



VEGEEdge

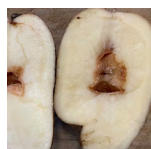
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Preventing Bitterness in Storage Carrots

Emma van der Heide, Cornell Cooperative Extension, Cornell Vegetable Program

At this point in the year, many growers have harvested or are harvesting a healthy carrot crop. Any rotten carrots have been culled, and the remainder are going into storage, with the objective of maintaining quality until sale. As a reminder, a high quality carrot for fresh market is firm, relatively straight, free of blemishes, and **not bitter**.

WHAT CAUSES CARROTS TO BE BITTER?

Bitterness in carrots coming out of the field may be a result of pre-harvest water stress. In this context, the bitter flavor is due to compounds called terpenoids. **Carrots that develop bitterness after storage, however, likely became bitter when exposed to ethylene**, which led to the production of isocoumarin. Let's dig into that a bit more.

WHAT IS ETHYLENE?

Ethylene is a plant hormone produced by ripening or damaged fruits and vegetables. In general, produce falls into one of three categories based on ethylene sensitivity:

1. Produce that is sensitive to and produces ethylene
2. Produce that is less sensitive to and does not produce ethylene
3. Produce that is sensitive to ethylene in the environment but does not produce much ethylene itself (Carrots fall into this category.)

Fruits and vegetables that are sensitive to ethylene can be induced to ripen by exposure to ethylene, which allows the



Avoid storing carrots with apples, cantaloupes, honeydew melons, nectarines, peaches, potatoes, and tomatoes, if possible, to help prevent the carrots from becoming bitter. *Photo by E. van der Heide, Cornell Cooperative Extension*

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About VegEdge

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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Information provided is general and educational in nature. Employees and staff of the Cornell Vegetable Program, Cornell Cooperative Extension, and Cornell University do not endorse or recommend any specific product or service.

This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are possible. Some materials may no longer be available and some uses may no longer be legal. All pesticides distributed, sold or applied in NYS must be registered with the NYS Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide usage in NYS should be directed to the appropriate Cornell Cooperative Extension (CCE) specialist or your regional DEC office.

CCE and its employees assume no liability for the effectiveness or results of any chemicals for pesticide usage. No endorsement of products or companies is made or implied. READ THE LABEL BEFORE APPLYING ANY PESTICIDE.

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 14224.



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The next issue of VegEdge newsletter will be produced on December 1, 2021.

Re-enroll in the Cornell Vegetable Program for 2022



ENROLL TODAY

- ✓ VegEdge newsletter
- ✓ telephone / email consultations from our Vegetable Specialists
- ✓ reduced registration fees at Cornell Vegetable Program events
- ✓ special event notices and alerts

RE-ENROLLMENT PACKETS AVAILABLE SOON

Local Cornell Cooperative Extension offices in our 14-county region will soon be reaching out with their 2022 enrollment forms. Re-enroll in the Cornell Vegetable Program to keep receiving VegEdge newsletter in 2022! Contact your local Cooperative Extension if you do not receive an enrollment solicitation by the end of the year.

NOT LOCATED WITHIN ONE OF OUR SUPPORTING 14 COUNTIES?

Enroll online at CVP.CCE.CORNELL.EDU or contact Angela Ochterski at 585-394-3977 x426 to have a form mailed to you.

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artificial ripening of fruits that are picked green and shipped from the tropics, like bananas and mangoes. However, accidental or excessive ethylene exposure can also cause ethylene-sensitive produce to ripen, senesce, and spoil at the wrong time.

WHY DOES ETHYLENE MAKE CARROTS BITTER?

When carrots sense ethylene, they begin to produce isocoumarin (Eye-so-coo-mar-in). Isocoumarin is a bitter-tasting natural defense chemical that carrots use to protect themselves from things that want to feed on them. For example, a carrot that is damaged in the field by an insect produces ethylene, which is detected by any nearby carrots. These carrots, now informed of the threat, begin to produce isocoumarin in order to make themselves bitter and unpalatable.

Unfortunately, carrots can't tell the difference between the ethylene produced by a damaged carrot in the field and ethylene produced by a nearby crate of ripening apples. Essentially, healthy ethylene-producing crops stored near carrots are telling the carrots that they are in imminent danger and should become bitter. It doesn't take much to make this happen; as little as 0.5ppm ethylene can produce a bitter carrot in two weeks.

WHICH CROPS PRODUCE A LOT OF ETHYLENE?

Crops that produce a lot of ethylene should not be stored with carrots. Apples, cantaloupes, honeydew melons, nectarines, peaches, pears, and tomatoes fall into this category. Apples will be the relevant winter storage crop for most farms.

It's worth noting here that carrots aren't the only ethylene sensitive crop you may be storing. Cole crops, lettuce, greens, and winter squash are all ethylene sensitive, though they produce relatively little ethylene themselves.



HOW TO PREVENT BITTERNESS

- As much as possible, **don't store carrots with ethylene-producing crops** like apple.
- **Store topped carrots at 95-100% humidity and around 32-34°F** to prevent water loss and slow metabolic functions (including the rate of isocoumarin production).
- **Good air exchange** will help prevent ethylene buildup. One complete air exchange per hour is usually sufficient, and is good storage practice anyway; airflow reduces condensation and helps prevent decay.
- **Handle the crop carefully during harvest.** Remember how ethylene is produced in response to wounding? Bruised, cracked, or broken carrots can give off ethylene. Damage can also provide entry points for pathogens and lead to yield loss in the form of gross, rotting carrots (which also produce ethylene at higher rates). Store only your best carrots - any disease issues from the field can be expected to worsen in storage. For an overview of carrot pathology issues, see Julie Kikkert's article "Carrot Root Decay at Harvest Time" in the [October 4, 2021 issue of VegEdge](#).
- **Ethylene absorbing filters** are available, but are probably not a cost-effective solution for most small-scale growers. Special filters carry an added installation and maintenance cost, and most storage crops don't have a strong enough response to environmental ethylene to justify the expense. Regular air exchange and consideration of which crops shouldn't be stored together can be enough to keep ethylene concentration below harmful levels.

SOURCES

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Internal Disorders and Diseases of Potato Tubers

Margie Lund, Cornell Cooperative Extension, Cornell Vegetable Program

With potato harvest winding down and tubers moving into storage, you may notice some tubers with defects or rotten insides. You are bound to have some tubers with internal disorders or diseases at harvest, but it can be concerning when you are seeing rotting potatoes in large numbers. This guide can help you identify what may be causing your internal tuber problems. This is not an exhaustive list but covers many of the more common internal tuber disorders and diseases.

HOLLOW HEART

This disorder presents as a brown or tan, grainy, hollow cavity in the middle of the potato tuber. It can be difficult to discover because hollow heart causes no blemishes to the skin of the potato, so it's not visible unless the tuber is cut open. Hollow heart is generally a result of inconsistent moisture levels throughout the season causing the tubers to grow rapidly at different points allowing the center to pull apart and create a hollow cavity. This disorder is most likely to be found in large or oversized tubers. Checking and maintaining soil moisture levels throughout the season can help to decrease hollow heart. Potatoes with hollow heart are still edible, though they are not suitable for making chips.



Hollow Heart. Photo by M. Lund, CCE Cornell Vegetable Program

INTERNAL NECROSIS

Brown internal necrosis in the potato flesh can be a result of a few different environmental factors. High soil and tuber temperatures during periods of rapid growth can cause heat necrosis and browning in the flesh. Internal brown spot also causes brown patches

in tuber flesh and is associated with calcium deficiency and low soil moisture. Stem end browning can cause browning along the vascular ring and occurs when plants experience rapid vine death and when desiccants are applied during periods of drought or heat stress.



Internal Necrosis. Photo by M. Lund, CCE Cornell Vegetable Program

FUSARIUM DRY ROT

Dry rot is caused by infection from the fungal species in the genus *Fusarium*. This rot can range in color from light brown or dark brown to black, and usually presents with some white fungal spores. Infection will often develop at an injury point and can also lead to further rot by bacteria. Potatoes are generally infected during harvest but can also be infected in storage by other diseased tubers. Allowing potatoes to properly cure and dropping storage temperatures slowly can help reduce the spread of this disease.



Fusarium Dry Rot. Photo by M. Lund, CCE Cornell Vegetable Program

LATE BLIGHT

Late blight is caused by the fungus-like pathogen *Phytophthora infestans* and can infect potato tubers both in the field and in storage. Tubers become infected in the field throughout the season by sporangia that has washed off infected plants into the soil. Tubers with late blight produce brown/black skin lesions, and the flesh may develop a tan or brown dry rot that can extend from the skin lesions in towards the center. Planting resistant varieties and maintaining proper fungicide programs during the field season can help with control of late blight in tubers.



Late Blight. Photo by Steve Johnson, University of Maine

BACTERIAL SOFT ROT

Soft rot in potato tubers is caused by many different bacteria, and causes soft, wet rot that may be cream or brown colored. Bacteria can enter potatoes through lenticels, growth cracks, or injuries, and is often a secondary infection to other diseases that infect the tuber first such as Fusarium dry rot. Proper handling of tubers during harvest can help reduce mechanical damage to tubers and reduce entry points for soft rot bacteria. Properly curing potatoes to heal wounds, lowering storage temperatures slowly, and proper sanitation of storage facilities can also help reduce spread in storage.



Bacterial Soft Rot. Photo by M. Lund, CCE

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PYTHIUM LEAK

Leak is another soft rot caused by the fungus *Pythium*. This fungus is soilborne and infects tubers through injuries. The rot can be cream, grey, brown, or black in color and is very wet. When squeezed, infected tubers will release a clear liquid. Infected areas are well defined and may be surrounded by a dark line. If left, the entire tuber will rot leaving a hollow shell. Tubers often have a sweet smell. Proper handling and reducing mechanical damage to tubers during harvest can help reduce leak infections in potatoes.



Pythium Leak. Photo by M. Lund, CCE

PINK ROT

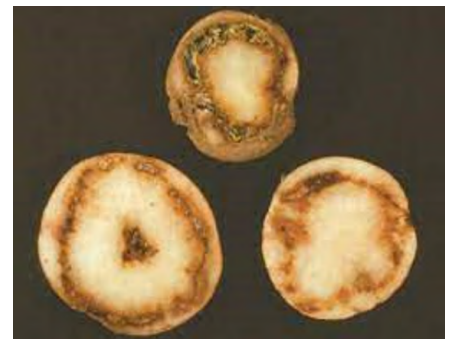
Pink rot is caused by a soil borne fungus, *Phytophthora erythroseptica*. The disease will develop before or at harvest and is associated with wet soils, poor drainage, or low spots in fields. Infection to the tubers occurs through stolons and lenticels, as well as wounds. Symptoms of pink rot include darkened skins of the tubers, and a rubbery flesh. When cut open, the flesh of the tuber will turn from a cream to a pink color in around 20-30 minutes, and if left for longer will turn black. Maintaining proper soil moisture throughout the season as well as proper sanitation of equipment are important control measures for pink rot.



Pink Rot. Photo by Ontario CropIPM

BACTERIAL RING ROT

Bacterial Ring Rot is not common, but if found is very serious. It is very infectious and can survive for long periods of time on equipment. Bacterial ring rot typically spreads from infected seed to healthy tubers during seed cutting and planting but can also spread to plants in the field by direct contact with infected plants. Internal tuber symptoms may present as creamy, odorless rot in the vascular ring, or corky tissue in hollowed out lesions in the vascular ring. These symptoms can look similar to dry rots and soft rots, and different varieties present different symptoms so it can be difficult to determine if the disease is bacterial ring rot. If you suspect you have bacterial ring rot, please reach out to your local extension specialist for testing.



Bacterial Ring Rot. Photo by Ontario CropIPM ●

Wash/Pack Farm Food Safety Videos and Assistance Available

Robert Hadad, Cornell Cooperative Extension, Cornell Vegetable Program

Our multi-state project, SCRUB, stands for Sanitizing and Cleaning Resources for Your Business. Through the collaborative efforts of Cornell, U. Vermont, Michigan State Univ., and National Farmers Union – Georgia, our education team has been focusing on small-scale produce farms assisting growers with easy fixes for food safety implementation problems. The idea is not to be overwhelmed with regulatory pressures but instead improve practices that make sense for the individual farms.

Over the late summer and fall, we have held 6 virtual twilight workshops. Each event had a panel of growers we have worked with describe how they have tackled a particular barrier that has really bugged them on their farm. With low cost and reasonable adjustments, they have created “easy wins”. Each workshop was on a particular topic. They included Bins, Doing More with Less, Floors, Wash Water, Employee Management, and Greens Bubblers. The workshops were held to a small number of participants for the live event. However, recordings were made of each workshop. As the cold weather settles in and you are looking for something to do, sit back, relax and watch one or more of these videos.

Go to the SCRUB website found on the UVM Ag Engineering section: <https://blog.uvm.edu/cwcallah/scrub-events/> Scroll down the page and look for the link for each of the twilight workshop recordings. Also checkout the resource page links listed there for more information.

If you want to learn more about the subject matter or have other issues you are looking for assistance on, please don't hesitate to contact us—Robert Hadad, rgh26@cornell.edu 585-739-4065; Caitlin Tucker, cv275@cornell.edu. If you don't know where to start in post-harvest handling or if it is field issues or maybe it is trying to get ready for GAPs or FSMA, we are here to help.

Further resources can be found on our [CVP website under Food Safety](#) – There are wash pack facility videos, checklists for cleaning equipment, specific SOPs for cleaning and sanitizing as well as other topics, and a whole lot more.

UVM Ag Engineering site— <https://blog.uvm.edu/cwcallah/scrub-project-resources/> —also has some great resources on a number of related topics. ●

In-furrow Applications of Thiamethoxam Expose Native Bees to Lethal Residues in Squash Crops

Diana Obregon and Katja Poveda, Department of Entomology, Cornell; Grace Pederson, Biological Sciences, Cornell; Alan Taylor, Department of Horticulture, Cornell AgriTech



Squash bee visiting a female squash flower. Photo by Diana Obregon

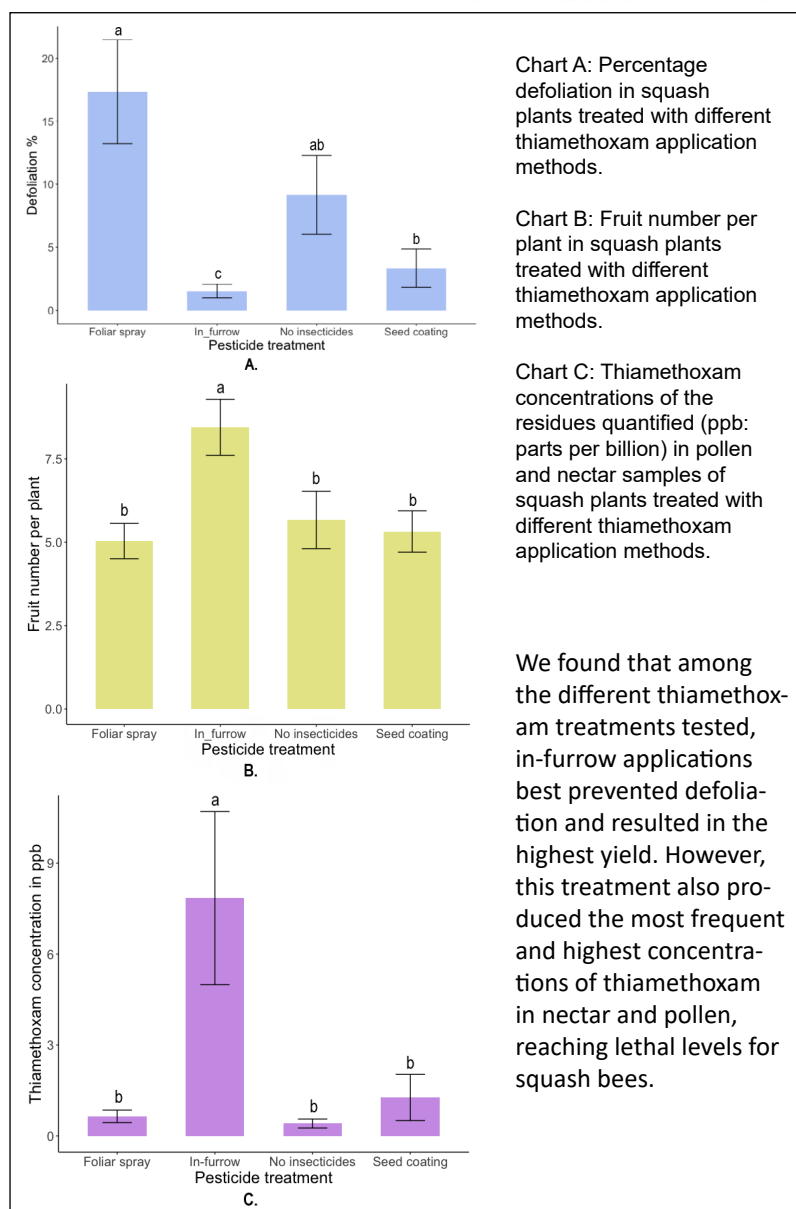
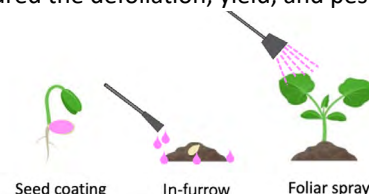
Squash crops, as well as other cucurbit crops are highly dependent on bee pollination. Cucurbits require insects to move pollen from their male flowers to their female flowers for fruit production. The most common and efficient bees that pollinate cucurbits in eastern North America are squash bees, bumble bees, and honey bees. Squash bees, in particular, have a very close relationship with the crops, because these solitary bees rely mostly upon their pollen to rear offspring. Moreover, female squash bees nest in the ground within the cultivated fields.

While bee pollination is fundamental for squash production, pest control is also necessary when there are high populations of the striped cucumber beetle *Acalymma vittatum* (F.) is high. This is particularly important early in the season when seedlings are more vulnerable. To control this herbivore, neonicotinoid insecticides are commonly used as prophylactic measures at planting through seed treatments, in-furrow drenches, or early foliar applications. Although neonicotinoids are well recognized for their broad-spectrum activity against sap-sucking and chewing pests, they are also known for their lethal and sublethal effects on bees. Once applied, neonicotinoids exhibit systemic uptake and are translocated to different plant tissues providing pest protection for some weeks. Less desirable is that neonicotinoids also accumulate in soils, nectar, and pollen potentially exposing insect pollinators. Little is known about the impact of different application methods on pest pressure and the pesticide residues found in nectar and pollen that could potentially affect bees.



To elucidate whether there is a particular thiamethoxam application method that would reduce pest damage and minimize pesticide exposure to bees, we treated squash plants (Var. Golden Zucchini and Success PM) with the following four thiamethoxam treatments at the commercial label rates: (1) In-furrow application after sowing (Platinum, 75% a.i., 3.67 oz/A, Syngenta) (2) Foliar spray application three weeks after sowing when the plants had three true leaves (Actara, 25% a.i., 5.5 oz/A, Syngenta), (3) Seed coating (Cruiser, 47.6% a.i., 0.75 mg ai/seed, Syngenta), and (4) No insecticides applied. We then measured the defoliation, yield, and pesticide residues in nectar and pollen.

Different thiamethoxam application methods tested. The pink color depicts thiamethoxam. Graphic illustration by Diana Obregon



We found that among the different thiamethoxam treatments tested, in-furrow applications best prevented defoliation and resulted in the highest yield. However, this treatment also produced the most frequent and highest concentrations of thiamethoxam in nectar and pollen, reaching lethal levels for squash bees.

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Seed treatment was the second-best treatment to avoid defoliation but there were no differences in yield when compared with the control with no insecticides. This is a concerning result because cucurbit growers commonly use seed treatments. The foliar spray treatment exhibited no yield difference from the untreated control. This may be caused by a short duration of the insecticide on the plant due to photodegradation or being washed away by rain, which often leads to the need for multiple applications in the field.

In our study, we show that due to the lethal hazard for bees of thiamethoxam residues coming from in-furrow applications and the lack of pest control efficiency from the seed treatments and the foliar spray, commercial applications of thiamethoxam do not currently provide a sustainable solution for squash growers, representing a dilemma that requires further research on more efficient pesticide delivery methods as well as on alternative non-pesticide pest control measurements. **To protect bee pollinators in your area, we recommend avoiding in-furrow applications of thiamethoxam.**

This research was supported by a Federal Capacity Fund multistate project (No. NYC-139848) received from the National Institute of Food and Agriculture (NIFA), United States Department of Agriculture, to Dr. Katja Poveda. ●

NEWA 3.0 Digital Resources for NY Vegetable Producers and Processors

Dan Olmstead, Extension Associate and NEWA Coordinator, New York State IPM Program

INTRODUCTION

The Network for Environment and Weather Applications (NEWA) is part of the New York State Integrated Pest Management Program and Cornell Cooperative Extension. NEWA 3.0 was relaunched on October 1, 2021 at <https://newa.cornell.edu> and includes a variety of useful tools and resources that are available free of charge.

GET STARTED WITH NEWA 3.0

You will have the best experience with NEWA by creating and using a user profile. We ask only for your e-mail address and will never share this information with anyone. This also helps us communicate directly in urgent situations. Watch the introductory videos below to get started.

Create and Configure Your User Profile (3 minutes)

<https://newa.zendesk.com/hc/en-us/articles/360054268454>

Dashboard Navigation (3 minutes)

<https://newa.zendesk.com/hc/en-us/articles/360057357553>

NEWA EVALUATES CROP RISK USING REAL-TIME WEATHER DATA

NEWA uses a network of grower-owned and operated weather stations to obtain farm weather data in real time. Digital vegetable models use these data to provide real-time crop risk forecasts for the next five days. NEWA also stores historical data and risk assessments for record-keeping. The following vegetable models are available to everyone for use.

Cabbage Maggot Model (4 minutes)

<https://newa.zendesk.com/hc/en-us/articles/1500003851521>

Cercospora Leaf Spot of Table Beets Model (4 minutes)

<https://newa.zendesk.com/hc/en-us/articles/1500003972482>

Onion Diseases Model (4 minutes)

<https://newa.zendesk.com/hc/en-us/articles/1500003852901>

Onion Maggot Model (3 minutes)

<https://newa.zendesk.com/hc/en-us/articles/360062424354>

Potato Diseases Model (legacy version) (3 minutes)

<https://newa.zendesk.com/hc/en-us/articles/4411685200407>

Tomato Diseases Model (legacy version) (3 minutes)

<https://newa.zendesk.com/hc/en-us/articles/4411685226007>

NEWA IS USEFUL FOR RECORD-KEEPING AND INSURANCE

NEWA serves up historical weather data records from every linked weather station. Hourly records and Daily summaries up to 12 months within a single calendar year are available for direct download. Learn more about this resource below.

All Weather Data Query Tool (4 minutes)

<https://newa.zendesk.com/hc/en-us/articles/360062426014>

TRACK YOUR OWN DEGREE DAYS

Customize a degree day accumulation model, even if NEWA doesn't have a resource for the insect or disease you are concerned about. Learn how to customize this tool for your own use.

Degree Day Calculator (2 minutes)

<https://newa.zendesk.com/hc/en-us/articles/1500003853241>

GET TIMELY ANSWERS TO YOUR QUESTIONS

NEWA has a system for tracking and resolving questions, concerns, bugs, and comments. Send an email to the Help Desk below and a live human being will respond within one or two business days or a bit longer during busy springtime periods. An electronic ticket is generated so we can answer your question or concern in a timely manner, even during the busiest times, without losing track of it when many requests are pending.

support@newa.zendesk.com ●

Upcoming Events

Cornell Vegetable Program events are listed at CVP.CCE.CORNELL.EDU

Labor Roadshow V

Series of 2-hour webinars on November 22 and 23, and December 2, 3, 9, and 10

Online via Zoom | 12:00pm - 2:00pm

Ag Workforce Development Council is hosting Labor Roadshow V as a virtual event. Cost is \$55 per person to attend all six webinars and to receive links to the webinar recordings and roadshow materials.

New York Labor Road Show V is an opportunity to learn about regulation changes and how to best position your business for compliance and success. Several important changes to state regulations occurred in 2021 that farm employers need to understand, and better employee management is the key to farm success during and after our current farm labor crisis.

Labor Roadshow V topics include: worker's compensation, employee handbooks, labor cost trends and management strategies, COVID issues for farm employers, NY farm labor law compliance, preventing turnover, employee housing management, employee wellness programs, NY farm unions and immigration enforcement, H-2A for beginners, and understanding NYS paid sick and family leave.

For the full agenda and to register, visit <https://agworkforce.cals.cornell.edu/labor-roadshow-v/>

Farmer Tax School

An educational series from Cornell Cooperative Extension Farm Business Management Specialists offering courses designed to inform and empower farm managers to better understand their tax obligations, management strategies, and improve farm profitability.

Farm Financial Records for Decision Making & Tax Management

December 2, 2021 (Thursday) | 7:00pm - 9:00pm

A primer for beginning farmers, or a tune-up for those already in production, on recording income and annual expenses, capital expenditures and depreciation with additional information covering loans & credit card or revolving loan payments, sales of business assets, and deducting losses. Cost: \$10/farm.

Tax Management for Beginning and Small Farm Businesses

January 18, 2022 (Tuesday) | 7:00pm - 9:00pm

A one-night virtual meeting for beginning and part-time farmers that provides useful tax information enabling participants to make better tax decisions for their business. Federal and state income taxes will be covered. Tax regulations specific to NYS will be covered as well. Cost: \$10/farm.

Farm Specific Tax Code Benefits

January 25, 2022 (Tuesday) | 7:00pm - 9:00pm

For farm businesses of all shapes and sizes, tune in to learn more about the tax advantages available for farms. This workshop will include information for the current tax season. Cost: \$10/farm.

Learn more about these courses at tinyurl.com/ccetaxschool or call Katelyn Walley-Stoll at 716-640-0522.

Processing Vegetable Crops Advisory Meetings

December 13, 2021 (Monday)

Beets & Carrots | 9:00am - 12:00pm (2.0 DEC credits in categories 10, 1a, 23)

Peas, Snap Beans & Sweet Corn | 1:00pm - 3:30pm (1.75 DEC credits in categories 10, 1a, 23)

Hybrid Format: Join online via Zoom or in-person at the WNY location to be announced

COVID-19 Statement: Face coverings will be required at all times at the in-person meeting to adhere to Cornell Regional Ag Team meeting COVID-19 guidelines. Pre-registration (forthcoming) will be required for both the online and in-person meeting. We will follow all other state, local, and venue guidelines at the time of the meeting.

All are invited to attend and discuss the 2021 growing season for each crop. Cornell researchers will be on hand to present an update on their research funded by the NYS Vegetable Research Association & Council. Separate DEC and CCA credits have been requested for each of the two sessions (AM & PM). The meeting is free of charge. Detailed meeting and registration information will be sent out in November to all processing growers and allied industry members. Contact Julie Kikkert, 585-313-8160.

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Upcoming Events *(continued)*

Events are listed at CVP.CCE.CORNELL.EDU

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Produce Auction Meetings

This winter the Cornell Vegetable Program is working with the education committees of local produce auctions to develop relevant workshops to advance the farming knowledge to be successful in this market place. Winter meetings will include grower and buyer panels, auction updates and sessions eligible for pesticide applicator re-certification credit. Agendas to be announced soon. In the meantime, please save the dates:

Finger Lakes Produce Auction Meeting (Penn Yan)
January 6, 2022 (Thursday)

Ontario Produce Auction Meeting (Stanley)
January 19, 2022 (Wednesday)

Empire State Producers



January 11-13, 2022
and Becker Forum, January 10, 2022
The Oncenter, 800 S State St, Syracuse, NY

Sessions appropriate for all levels of experience:

- | | |
|-------------------------------------|---|
| • Potato | • Cut Flower |
| • Snap Bean | • Agroforestry |
| • Industrial Hemp | • Weed Management |
| • Sweet Corn | • Soil Health |
| • Cabbage | • IPM/Biocontrol |
| • Berries | • Enterprise Budget |
| • Greenhouse/High Tunnel Production | • Energy Savings |
| • Tomato | • Produce Safety Alliance Grower Training |
| • Organic Allium | • Digital Marketing |
| • Organic Apple | • Agritainment |

**PROGRAM DETAILS and
ONLINE REGISTRATION**
nysvga.org/expo

Registration will open in late November.

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VegEdge is the highly regarded 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 University 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**

For more information about our program, email cce-cvp@cornell.edu or visit CVP.CCE.CORNELL.EDU



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