



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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First real snow storm of the season! It's still coming down this morning outside a barn in Hadley, MA.

CROP CONDITIONS

As of this writing, Massachusetts has gotten anywhere from 1 to 17 inches of snow in the Nor'easter that hit the state last night, and it's still coming down—a fittingly dramatic end to a truly strange year. You all have weathered this year's storm of events, with the pandemic and the drought, with remarkable grace and ingenuity. May your greenhouses survive this latest storm just as well!

Speaking of the drought, this is the first week since late May that the [US Drought Monitor map](#) has shown the majority of the state to be in normal status. Cape Cod and the Islands and the northern part of Essex County are the only exceptions—still abnormally dry. Late-season precipitation helped recharge depleted groundwater supplies as well. The [USGS Groundwater Watch map](#) shows normal amounts of groundwater for the majority of measurement sites across Massachusetts.

All of the usual winter meetings have predictably gone virtual this year, which means we won't see each other in person but it will be a lot easier to get to the wealth of events still being offered. The UMass Extension Vegetable Team is collaborating with our neighbors to the south to host the Southern New England Vegetable Growers Meeting Series, covering pests of 2020, winter greens diseases, greenhouse production, and high tunnel fertility—see the Events section at the end of this issue for full descriptions and registration information. Several other of the regional conferences are listed there as well.

If you're looking for a good book, or a last-minute farmer gift, we put together a list of some of our favorite resources. These are some of the books we routinely consult for answers. [Check out the list here](#) and let us know if you have any go-to guides that we haven't included!

This is our final issue of Veg Notes for 2020. We wish all of you good health going into the new year and hope you have a chance to get some much-deserved rest. Happy holidays—hope to see you (online) soon!

CONTACT US:

Contact the UMass Extension Vegetable Program with your farm-related questions, any time of the year. We always do our best to respond to all inquiries. **Office phone:** (413) 577-3976 *We are currently working remotely but checking these messages daily, so please leave us a message!* **Email:** umassveg@umass.edu

Home Gardeners: Please contact the UMass GreenInfo Help Line with home gardening and homesteading questions, at greeninfo@umext.umass.edu.

PEST ALERTS

Aphid populations on high tunnel crops have taken off in the last few months. Lady beetles are the most effective biocontrol option for winter tunnels, as parasitic wasps are much less active in cold temperatures (although they may not die) and Aphidoletes midges go fully dormant through the winter. If you struggle with aphids year-round, you may want to start thinking now about releasing wasps or midges in the spring. Different parasitic wasps are specific to certain aphid species: see the article in the [August 27, 2020 issue of Veg Notes](#) for a wasp-host table. Chemical control options for organic growers include azadirachtin products, Pyganic, and insecticidal soaps and oils. The entomopathogenic fungus *Beauveria bassiana* (e.g. BotaniGard, Mycotrol O) effectively controls aphids but has reduced efficacy at colder temperatures. Conventional products include pyrethroids (e.g. Mustang), neonicotinoids (e.g. Assail), and Beleaf, for a complete listing check the [New England Vegetable Management Guide](#)—check labels to make sure products are allowed for use indoors and for the particular crop (e.g. spinach, brassicas, or lettuce).



Ladybeetles eat aphids and are active through winter when temperatures are above 50°F, though they may enter diapause under short day lengths.

Photo: UMass Vegetable Program

Allium leafminer was reported in early December in a home garden in Berkshire Co., MA. This pest was first reported in the US in Pennsylvania in 2015 and has since caused consistent damage in PA, NJ, and NY every year. It was first reported in MA in 2018, also in Berkshire Co.; it has not been reported widely in MA but it was reported in CT this year and it is possible that its range in the state is broader than we know about. At this time of year, ALM pupae would be found within the leaves of leeks and onions in storage. If you see these pupae, please share a picture with us via umassveg@umass.edu so that we can confirm and track this new invasive pest. If you have seen damage from this pest and are planning for management next year, ALM control depends on protecting allium crops during the spring and fall flights of the adults, which occur in late-May and late-September. Row covers will effectively protect crops. Pesticide recommendations have been compiled by Dan Gilrein of CCE-Suffolk County and are available [here](#). Include a spreader sticker. An option for organic growers is Entrust (2 oz/A) + M-Pede (1-1.5% v/v solution). An update on ALM will be included in the upcoming webinar on “Pests of the Year”—see the events section for information and registration details.



Allium leafminer pupae in leeks.

Photo: PA Dept of Ag

Cladosporium leaf spot reports continue to come in from high tunnel spinach plantings across the region. See article this issue for details and management recommendations.

HOT WATER SEED TREATMENT

Some plant pathogens, including specific fungal, oomycete, bacterial, and viral pathogens, can be carried on seed; some can only infest the seed surface and others are able to penetrate the seed coat and survive within the seed. In both cases, when the seed is planted, the pathogen can grow along with the seed, resulting in an infected plant. Therefore, starting with disease-free seed is an important step towards growing disease-free crops. Seeds can be treated with chlorine or pesticides to eliminate pathogens that are associated with the surface of seeds. However, these treatments cannot penetrate the seed coat, and therefore leave internal pathogens untouched. Hot water can penetrate the seed coat and kill pathogens, making it a useful tool for managing seed-borne pathogens.

Treating your seeds with hot water can help prevent the establishment of seed-borne diseases on your farm, or prevent their reintroduction year after year. However, while hot water seed treatment (HWST) will kill pathogens on and within your seeds, it does not *protect* crops from disease and does not guarantee disease-free crops. Many diseases, including some of those that can be seed-borne, are spread by wind, water, and insects and can arrive on your farm by those paths. Crop rotation and field sanitation are key for preventing diseases that overwinter on crop debris, and you may need to con-

tol for wind-, water-, and insect-borne diseases in your crops, regardless of whether or not you hot water treat your seed.

HWST has the beneficial effect of priming seeds, resulting in faster germination than untreated seed. However, the treatment can decrease germination rates, especially of older seed (more than 1 year old) or seeds that were grown under stressful environmental conditions. Treated seed does not remain viable for as long as untreated seed and should be planted during the growing season immediately following treatment.

Deciding which seeds to treat:

- Determine the likelihood that seed-borne pathogens are present based on the seed (see Table 1 for reference). If you are saving your own seed and diagnosed one of the diseases in Table 1 in your crop, you should hot water treat that seed.

If you buy in seed, it can be harder to determine if HWST is necessary. Tomato, pepper, and brassicas are good candidates for hot water seed treatment because there are common bacterial and fungal diseases of these small-seeded crops that can be easily killed through treatment. Having a conversation with your seed supplier is also a good idea: ask them if the seed was produced in a way to minimize exposure to seed-borne pathogens and if the seed was tested for their presence. Find out if the seed has already been treated with hot water or if it has been primed (pre-soaked to promote earlier and more uniform germination), as treating again could adversely affect the seed. Only a few companies routinely hot-water treat seeds—many are reluctant because there is a risk that germination rate will drop if the water is too hot or if the seeds were already exposed to stressful environmental conditions.

- Don't treat seed that has a fungicide or insecticide treatment coating, as it will wash off during treatment.
- Treat only the seeds that you will use next season. HWST reduces the shelf-life of seeds, so don't treat seeds that you plan to seed more than a year in the future.
- Don't treat old seed. Treat only seeds that were produced for the current growing season. HWST is more likely to decrease the germination of old seed.
- Large-seeded crops (beans, cucurbits, peas, corn etc.) are usually not effectively disinfested with hot water treatment because the temperature required to heat the whole seed would kill the outer seed tissue and the seed will not germinate. In some cases, hot water has been used to disinfect just the surface of larger seeds, for example, treating anthracnose on beans.

Treatment procedure: The general protocol for seed treatment is the same across all crops, with just the water temperature and treatment time varying depending on the crop. The temperature of water for treating seed varies from 115 to 125°F, and the treatment period varies from 10 to 60 minutes. It is important to use the appropriate protocol for each crop to control pathogens without damaging the seed; a difference of just a few degrees can either damage your seed or fail to kill pathogens. While hot water seed treatment can be done effectively on a stovetop in a large pot with an accurate thermometer and careful temperature control, it is easier and safer to use precision water baths which provide an even, stable, and accurate temperature.

Before you treat all of your seed, you may want to conduct a seed germination test, as different varieties and lots may react differently to hot water treatment. Treat a 50- or 100-seed sample using the procedure below, then test the germination of both the treated seeds and an equal number of untreated seeds, either in the same growing medium that you plan to use for transplant production, or in a moist paper towel. If the test gives acceptable germination rates, treat as much seed as you expect to use in the coming season.

1. **Preheat water baths.** Heat one bath to 100°F and another to your treat-



We use a strip of insect netting, folded in half and stapled along either side to make reusable treatment packets. The open edge of the packet is clamped shut with binder clips.

Photo: UMass Vegetable Program



Treat seed in an ample amount of water so that the water can move throughout each seed packet.

Photo: UMass Vegetable Program

ment temperature (see Table 1). The first bath will be used to preheat the seed so that the temperature of the treatment bath doesn't drop when the seeds are added. Heat enough water to allow water to move around seeds freely. We treat about 0.5 liters of seed at a time in our six-liter water bath. Use an accurate laboratory thermometer. It is important that the water be maintained at a uniform temperature throughout the bath, that the recommended temperature not be exceeded, and that the seed be treated no longer than the time interval specified. A stirring hot plate helps to provide continuous agitation and uniform water temperature, though it can be done with continuous, consistent manual agitation or an aquarium bubbler. Keep a separate container of room temperature water close by to add, if necessary, to prevent overheating. An immersion circulator (a hand-held water heater used for the sous vide cooking method) is a great tool for treating your own seed.

2. **Prepare the seed.** Make a packet for the seeds out of cheesecloth, screen, a coffee filter, or insect netting. Fill each packet no more than halfway with seed, to allow for water movement throughout the packet. Include a metal bolt, coin, or other weight to keep the seed submerged. Label all packets, especially if you're treating more than one variety at once!
3. **Pre-heat the seed.** Submerge the seed in the pre-heat bath for 10 minutes, constantly checking the temperature to ensure that it does not rise above 100°F.
4. **Treat the seed.** Move the seed to the treatment bath and treat for recommended time (see Table 1). Again, check the temperature constantly to ensure that it does not rise above the recommended temperature. Remove the seeds promptly and run them under room temperature tap water to cool them.
5. **Dry the seed.** Pat dry with towels, then air dry at 70 to 75°F by spreading the seed on dry paper towels. We leave treated seeds in their packets and dry them in a simple food dehydrator on *fan only* (no heat! Not all dehydrators have this option—check before you buy.) to dry the seeds quickly.

Crop	Treatment Temperature and Time		Diseases Controlled
Broccoli	122°F	20 minutes	Alternaria leaf spot, Bacterial leaf spot, Black leg, Black rot
Brussels sprouts	122°F	25 minutes	
Cabbage	122°F	25 minutes	
Collards	122°F	20 minutes	
Kale	122°F	20 minutes	
Carrot	122°F	20 minutes	Alternaria leaf blight, Bacterial leaf blight, Cercospora leaf spot, Crater rot/foliar blight
Celery/Celeriac	118°F	30 minutes	Bacterial leaf spot, Cercospora leaf spot, Septoria leaf spot, Phoma crown and root rot
Eggplant	122°F	25 minutes	Anthraco-nose, Early blight, Phomopsis, Verticillium wilt
Lettuce	118°F	30 minutes	Anthraco-nose, Bacterial leaf spot, Lettuce mosaic virus, Septoria leaf spot, Verticillium wilt
Onion	122°F	20 minutes	Purple blotch, Stemphylium leaf blight, Basal rot, Botrytis blight, Smudge, Black mold, Downy mildew
Pepper	125°F	30 minutes	Anthraco-nose, Bacterial leaf spot, Cucumber mosaic virus, Pepper mild mosaic virus, Tobacco mosaic virus, Tomato mosaic virus
Parsley	122°F	30 minutes	Bacterial leaf blight, Alternaria leaf blight, Black rot, Cercosporoid leaf blight, Septoria blight
Spinach	122°F	25 minutes	Anthraco-nose, Cladosporium leaf spot, Cucumber mosaic virus, Downy mildew, Fusarium wilt, Stemphylium leaf spot, Verticillium wilt
Tomato	122°F	25 minutes	Alfalfa mosaic virus, Anthracnose, Bacterial canker, Bacterial speck, Bacterial spot, Cucumber mosaic virus, Early blight, Fusarium wilt, Leaf mold, Septoria leaf spot, Tomato mosaic virus, Verticillium wilt, Double virus streak

Source: "[Managing Pathogens Inside Seed with Hot Water](#)" – Meg McGrath, Cornell University Long Island Horticultural Research & Extension Center

Equipment: There are many options for water bath equipment; cheaper options likely require you to watch and adjust the temperature constantly where more expensive options may be more precise and hands-off. [Stirring hot plates](#) start at about \$400. Both [analog](#) and [digital precision water baths](#) run at about \$700 minimum. [Laboratory thermometers](#) are about \$15. There are many brands of sous vide immersion circulators that sell for \$50-100.

UMass Hot Water Seed Treatment Service: If the procedure above sounds daunting or you're not sure you want to invest in hot water treatment equipment, we can treat your seed for you! We are currently only able to treat seed that will be used by the submitter—we cannot treat seed that will be resold or distributed. Submissions are treated and returned to the submitter within 10 days of receipt. **We are currently working from home, so if you are sending in seeds for treatment, please email or call us ahead of time so we know to expect them.**

[Click here to submit a hot water seed treatment sample](#)

--Updated for 2020 by Genevieve Higgins, UMass Vegetable Program

CLADOSPORIUM LEAF SPOT OF SPINACH

Over the last few months, Extension staff from across New England have been receiving reports of Cladosporium leaf spot on field and high tunnel spinach crops. While this disease is relatively uncommon and unstudied in the Northeast, it has been appearing more frequently over the last few years.

Identification. Cladosporium leaf spot is caused by the fungal pathogen *Cladosporium variabile*. Early leaf spots are tan colored, and expand to 1-3mm in diameter. Adjacent spots may coalesce, forming irregular lesions. As the disease develops, velvety dark green-brown sporulation develops within the lesions. In severe cases, older infected leaves may be killed.

Life Cycle. Development of Cladosporium leaf spot is favored by cool, humid environmental conditions that often occur in the fall and in winter high tunnels in New England. Optimum conditions for infection are 59-68°F and relative humidity above 80%, but infection can occur at temperatures between 50 and 86°C and the fungus can continue growing at temperatures as low as 41°F.



Cladosporium leaf spot on spinach. Photo: G. Higgins

In the absence of a spinach crop, *Cladosporium* may overwinter on crop residue, spinach volunteers, and weed hosts (which weeds serve as hosts for this disease has not been confirmed). Viable spores of *Cladosporium* have been isolated from dried spinach leaves and seed up to 8 years old. In the field, spores are spread by splashing water, wind, workers, and equipment.

Cladosporium can be seed-borne; in one 2006 study from Washington State University, *Cladosporium* was found infesting 37 out of 66 seed lots tested, with infestation levels ranging from 0-49%. Under the right environmental conditions, it's likely that seed contamination could lead to infected seedlings, although this hasn't yet been confirmed in the field, only in a controlled greenhouse environment.

Cultural Controls & Prevention

- **Till under crop residues** promptly after harvest to speed up decomposition.
- **Hot water seed treatment** can effectively eliminate *Cladosporium* from spinach seed. Researchers at Washington State University found that treating infested seed at 40°C/104°F for 10 minutes sufficiently eliminated *Cladosporium* and that germination only decreased when seed was treated at 50°C/122°F for 30 minutes or more, or at 55°C/131°F for 10 minutes or more. [Click here to learn about the UMass Vegetable Program Hot Water Seed Treatment Service.](#)

- **Chlorine seed treatment** also effectively eliminates *Cladosporium* from spinach seed and does not reduce germination. Soak seed for 10 minutes in a 1.2% sodium hypochlorite (NaOCl) solution. NaOCl is the active ingredient in bleach; different bleach products have different percentages of NaOCl, with 5.25% being a common concentration. To make a 1.2% NaOCl solution from a common 5.25% NaOCl product, dilute bleach with water at a 1:3 ratio. There are many bleach solution calculators available online ([here's an example](#)). Note for dilution calculators: 1000ppm = 1%.
- **Use drip irrigation or overhead irrigate early in the day** on sunny days, when possible, so that crop foliage will dry quickly.
- **Control weeds** within your crop, as well as around the outside edge of high tunnels, both to increase air flow and eliminate possible weed hosts.
- Variation in susceptibility to *Cladosporium* between spinach varieties has been noted in the field, but resistance is not regularly evaluated for commercially available varieties.

Chemical Controls. Few products are labeled specifically for *Cladosporium* leaf spot in spinach and little research has been conducted on chemical control of this disease. QoI fungicides, commonly known as strobilurins, (FRAC Group 11) have been shown to effectively control this disease. Group 11 products that are labeled for spinach include Quadris (note: Quadris Top and Opti are not labelled for use on spinach), Reason, and Cabrio, and combination products including Merivon (groups 7 & 11) and Tanos (groups 27 & 11). In one University of Florida trial that evaluated Cabrio, Merivon, and Tanos, among other products, Cabrio and Merivon provided better control than Tanos.

- Because QoI fungicides have a single-site mode of action, pathogens frequently develop resistance to this group of fungicides. A few rules of thumb for using materials in FRAC group 11 are:
- Limit the total number of QoI applications. Product labels often provide information on maximum number of applications allowed per season. If no guidelines are given, make no more than 3 applications.
- Use a maximum of 1 QoI spray out of every 3 fungicide applications when using QoI alone (as opposed to a tank mix or combination product).
- Use a maximum of 1 QoI spray out of every 2 fungicide applications when using a tank mix or combination product.
- Do not make consecutive applications of QoI fungicides.
- Tank mix with a contact fungicide or use a combination product containing a contact fungicide (e.g. chlorothalonil, mancozeb, sulfur, oil).

Copper products are effective protectants for this disease.

No research has been conducted on control of *Cladosporium* with OMRI-listed products. Copper is the most effective OMRI-listed material for controlling foliar fungal diseases, in general. Adding a *Bacillus subtilis* (e.g. Serenade) or *Bacillus amyloliquifaciens* (e.g. Double Nickel, Stargus, Taegro, Triathlon) product to copper has a synergistic effect, meaning that applying copper + *Bacillus* provides better control than either product alone. Hydrogen dioxide products (e.g. Oxi-Date) will kill spores on contact but does not kill the fungus within the plant or offer any protection against future infections.

--Written by Genevieve Higgins, UMass Vegetable Program

NEWS

MDAR'S MA FARM ENERGY PROGRAM (MFEP)

[MDAR's Massachusetts Farm Energy Program \(MFEP\)](#) has funds to help farms cover audits, energy efficient projects, and select renewable energy projects.

Now is the time to have a technical assessment completed for any energy project you are considering in preparation for upcoming energy grants! You will need a technical assessment to file an energy grant application whether with MDAR or USDA. So start planning now; if you wait until applications come out you may not be able to have one scheduled in time! Remember MFEP pays 75% of the technical assessment, first come, first served. MFEP is providing tele-assessments during this trying time.

Contact MFEP now for more information through the Center for EcoTechnology (CET), MDAR's partner carrying out the MFEP. 413-727-3090, info@massfarmenergy.com, or visit www.massfarmenergy.com, submit a *Request Form*, and then you will be contacted.

MDAR PESTICIDE EXAMS TO BE HELD ONLINE

The MA Department of Agricultural Resources Pesticide Department will be providing pesticide exams online. The online exam will allow for applicants to take the pesticide exam any time of day and any day of the week. Individuals signing up to take the exam will do so using the current EEA ePLACE Portal where they will register for the exam and pay the registration fee. Applicants will then receive instructions via email about how to take the exam.

To learn more and to apply for a pesticide exam, license, or renewal go to: <https://www.mass.gov/guides/applying-for-a-pesticide-exam-license-and-renewal-through-the-eplace-portal>

MDAR SEEKS INPUT FROM FARMING COMMUNITY ON IMPACTS OF COVID-19 ON MA AGRICULTURE

MDAR is conducting a survey to gain insights from the farming community on the impact of COVID-19 on Massachusetts agriculture. Your response will help the Commonwealth understand the effects of COVID-19 on the agricultural economy, and may result in future programs and funding to help serve your local community as we enter the 2021 production season. Please rest assured that results will be aggregated, so individual responses will not be identifiable to protect your data.

Please only respond once per farm operation. Thank you for your time!

Estimated survey time: 5-10 minutes for 12 questions.

Take Survey here: www.surveymonkey.com/r/MDARWinter2020Survey

CORNELL PLASTIC MULCH SURVEY

Cornell Cooperative Extension is a partner on a Rochester Institute of Technology project that is creating new methods for manufacturing plastic mulch and promoting its field break-down. The project aims to tightly match new product development to real-world grower preferences, on-farm use patterns, and current economic constraints surrounding plastic film use. This 5-minute survey is being used to collect that data. Your response will be greatly appreciated.

Take the survey here: https://cornell.ca1.qualtrics.com/jfe/form/SV_3mxuwOVIZlaxGvj

With any questions about the survey, please contact: Elizabeth Buck at emb273@cornell.edu

STRAWBERRY GROWERS: WE NEED YOUR HELP

As part of a new Northeast SARE project "Advancing Strawberry Production in the Northeast", Northeast Extension researchers want to learn more about the practices you use and the challenges you face in strawberry production.

Your responses will help extension better understand the diversity of practices used in the Northeastern U.S. and Canada, and will help us design our research & outreach programs to provide the best resources for improving strawberry production on your farm! It should take approximately 15 minutes of your time. To thank you for your time, you can also be entered into a drawing to win fabulous prizes. Learn more at the link below!

The survey is being conducted by researchers at the University of New Hampshire, Cornell University and the University of Vermont and is available here: https://unh.az1.qualtrics.com/jfe/form/SV_2nlFpEZhejOE0Pr

EVENTS

Need pesticide recertification credits? All of the New England states have reciprocity in regards to recertification credits and NY credits are also accepted by most New England states, including MA. Check with your state pesticide board with questions about NY credits in your state. This means that credits offered at virtual events hosted by these other states will be recognized by MDAR and will count towards your total recertification requirement. We will continue to send out relevant events, UMass Vegetable Program events can also be found on our [Upcoming Events](#) page, and links to event listings from other New England state Extension can be found in the [November 2020 issue of Veg Notes](#).

SOUTHERN NEW ENGLAND VEGETABLE GROWERS WEBINAR SERIES

This series is co-sponsored by University of Connecticut, University of Rhode Island, and University of Massachusetts Extensions. Funding is provided in part by the UMass Extension Risk Management Program.

• Pests of the Year!

When: Thursday, January 14, 3:30-5pm

Presenters: Ann Hazelrigg, UVM Diagnostic Clinic, Andrei Alyokhin of UMaine and Ethan Grundberg of Cornell Cooperative Extension

1.5 pesticide recertification credits available for New England PA, 1A category

Learn about the biology and management of a few key pests from last season, and perhaps what made them stand out. Tomato diseases are a perennial issue, which need to be controlled every year, even in a drought! Colorado potato beetles were especially bad this year, perhaps because they are prone to developing resistance to key insecticides like imidacloprid and spinosad. Learn about alternative strategies and the best insecticide programs for organic or conventional systems. Allium leafminer is a new invasive pest that was first reported in CT this year. Learn the basic biology and best management practices based on new research from Cornell Cooperative Extension.

Agenda available here: ag.umass.edu/vegetable/events/pests-of-year

Registration: [Click here to register for this meeting.](#)

• Field Day: Winter Greens Diseases & Variety Trials

When: Thursday, January 28, 3:30-5pm

Presenters: Jim Correll of the University of Arkansas, and Genevieve Higgins and Sue Scheufele of UMass Extension

1.5 pesticide recertification credits available for New England PA, 1A category

Spinach downy mildew is an emerging pest in our region, which has the potential to destroy entire plantings quickly. Expert Jim Correll will discuss the pathogen biology, management, and share some spinach growing tips. UMass Extension has been conducting winter spinach varieties for several seasons now and we will present a summary of our findings on their growth, productivity, and downy mildew resistance, since using resistant varieties is a critical component of managing this disease effectively. We will also cover other diseases that are popping up more frequently in winter greens in recent years, including damping off, Cladosporium, and lettuce downy mildew.

Agenda available here: ag.umass.edu/vegetable/events/field-day-winter-greens-diseases-variety-trials

Registration: [Click here to register for this meeting.](#)

• Greenhouse Seedling Production: Compost-based potting mix, nutrient management, chlorination, and tray selection

When: February 11, 3:30-5pm

Presenters: Rosa Raudales of UConn Extension, and Andy Radin of URI Extension

Adequate nutrient levels in substrates are achieved by providing the right amount and type of the fertilizers and maintaining an optimum pH. Rosa Raudales will discuss how to: use water quality to develop nutrient programs with conventional fertilizers, safely and effectively inject chlorine in irrigation systems, and choose the plug-trays sizes for seedling. Additionally, there are many commercially available compost-based mixes on the market, and many growers also create their own. Sometimes they work better than others (both commercial and farm-made). Why? Andy Radin will discuss factors to consider if you use these types of mixes.

Agenda available here: ag.umass.edu/vegetable/events/greenhouse-seedling-production

Registration: [Click here to register for this meeting.](#)

• High Tunnel Fertility Research Update

When: February 25, 3:30-5pm

Presenters: Judson Reid of Cornell Cooperative Extension, Becky Maden of UVM Extension, and Andy Radin of URI Extension

Maintaining nutrient availability to the big, fruiting high tunnel vegetable crops is still very much an evolving science and art. There's lots of work going on in the Northeast that focuses on maximizing production without using inadequate or excessive amounts of nutrient sources.

Agenda available here: ag.umass.edu/vegetable/events/high-tunnel-fertility-research-update

Registration: [Click here to register for this meeting.](#)

OTHER REGIONAL CONFERENCES

40TH ANNUAL LONG ISLAND (VIRTUAL) AGRICULTURAL FORUM

When: Tuesday, January 5, 2021, 7:30 AM - 6:00 PM

Wednesday, January 6, 2021, 7:30 AM - 6:00 PM

Thursday, January 7, 2021, 7:30 AM - 4:00 PM

The past year has been different in many ways, but as you know the Long Island agricultural and horticultural industries have not slowed down! Like so many other conferences and events this year, the 2021 Ag Forum will be presented through Zoom webinars and online meetings. While the Forum will be coming to you in a different format, you will still hear the latest in research on environmentally safe and viable production, marketing tips, issues related to crop culture, and legislative, agency, and association updates. For more information check out the [sessions brochure](#).

Fee: \$45 per participant

Register: <http://weblink.donorperfect.com/2021LongIslandAgForum>

Contact: Melissa Elkins, me336@cornell.edu, 631-603-4332

UConn VEGETABLE SEEDLING & TRANSPLANT PRODUCTION IN GREENHOUSES WEBINAR SERIES

When: January 4-8, 12-1pm every day

Registration: For CT growers: \$25 flat fee, regardless of whether you attend one webinar or the whole series. For all others: \$25/webinar.

Our friends at the University of Connecticut have put together a webinar series around the theme of vegetable seedling and transplant production in greenhouses. Click the link below for more information and registration for what looks to be an excellent series on a timely topic:

- Monday, Jan 4: Achieving Transplant Uniformity
- Tuesday, Jan 5: Managing the Root-Zone in Plug Trays
- Wednesday, Jan 6: Using Organic Fertilizers for Vegetable Transplants*
- Thursday, Jan. 7: Identifying & Managing Pests of Vegetable Transplants*
- Friday, Jan. 8: Identifying & Preventing Common Diseases in Herbs & Vegetable Seedlings in Greenhouses*

**1 pesticide recertification credit is available for this webinar for applicators in New England states.*

More information and registration available here: <https://greenhouse.uconn.edu/webinars>

Questions? Contact Rosa Raudales (rosa.@uconn.edu) or Leanne Pundt (leanne.pundt@uconn.edu), UConn Extension.

2021 EMPIRE STATE PRODUCERS EXPO

When: January 12-15, 2021

The NY State Vegetable Growers Association and Cornell Cooperative Extension are transforming the annual Becker Forum & Empire State Producers Expo into a virtual conference. There are lots of great sessions, including an IPM School track.

Pesticide credits are available for MA and NH growers for this Expo. For information about NY pesticide credit categories, please visit: <https://www.dec.ny.gov/permits/41072.html>.

Expo program schedule: <http://nysvga.org/expo/information/>

Register here: <https://nysvga.org/register-for-meeting-online/>

2021 MID-ATLANTIC FRUIT AND VEGETABLE VIRTUAL CONVENTION

When: February 8-11, 2021

Registration info coming soon

The 2021 virtual Convention will feature four days of three or more concurrent educational sessions. The detailed educational program can be seen [here](#). The sessions will all be recorded so that registrants will be able to access them for several weeks after the Convention.

VIRTUAL HARVEST NEW ENGLAND AGRICULTURAL MARKETING CONFERENCE AND TRADE SHOW

When: February 24 and 25, 2021

We'll miss seeing you in person, but are excited to bring you the 2021 Harvest New England Conference with our new on-line format. This unique marketing conference sponsored by your New England State Departments of Agriculture is for New England farmers interested in learning new marketing ideas or fine-tuning strategies for business success. Attended by hundreds of farmers from across the region, this will be the eighth biennial conference.

Register here: <https://www.harvestnewengland.org/events/registration/>

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