office work to wash/pack), before and after eating, after using the bathroom, before putting on gloves when working with produce, and after contact with animals. Soap + water + 20 seconds or more are needed to scrub all surfaces of your hands and fingers thoroughly. Then, dispose of paper towels in a covered, lined trash container.
- ✓ Cleaning, Sanitizing, and Drying – According to the FDA, there is no indication that this virus has spread via food. But, we know viruses (including SARS-CoV-2) survive and spread via hard surfaces. Farms handle produce using tools and equipment with surfaces. We also know that produce has surfaces. Viruses, in general, can be relatively long-lasting in the environment, and have the potential to be transferred via food or food contact surfaces. So, there's no better time than the present to review, improve, and reinforce your standard operating procedures for cleaning, sanitizing, disinfecting, and drying any food contact surfaces, food handling equipment, bins, and tools. More info is provided below in the Q&A section. Remember, cleaning means using soap and water, sanitizing is using a product labeled for sanitizing, disinfecting typically involves higher concentrations of a product labeled for disinfection, and drying means allowing the surfaces to dry completely before use.
- ✓ Plan for Change – Many produce farms are lean operations run by one or two managers and a minimal crew. Do you have a plan for if you become severely ill? How do things change if half your workforce is out sick? More business and labor planning guidance is available at the Cornell Agricultural Workforce Development site.

## What Should Markets and Farmers Markets Do?

- ✓ Everything Above – Growers, retail food market owners, and farmers market managers should do all the things above.



(Continued on page 4)

(Continued from page 3)

Does your market have a hand washing station? More guidance for food and lodging businesses is available from the Vermont Department of Health .

- ✓ **Communicate with your Customers** – Consider reaching out to your customers and recommend they stay home if they are ill. Have you informed your customers about any changes in your hours or policies?
- ✓ **Consider Alternative Delivery** – Some markets are taking this opportunity to launch pre-ordering and electronic payment options to enable social distancing at market. Some markets are moving to a drive-through pickup option. More examples are provided below in the Q&A section.
- ✓ **Reinforce the Health Benefits of Fruits and Vegetables** – We're fortunate to have so many growers who do a great job with storage crops and winter production. This means our community has access to fresh fruits and vegetables that are important to their immune systems at this time of need. Be sure to promote the nutritional value of your products! But, keep in mind that promotion of your products should be within reason. Avoid making overly broad or unsupported health claims. Fresh produce contains many minerals and nutrients important for immune health which may reduce the severity and duration of an illness. Fun Fact: Pound for pound, that storage cabbage in your cooler has as nearly as much vitamin C as oranges.

## Questions and Answers

**1. What is the difference between cleaning, sanitizing, and disinfection?** The CDC provides [more detail on their cleaning website](#), but the take-homes are:

- **“Cleaning** removes germs, dirt, and impurities from surfaces and objects...using soap (or detergent) and water to physically remove [them].”
- **“Disinfecting** kills germs on surfaces or objects. Disinfecting works by using chemicals to kill germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface after cleaning, it can further lower the risk of spreading infection.”
- **“Sanitizing** lowers the number of germs on surfaces or objects to a safe level, as judged by public health standards or requirements.”
- EXAMPLE 1: Reviewing the [label for Sanidate 5.0](#) (p.12, “General Disinfection”), a 5.3% peroxyacetic acid and 23.0% hydrogen peroxide product, we note that the concentration used for disinfection is 0.5-2.2 fl. oz. per gallon of water (230-1000 ppm of peroxyacetic acid in

water) compared to the lower rate used for sanitizing (p.10, “Sanitization of Food Contact Surfaces”) of 1.6-5.4 fl. oz. to 5 gallons water (147-500 ppm). Later in the label, we find the postharvest water application to control cross contamination that we're most familiar with (p. 20, “Treatment of Fruit and Vegetable Processing Waters”) where the rate of use is 59.1-209.5 fl. oz. per 1000 gallons of water (27-96 ppm).

- EXAMPLE 2: Reviewing [the label for Ultra Clorox\(R\) Brand Regular Bleach](#) (alternate name, “Clorox Germicidal Bleach”), a 6.0% sodium hypochlorite product, we note that this product is labeled as effective against human coronavirus (p.35 revised). We also note that the concentration used for disinfection of hard, nonporous surfaces (p. 14 and 22 of PDF) is 2700 ppm (¾ cup per gallon of water) available chlorine compared to the lower rate used for sanitizing (p. 14 of PDF) of 200 ppm (1 tbsp per 1 gallon of water). The [effectiveness of chlorine depends on the pH of water](#).

**2. What Should I Use for Disinfection and Sanitizing?** The EPA has provided [a list of disinfectants for use against SARS-CoV-2](#), the virus causing COVID-19. Very few of these products are common on the farm and may be hard to find. If you are currently using a sanitizer as part of a standard cleaning and sanitizing procedure for hard surfaces on your farm, continue doing so. Consider reviewing the label for that product and using it for disinfection of specific high-touch surfaces if applicable. You can also follow the CDC guidance and use a [mixture of bleach](#) and water (5 tbsp / gallon or 4 tsp / quart).

**3. Should I be disinfecting my produce?** As noted above, there is no indication that COVID-19 has spread via produce. The virus is thought to be spread mainly from person to person [according to the CDC](#). For most farms the level of operational change and amount of disinfectant needed to disinfect produce is unrealistic.

**4. What about using gloves?** Gloves can provide a barrier between hands and produce preventing transmission of pathogens from hands to produce and from produce to hands. They aren't a perfect solution, and require attention to detail when using as a [Penn State Extension summary highlights](#).

**5. What are farmers' markets and CSAs doing?** Some farmers markets have changed the way they do business to implement some of the best practices listed above.

- **Carrboro, NC Farmer's Market Case Study** – [NC State Extension has posted a summary](#) of what the Carrboro Farmers' Market has done. This has included communication with market customers, social distancing by rearranging the market layout, rounding prices for limited use of coins,

(Continued on page 5)



running a “tab” for customers to minimize cash transactions, no samples, no tablecloths to ease sanitation, and the addition of a hand washing station among other things.

- **Minimize the Number of Touches (CSA)** – One CSA has decided to change how they distribute to an urban market. They have previously trucked larger bins of produce to a distribution site where customers would select their own produce to fill their share. They have decided to pack the shares to order at the farm prior to distribution to minimize the number of people touching the produce. Another alternative would be packing shares to order at the market. What are other CSAs doing? Send me an email at [chris.callahan@uvm.edu](mailto:chris.callahan@uvm.edu), I'll compile the results.
- **Minimize the Number of Touches (Farmers' Market)** – The Bennington Farmers' Market has shifted to online ordering and pre-bagged orders from each farm that are combined

into larger collective orders delivered to each customer via a drive-up system. The biggest decision was deciding that they'd actually continue to have the market. The new approach required the addition of an on-line ordering system (Google Forms for now), coordination among farms and some serious organization at the market. Orders are organized alphabetically, pickups are scheduled with a quarter of the alphabet every 30 minutes. People won't get out of their cars. What are other markets doing? Send me an email at [chris.callahan@uvm.edu](mailto:chris.callahan@uvm.edu), I'll compile the results.

**6. What are other farms doing?** Some farms have written and implemented specific response plans or taken other measures to mitigate the risk of COVID-19. [Two Farmers Farm](#) in Scarborough, Maine have developed a detailed, yet agile [farm plan available online](#). What are other markets doing? Send me an email at [chris.callahan@uvm.edu](mailto:chris.callahan@uvm.edu), I'll compile the results.

---

## Be Prepared, H-2A Visas and Embassy Closures Will Impact Travel from Major H-2A Source Countries

*Elizabeth Higgins, CCE Eastern NY Commercial Horticulture*

If you rely on H2A workers for your farm, you are probably aware by now that there will be delays in getting visas and travel restrictions from many countries due to coronavirus. USDA Secretary Sonny Perdue had a call with state departments of agriculture earlier this week outlining the situation and assured State Departments of Ag and others on the call that this situation is being taken very seriously. You can hear a recording of the call at this link: <https://www.farmers.gov/sites/default/files/2020-03/Ag-Labor-Call-03172020.m4a>

Employers are encouraged to monitor USDA's website on H2A <https://www.farmers.gov/manage/h2a> and the State Department's website [www.travel.state.gov](http://www.travel.state.gov) for the latest information and should monitor the relevant Embassy/Consular websites for specific operational information. For the primary countries of origin in our region here is the latest information, thanks to Dr. Rick Stup of the Cornell Ag Workforce Development Program <https://agworkforce.cals.cornell.edu/> for summarizing the current status. His blog is a great resource for current updates related to labor issues and coronavirus:

**Mexico** suspended all routine nonimmigrant visa services starting March 18, 2020, and until further notice. This includes both visa interviews at the embassy and consulates as well as processing at the Centros de Atención a Solicitantes (CAS). But will continue to accept nonimmigrant visa applications on a very limited basis for emergency travel only. According to USDA Secretary Perdue on his call, the State Department in Mexico is

aware of the H2A situation and “the consulates in Mexico will prioritize the visa applications of returning H2A workers who were in the U.S. within the last 12 months, who are eligible for an interview waiver. If eligible, they can have a phone interview and receive a waiver for an in-person visit”. For the Monterrey consulate this is estimated to be about 50-55% of the workers normally processed.

**Jamaica** has stopped processing visas until April. One embassy employee tested positive for COVID-19 and is now recovering. Jamaica's international airports will close for a period of three weeks beginning March 22, 2020. Secretary Perdue also said he expects the interview flexibility to be applied in Jamaica like in Mexico, once consular activities are resumed.

**Guatemala** cancelled all flights into and out of the country for 15 days beginning on March 16 and all non-emergency visa appointments are also cancelled with the “exception of some H-2 applications” according to the U.S. Embassy. Guatemalan workers in Guatemala right now, even with approved visas, are unlikely to be able to travel to the U.S. until something changes.

### What other options are there?

According to USDA, USDA and DOL have identified nearly 20,000 H-2A and H-2B certified positions that have expiring contracts in the coming weeks. There will be workers leaving these positions

*(Continued on page 6)*

who *could be* available to transfer to a different employer's labor certification. The data, available on an excel spreadsheet at this link <https://www.farmers.gov/sites/default/files/documents/H2-Certified-Positions-Ending-March-April-2020.xlsx>, includes the number of certified worker positions, the current employer name and contact, attorney/agent name and contact, and the worksite address. This information will be a resource to H-2A employers whose workforce has been delayed because of travel restrictions or visa processing limitations. Employers should be aware that all statutory and regulatory requirements continue to apply.

### What you should do

Let your local elected officials know of your needs for workers and problems with accessing your H2A workers so that they can help to keep pressure on the federal government to prioritize processing H2A workers visas. Depending on when your H2A workers generally arrive, you may want to consider your cropping plans, anticipating that you might not have a full crew this season. You also may want to start advertising for local workers – depending on how long businesses are closed, there may be a pool of workers who worked in the service sector who are looking for work.

---

---

## Key Sources of Information on COVID-19

**Need information? View the following Cornell CALS and CCE Resource Pages Updated Regularly**

General Questions & Links:

<https://eden.cce.cornell.edu/>

Food Production, Processing & Safety Questions:

<https://instituteforfoodsafety.cornell.edu/coronavirus-covid-19/>

Employment & Agricultural Workforce Questions:

<http://agworkforce.cals.cornell.edu/>

Cornell Small Farms Resiliency Resources:

<https://smallfarms.cornell.edu/resources/farm-resilience/>

Financial & Mental Health Resources for Farmers:

<https://www.nyfarmnet.org/>

Cornell Farmworker Program:

<https://cardi.cals.cornell.edu/programs/farmworker/> and

[www.trabajadores.cornell.edu](http://www.trabajadores.cornell.edu) (en espanol)

Local news and information:

ENYCH team Twitter site on COVID-19: [twitter.com/19\\_cce](https://twitter.com/19_cce) (@19\_CCE)

- Updates from ENYCH/CCE/Cornell, federal and state agencies and local government relevant to ENYCH fruit and vegetable farms and related businesses.



# How the 'Bag Waste Reduction Law' Affects Farm Markets, Farm Stands, and PYOs

Elizabeth Higgins, CCE Eastern NY Commercial Horticulture

As of March 1, 2020, plastic carryout bags, other than an exempt bag, became banned from distribution by anyone required to collect New York State sales tax, even for tax-exempt purchases. There is a website with information about the law and regulations on NYS DEC's webpage. <https://www.dec.ny.gov/chemical/117781.html>. The regulations are now available and are located at <https://www.dec.ny.gov/regulations/118810.html>. The regulations became effective as of March 14, 2020. Under the regulations:

Cities and counties are authorized to adopt a five-cent paper carry-out bag reduction fee. This means that in these areas, a consumer will be charged 5 cents for each paper carryout bag provided at checkout. Vendors in counties that have not adopted the fee are not required to charge for a paper bag, or if they charge for the bag it would be included as an item sold. In counties with the fee, it is not a charge for the paper bag, nor does it go to the merchant. The New York State Department of Taxation and Finance provides information regarding the paper carryout bag reduction fee <https://www.tax.ny.gov/bus/st/paper-carryout-bag-fee.htm>. Sales tax vendors must report and remit the fee on Schedule E, *Paper Carryout Bag Reduction Fee*, which is filed as part of their periodic sales tax return. SNAP (Supplemental Nutrition Assistance Program) and WIC (Women, Infants, and Children -- a nutrition program) recipients are exempt from paying a paper carryout bag reduction fee for paper carryout bags. Right now, none of the counties in the ENYCH region have enacted the paper bag fee, but it has been enacted in all 5 boroughs of NYC. The list of counties is available at <https://www.tax.ny.gov/pdf/publications/sales/pub718b.pdf>.

## Exempt Bags

Some plastic bags that are used by farm stands, PYOs and farmers markets are exempt under the law. Exempt bags include;

- bags used solely to contain or wrap uncooked meat, fish, seafood, poultry, other unwrapped or non-prepackaged food, flower, plant, or other item for the purpose of separating it from other items to avoid contamination, prevent damage from moisture, or for sanitary, public health, or environmental protection purposes;
- bags used solely to package items from bulk containers, including fruits, vegetables, grains, candy;
- used solely to contain food sliced or prepared to order;
- provided by a restaurant, tavern or similar food service establishment, as defined in the New York state sanitary code, to carry out or deliver prepared food;
- A reusable bag, as that term is defined in this Part.

What is considered a reusable *plastic* bag? A reusable plastic bag is a non-film plastic washable material that has at least one strap or handle that does not stretch and is fastened to the bag in such a manner that it allows the bag to meet the strength and durability standards in the bullet point below; it has a minimum lifespan of 125 uses, with a use equal to the ability to carry a minimum of 22 pounds over a distance of at least 175 feet; and has a minimum fabric weight of 80 grams per square meter (GSM) or equivalent for bags made of any non-film plastic of natural, synthetic, petroleum based, or non-petroleum-based origin, including woven or nonwoven polypropylene (PP), polyethylene-terephthalate (PET).



# Statewide Herbicide Resistance Screening to Start in 2020: Help Us Help You!

Dr. Lynn Sosnoskie, Cornell University

Weeds compete with crops for light, water, and nutrients, which can result in yield reductions. Weeds can also interfere with crop production by serving as alternate hosts for pests and pathogens, providing habitat for rodents, and impeding harvest operations. Consequently, growers employ a variety of control strategies, including the application of herbicides, to manage unwanted vegetation. Although herbicides can be extremely effective at controlling undesirable plants, failures can and do occur. Weeds may escape chemical treatments for many reasons including the evolution of herbicide resistance.

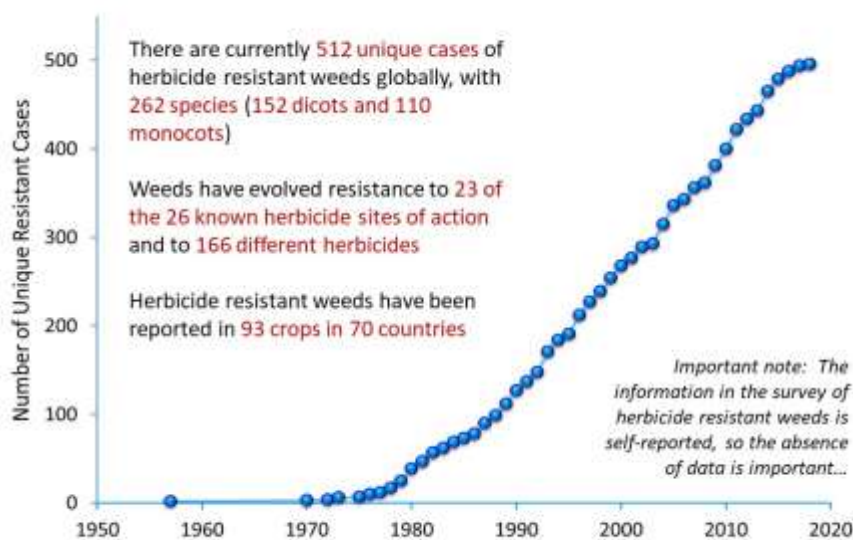
Worldwide, there are 512 confirmed cases (species x site of action) of herbicide resistance. With respect to the United States, 165 unique instances of resistance have been documented. In New York, there are only four formally reported occurrences; these include common lambsquarters (*Chenopodium album*), smooth pigweed (*Amaranthus hybridus*), common ragweed (*Ambrosia artemisiifolia*) and common groundsel (*Senecio vulgaris*). All were described as being insensitive to the photosystem II inhibitors (e.g. atrazine and simazine).

This, however, does not reflect the current on-the-ground situation in the state; work done by Drs. Julie Kikkert (CCE) and Robin Bellinder (Cornell) indicates resistance to linuron in some populations of Powell amaranth (*Amaranthus powelli*). Recent studies by Drs. Bryan Brown (NYS IPM) and Antonio DiTommasso (Cornell) suggest that horseweed (*Conyza canadensis*) and waterhemp (*Amaranthus tuberculatus*) populations may be resistant to one or more herbicide active ingredients. Pennsylvania has nine reported cases of herbicide resistance including glyphosate resistance in Palmer amaranth (*Amaranthus palmeri*), which was recently identified here in NY. While it is tempting to believe that herbicide resistance is a hallmark of agronomic cropping systems, resistance can and has developed in orchards, vineyards, vegetable crops, pastures, and along roadsides.

Beginning in 2020, we will undertake a screening effort to describe the distribution of herbicide resistance in the state. This coming summer and fall, growers, crop consultants and allied industry personnel who suspect they have herbicide resistance are encouraged to contact Dr. Lynn Sosnoskie ([ims438@cornell.edu](mailto:ims438@cornell.edu), 315-787-2231) to arrange for weed seed collection. Indicators of possible herbicide resistance include:

- Dead weeds intermixed with live plants of the same species.
- A weed patch that occurs in the same place and continues to expand, yearly.
- A field where many weed species are controlled but a previously susceptible species is not.
- Reduced weed control that cannot be explained by skips, nozzle clogs, weather events, herbicide rate or adjuvant selection, and calibration or application issues.

Growers can take several actions to stop the spread of herbicide resistant weeds and to prevent the development of new ones. First and foremost is scouting fields following herbicide applications and keeping careful records of herbicide performance to quickly identify weed control failure. Pesticide applicators should ensure that their equipment is properly calibrated and that they are applying effective herbicides at appropriate rates to manage the target species. Whenever possible, diversify herbicides to reduce chemical selection pressures that result from the repeated use of a single herbicide or site of action. If possible, incorporate physical and cultural weed control practices into a vegetation management plan. Be sure to control unwanted plants when they are small and never allow escapes to set seed. Clean equipment to prevent seeds of herbicide-resistant weed species from moving between infested and non-infested sites and harvest areas with suspected resistant populations, last.



Current status of herbicide resistance, globally, over time according to the International Survey of Herbicide Resistant Weeds ([www.weedscience.org](http://www.weedscience.org))



## Tomato Research Adding Wild Resistance Traits

*Originally printed in NYFVI American Agriculturist for April 2020 issue (filed 2/3/2020) by Kara Lynn Dunn*

Progressive research since 2005 is adding the key traits of resistance to fungal and bacterial disease in tomato crops and providing growers with lower and no-spray opportunities.

Dr. Martha Mutschler-Chu, a professor in the Plant Breeding and Genetics Section of the Cornell University CALS School of Integrative Plant Science, Ithaca, N.Y., is developing such tomato lines with help from NY vegetable grower Barth Davenport and others.

Since 2005, Mutschler-Chu has been successively transferring natural fungal and bacterial resistances found in wild tomatoes to field-grown tomatoes adapted to New York state and the Northeast.

"The lines released starting in 2009 have combined resistance to early blight, late blight, and Septoria leaf spot, and resulted in commercialization of tomato hybrids with superior disease with no or less use of fungicides," Mutschler-Chu explains.

Seed companies have used the enhanced resistance lines to create new hybrids with reduced incidence of Septoria leaf spot, early blight, and late blight. Starting in 2018, Mutschler-Chu's team completed lines with an improved degree of early blight resistance in addition to the late blight and Septoria leaf spot resistance.

Tomatoes are among the diversified vegetable crops planted by Barth Davenport, who operates Davenport Farms in Stone Ridge, N.Y., with his brother Bruce. Field trials there evaluated several different lines developed by Mutschler-Chu.

"The trials here included heirloom and 'big red' tomatoes that we grew out from seed to transplants in the greenhouse and then planted to the field. As fungal and disease concerns becoming more and more an issue, we were interested to see which higher-resistance varieties were available and how well they would grow here," Davenport says.

Teresa Rusinek with the Eastern New York Commercial Horticulture Program helped oversee the trials at Davenport Farms. She notes how the research addresses growers' concerns.

"In my 24 years as a Cornell Cooperative Extension field scout and veg specialist, I have often seen tomato disease outbreaks on both organic and conventional production farms. Many growers worry about late blight, and they should, because it is a very fast acting, destructive disease, but early blight and Septoria can also take out tomato plantings, especially in an organic production system where effective fungicides are limited. This is why Dr. Mutschler-Chu's research is so important," Rusinek says.

Building a tomato crop's resistance to fungal infection also addresses the fungus' increasing resistance to fungicidal treatment.

Rusinek points out, "Insensitivity of the early blight pathogen to group 11 fungicides has been identified in farms in New York and elsewhere for some time now. Dr. Mutschler-Chu's work on tomato lines with fungal and bacterial disease resistance is an important tool to help growers implement an integrated pest management program and to reduce the risk of crop loss."

The commercially available higher-resistance hybrids tested in the trials at Davenport Farms included Plum Perfect, Summer Sweetheart, and half-heirloom hybrid Brandywine grown under production practices applied to the entire tomato crop there.

"We try to spray as little as possible, judging what is needed from year-to-year. The difference I saw was that the new varieties lasted longer through the end of the growing season," he says.

Davenport sells tomatoes at the farm's market and to local food stores, and the produce is used in the farm's kitchen run by Culinary Institute of America-trained chefs. Consumer response is a key metric.

"Tomatoes do well as an option in our crop mix to meet consumer demand. We harvested Dr. Mutschler-Chu's tomatoes for sale at the farmstand and people liked them," Davenport says.

Davenport has his ear to the ground for updates on Mutschler-Chu's current work. Dr. Christine Smart's Lab at Cornell AgriTech in Geneva, N.Y., is testing the newly-developed tomato varieties with resistance to bacterial spot as well as the fungal resistances.

"Bacterial diseases, such as bacterial spot and speck, have increasingly become an issue in the past 10 years on more and



*Dr. Martha Mutschler-Chu of Cornell University is adding key traits of resistance of fungal and bacterial disease to tomato crops.  
Photo: Dr. Martha Mutschler-Chu*

*(Continued on page 10)*

(Continued from page 9)



*After the harvest: Barth Davenport, center, with his daughter Robin and his brother Bruce at the family farm established when Isaiah Davenport moved across the Hudson River to Ulster County in the 1840s.*

*Photo: Davenport Farms*

more farms in New York, and they can persist for many years in field soil, trellising stakes, and in greenhouses,” Rusinek says.

Davenport does not overlook the economic benefits of this selective breeding research.

“The possibility of high-resistance, low-spray, no-spray tomatoes represents the potential for time, labor and cost savings,” he says.

Mutschler-Chu’s research continues to create new options for seed companies and ultimately growers and consumers. This research expands its cooperative field trials to others states and begins seed production for other growing zones this year.

Additionally, Mutschler-Chu is working on the third class of living plant challenges, i.e., insects and insect-transmitted virus. While insect pressure in field tomatoes in New York is quite low, it is present in controlled environment production, is increasing in

warmer-climate neighboring states, and is already serious in mid-Atlantic and southern states.

“Certain wild tomatoes have a trichome metabolite that provides a safe, strong natural deterrence against many insect species. This resistance could strongly reduce or eliminate the need for pesticides in tomato production,” Mutschler-Chu notes.

Mutschler-Chu expects lines combining insect resistance and fungal resistances to be completed and released in two years.

Longer-term, Mutschler-Chu says the tomato lines already developed could be used in further breeding process to enhance tomato flavor.

“The fungal-bacterial resistant tomato lines well-adapted to the Northeast are a platform that can be used to breed for additional traits, such as flavor. This platform plus new selection techniques allow breeders to make in two generations the progress that used to take six or more generations,” says Mutschler-Chu.

The New York Farm Viability Institute (NYFVI) has helped fund Mutschler-Chu’s work. NYFVI Director David Grusenmeyer notes, “The Institute is pleased to support this exciting research that represents new opportunities both near and long-term for New York’s farmers, the seed industry, processors, and consumers.”

For more information, contact Dr. Martha Mutschler-Chu at [mam13@cornell.edu](mailto:mam13@cornell.edu).



*Tomato growers attend a tomato production workshop at Davenport Farms with Eastern New York Commercial Horticulture Program educator Teresa Rusinek (center). Photo: Davenport Farms*



# Two Years of Heat-Tolerant Romaine Lettuce Trials; Results and Insights

Natasha Field and Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture Program

## 2018 Standout Varieties

- Augustus – sweet through two first plantings, average 12 oz heads but had average disease resistance
- Breen - sweet in first and last plantings, average 3.8 oz heads and had good disease resistance
- Dragoon – sweet in first two plantings and bitter in last, average 5.5 oz heads with average disease resistance
- Fusion – sweet in the second planting and average taste in the first and third plantings, 12.3 oz average heads and good disease resistance
- Holon - sweet in first and last plantings, average 10.7 oz heads but had average disease resistance
- Kalura - sweet through two first plantings, average 12.3 oz heads but had average disease resistance
- Romulus – sweet in all plantings, average 9.8 oz head but had average disease resistance
- Spretnak - sweet in all plantings, average 7.7 oz head, had good disease resistance



*Lettuce varieties ready for harvest at Philia Farm. Photo: C. Stewart-Courtens*

## 2019 Standout Varieties

- Dragoon – sweet tasting, excellent taste and great disease resistance. 14.2 oz head
- Fusion - sweet tasting, excellent taste and great disease resistance. 14.2 oz head
- Salvius – not bitter or sweet but great tasting and great disease resistance. 13.6 oz head
- Coastal Star - not bitter or sweet but great tasting and great disease resistance. 12.9 oz head
- Zeb Romaine – mini romaine with a 5.8 oz head. Sweet with excellent taste. Average disease resistance
- Jericho – not bitter or sweet but good tasting and good disease resistance. 20.4 oz head, second heaviest in the trial!
- Olga – a bitter lettuce, but good tasting, with good disease resistance. 19.2 oz head.

## Overview

The 2018 lettuce variety trial was conducted at Pleasant Valley Farm in Argyle, NY. The main goal of the trial was to evaluate romaine varieties to see which would perform well in hot summer conditions. We had three plantings over the summer:

- ✓ First planting: May 28<sup>th</sup>, harvested August 1<sup>st</sup>, had 17 days above 85 degrees, GDD (Base 45) 1612
- ✓ Second planting: July 15<sup>th</sup>, harvest September 15<sup>th</sup>, had 15 days above 85 degrees, GDD (Base 45) 1711
- ✓ Third planting: August 1<sup>st</sup>, harvest October 3<sup>rd</sup>, had 12 days above 85 degrees, GDD (Base 45) 1525

The 2019 lettuce variety trial was conducted at Philia Farm in Johnstown, NY.

- ✓ First/only planting: May 29<sup>th</sup>, harvested July 23<sup>rd</sup>, had 12 days above 85 degrees, GDD (Base 45) 1304

*(Continued on page 12)*

(Continued from page 11)

We evaluated the varieties based on the number surviving to harvest, the number harvestable, the number bolted, disease pressure, bitterness, taste and the weight of one average head.

### Ratings

**Bitterness:** on a scale of 1-3 with 1 being bitter and 3 being sweet

**Disease:** on a scale of 1-5 with 1 being extremely sick and 5 having no disease present

**Taste:** While personal tastes play a role, three different people tasted the lettuce, and their rankings were averaged to minimize personal taste preference on a scale with 1 being bitter, 2 being neither bitter nor sweet and 3 being sweet.

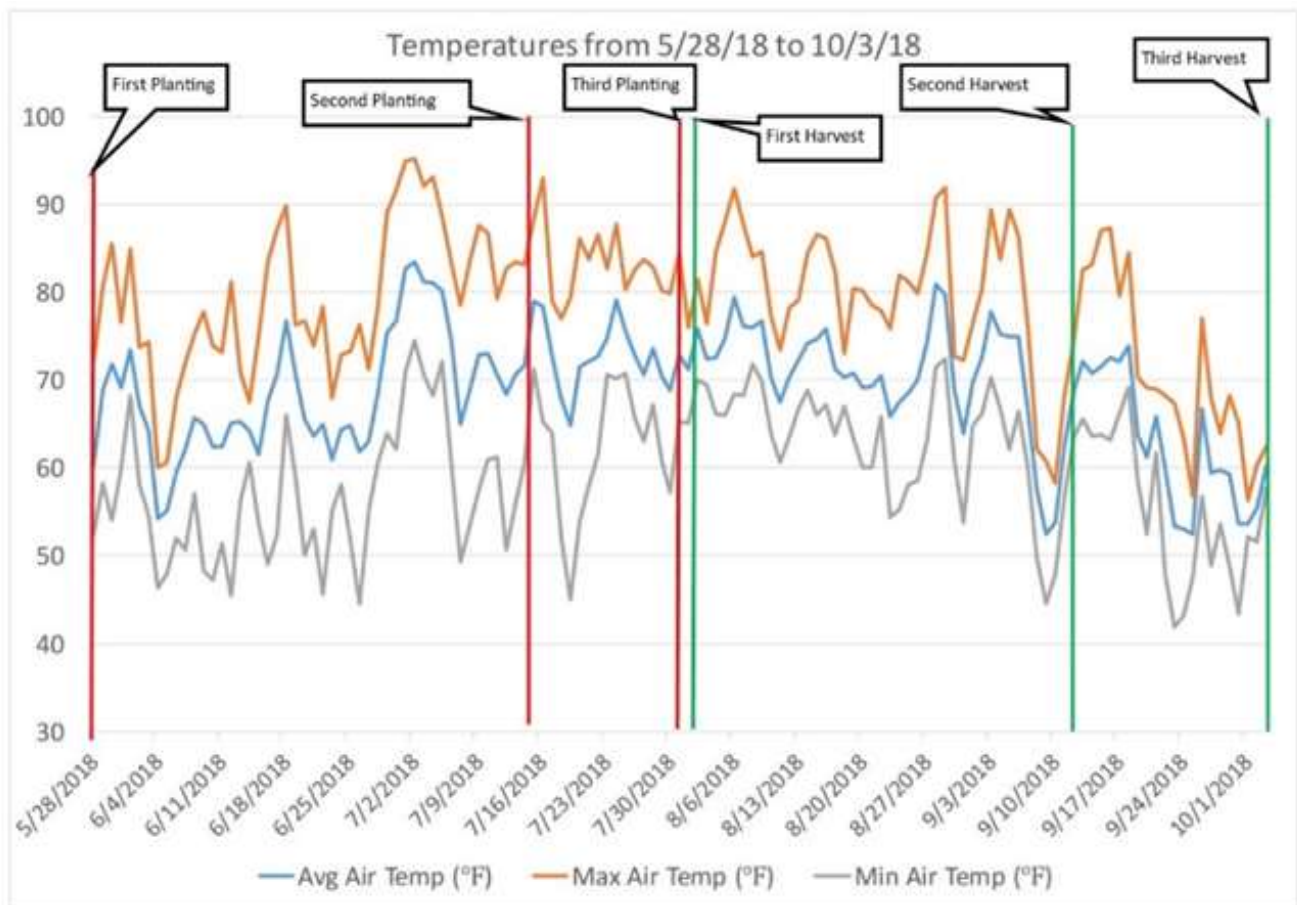
### Weather

One of the most important factors is the number of plants bolting. Often this leads to bitter leaves and odd head shapes and sizes that are unmarketable. In general, the varieties that bolted did so across more than one planting, with the most plants bolting in the first planting. As you can see in the chart below, the first planting in 2018 had more extreme temperature swings as well as the most days over 85 degrees. The first planting had 71 plants bolt, 15% of plants.

Surprisingly, the second 2018 planting had the least amount of plants bolting. It had more heat units but less temperature swings. It was just consistently hot. Only 14 plants bolted during this time despite inconsistent irrigation and the hot and humid temperatures.

The third 2018 planting did have some extreme temperature swings, although it was getting in to the cooler months. Those plants did experience heat stress in August. 41 plants bolted.

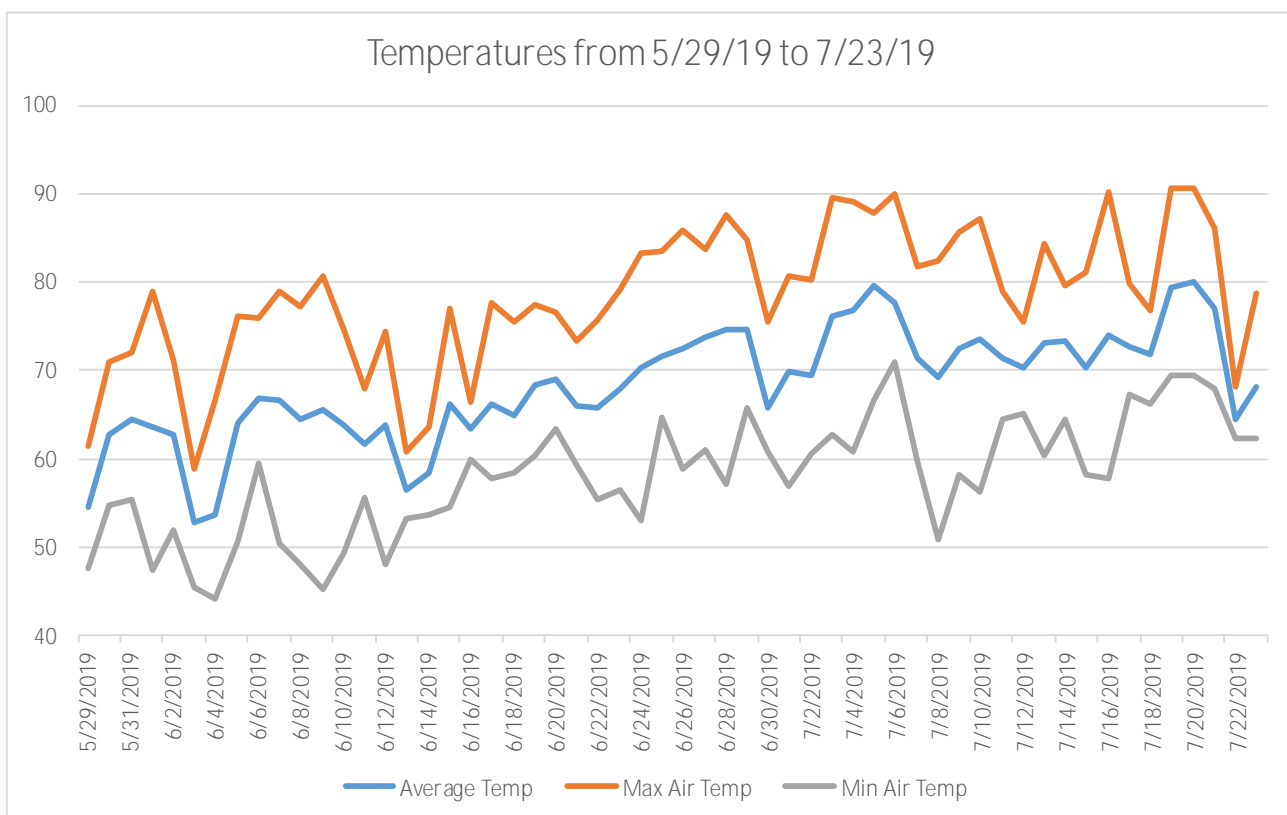
None of the varieties that bolted were in the average to sweet category in bitterness.



2018 Weather Chart

(Continued on page 13)





2019 Weather Chart

In the 2019 planting, only a few varieties bolted when we harvested and evaluated at 55 days from planting. However, just 6 days later, most of the varieties had bolted, leaving only a few able to be harvested. Those that were still marketable were: Salvius, Breen, Coastal Star, Cherokee, Nevada, Fusion, Dagoon, Truchas, Plato II, Jericho, and Sparx.

2019 was cooler than 2018 during the growing period, with only 12 days above 85 degrees and a slow increase to those high temperatures as seen on the chart below. In 2018, the plantings that had the most sudden temperature swings from cool to hot had more plants bolting. 85 degrees is when lettuce will stop growing and experience greater heat stress, leading to bolting. Given that most varieties bolted quickly after we evaluated, keeping a close eye on your lettuce during extreme heat and humidity is extremely important to have heads that are still marketable.

### **Where to Find the Full Variety Reports**

2019 Report - [https://enych.cce.cornell.edu/submission.php?id=683&crumb=crops|crops|lettuce / leafy greens|crop\\*17](https://enych.cce.cornell.edu/submission.php?id=683&crumb=crops|crops|lettuce / leafy greens|crop*17)

2018 Report - [https://enych.cce.cornell.edu/submission.php?id=618&crumb=crops|crops|lettuce / leafy greens|crop\\*17](https://enych.cce.cornell.edu/submission.php?id=618&crumb=crops|crops|lettuce / leafy greens|crop*17)

If you can't get to the above links, go to [enych.cce.cornell.edu](https://enych.cce.cornell.edu) and scroll through the crops near the top until you get to lettuce, click the lettuce box and it will take you to the page with all of the lettuce variety trial information. You can also request physical copies of these reports by contacting Crystal at [cls263@cornell.edu](mailto:cls263@cornell.edu) or at (518) 775-0018.



*Newer varieties of Romaine feature excellent red color, hearty crunch, and RUFFLES! A personal favorite was Fusion, center left. Photo: C. Stewart-Courstens*

## Interim Guidance for Horticulture

Richard A. Ball, Commissioner, NYS Agriculture and Markets

*This guidance is provided for greenhouse operations, landscapers, arborists, garden centers, and nurseries.*



### Background:

In December 2019, a new respiratory disease called Coronavirus Disease 2019 (COVID19) was detected in China. COVID-19 is caused by a virus (SARS-CoV-2) that is part of a large family of viruses called coronaviruses.

On March 20, 2020, Governor Cuomo signed the "PAUSE" Executive Order, a 10-point policy to assure uniform safety for everyone. It includes a new directive that all nonessential businesses statewide must close in-office personnel functions effective at 8PM on Sunday, March 22, 2020. Essential businesses are exempt from this guidance. Horticulture operations as defined below have been deemed essential and are exempt.

### Horticultural Operations:

For purposes of Executive Order 202.6/PAUSE Executive Order, "Essential Business" states "agriculture/farms," which includes the horticulture industry. As outlined in Agriculture and Markets Law Article 25-AA Section 301, horticulture is a key component of agriculture and New York State farms.

For horticultural operations, the Department defines the following businesses/activities as consistent with Executive Order 202.6:

- Production, movement, maintenance, and sale of vegetable plants, nursery stock, trees, plants, and flowers at greenhouse and nursery operations.
- Tree and shrub trimming and removal for disease, safety, and public health purposes.
- The placement and ground maintenance of sod, landscaping plants, flowers, ornamentals, and trees on residential and commercial grounds.
- Transportation necessary to meet any of the above functions.
- Agribusiness, including the sale and application of pesticides, herbicides, fertilizers, and minerals, that support any of the above functions.

If a business does not fall within this guidance, but you believe that it is essential or it is an entity providing essential services or functions, you may request designation as an essential business. [Request designation as an essential business.](#)

### FOR EMPLOYEES

Cleaning/Disinfecting and Social Distancing:

All privately-owned facilities must practice social distancing, and proper cleaning and sanitizing of the facility. This includes:

- Regular hand washing with soap and water for at least 20 seconds. This should be done:
  - \* Before and after eating.
  - \* After sneezing, coughing, or nose blowing.
  - \* After touching face, hair, cellphone, and/or clothing.
  - \* After using the restroom.
  - \* Before handling food.
  - \* After touching or cleaning surfaces that may be contaminated.
  - \* After using shared equipment and supplies.
- Covering coughs and sneezes with tissues or the corner of elbow.
- Disposing of soiled tissues immediately after use.

It is encouraged that businesses post [signage](#) with handwashing procedures in prominent locations to promote hand hygiene. Clean and disinfect buildings and equipment as outlined in this [guidance](#).

**For additional information, visit the links below:**

NYS Department of Agriculture and Markets: <https://agriculture.ny.gov/coronavirus>

NYS Department of Health: <https://coronavirus.health.ny.gov/home>

**Dear farmers and friends,**

Over the last week, our networks have been buzzing with conversations on how farmers can prepare for possible changes due to COVID-19. We at the Cornell Small Farms Program want to support you through this crisis. We have set up a [farm resilience resource page](#) that brings together information and resources from our partners in CCE and other agencies, as well as learning opportunities to help you adapt for this season.



To further support you in this trying time, we would like to offer you free access for any two of our online courses through the end of April. This is a gesture of solidarity made possible by our online course team, as well as students who have paid to take these courses over the years. While our instructor-led courses are nearly wrapped up for the year, all of the recorded lectures and other content is there for our self-directed study.

Our suite of more than 20 online courses help farmers improve their technical and business skills. These courses cover a range of topics, from mushroom growing to financial planning, to anything in between that a farmer needs to succeed.

If you want to use some of your time at home and take advantage of this online class offer, please do the following:

1. Between now and the end of April, go to [www.smallfarmcourses.com](http://www.smallfarmcourses.com) and choose a course to enroll in.
2. When you get to the checkout page, look for the 'Add Coupon' link, and enter COVID19 in that field.
3. Checkout for free, and get started on your course.
4. You can choose a second course if you'd like, but please limit your use of this coupon to two courses.
5. Complete the course(s) before April 30, when you will lose access to the course materials.

One thing that this pandemic has made clear is that our small-scale farmers help build local food security. We'd like to support you using this time to further develop your farming skills.

Together, we'll get through this challenging time!

The Cornell Small Farms Program team





# Upcoming Events

## Bloom Thinning with the Pollen Tube Growth Model

March 31, 2020

Join us via webinar to learn about bloom thinning with the pollen tube growth model. We will hear from Dr. Greg Peck, Assistant Professor of Horticulture at Cornell University in Ithaca. Following his bloom thinning presentation, Greg will be available to field questions on his other research areas, including:

- Hard cider orchard management
- Organic production strategies
- Sustainable orchard ground floor management

Register by March 29 to receive the webinar link via email on March 30: [bit.ly/BloomThinning](https://bit.ly/BloomThinning)

## Websites for coronavirus education and updates:

Cornell Institute for Food Safety - COVID-19 Resource page: <https://instituteforfoodsafety.cornell.edu/coronavirus-covid-19/food-industry-resources/>

Cornell Agriculture Workforce and Development - <https://agworkforce.cals.cornell.edu/2020/03/12/novel-coronavirus-prevention-control-for-farms/>

CCE NY Extension Disaster Education Network (EDEN): <https://eden.cce.cornell.edu/home/coronavirus-response/> and <http://eden.cce.cornell.edu/disease/>

The Centers for Disease Control (CDC) provides excellent resources at <https://www.cdc.gov/coronavirus/2019-ncov/>

New York State Department of Health is communicating via their dedicated site at <https://www.health.ny.gov/diseases/communicable/coronavirus/>

General Questions & Links: <https://eden.cce.cornell.edu/>

Food Production, Processing & Safety Questions: <https://instituteforfoodsafety.cornell.edu/coronavirus-covid-19/>

Employment & Agricultural Workforce Questions: <http://agworkforce.cals.cornell.edu/>

Cornell Small Farms Resiliency Resources: <https://smallfarms.cornell.edu/resources/farm-resilience/>

Financial & Mental Health Resources for Farmers: <https://www.nyfarmnet.org/>



The Label is the Law. Cornell Cooperative Extension and the staff assume no liability for the effectiveness of results of any chemicals for pesticide use. No endorsement of any product is made or implied. Every effort has been made to provide correct, complete, and current pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly and human errors are still possible. These recommendations are not substitutes for pesticide labeling. Please read the label before applying any pesticide. Where trade names are used, no discrimination is intended and no endorsement is implied by Cornell Cooperative Extension.

*Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.*