



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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CROP CONDITIONS

We made it to 2021! Here's hoping life is a little easier in 2021. Despite the challenges of the past year, we here at the UMass Extension Vegetable Program are feeling proud of all that our small team did accomplish. A lot of our planned workshops, farm visits, and research trials had to be canceled or re-imagined, but we were still able to:

Visit at least 50 farms with pest or crop issues

Respond to at least 120 requests for technical assistance via email, phone, text, and video

Organize 20 workshops with over 1,050 attendees

Provide food safety training to 250 producers

Host a record number of Twilight Meetings via new "virtual" format. Watch any you missed [here!](#)

Publish an extra 4 issues of Veg Notes in response to rapidly changing COVID-19 conditions, regulations, and resources

Maintain state-wide pest scouting and monitoring network, thanks to farmer collaborators!

Write 14 new factsheets and articles

Re-vamp our website, which gets over 330,000 views per year, to make it easier for you to connect with us directly

Conduct 4 on-farm research trials

Treated seeds through our [Hot Water Seed Treatment Service](#)

Wrote new grants, bringing in a total of \$572,000 and establishing new projects, research, and collaborations

And much more!

Thanks so much to all of you who supported our team this year, by downloading Veg Notes, participating in workshops online and in-person,

calling us with questions, texting us photos of crop issues, submitting seeds to treat, submitting diagnostic lab and soil samples, writing letters of support for grants, filling out surveys, and countless other ways that you all were involved in making our year so successful! Our program is funded by state and federal Extension funds (~30%), external grants (~60%), and donations and sponsorships (~10%). If you or your business have the interest and ability to support our program financially, you can make a donation or sign up to be a Veg Notes sponsor by clicking the red bars on the left. Any and all donations are helpful—even a small donation of \$25 can make a difference by funding the deployment of one pest trap in our statewide sweet corn pest monitoring network.

Thank you for supporting Vegetable Notes and the UMass Extension Vegetable Program this year, wishing you all the best for a great 2021 season!!

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

Allium leafminer reports have been pouring in from across the region since we heard about this new invasive pest last week from Ethan Grundberg of Cornell's Eastern New York Horticulture Program who presented at the Pests of the Year webinar last week (next week will be a winter spinach field day, register [here!](#)). Look for small brown pupae (see photo) as you are working through your leeks in storage, or perhaps you might notice them while preparing some potato leek soup for supper! That's how I recently found two ALM pupae--they were buried down a few leaves, so I may have missed them if I didn't peel back as many leaves. Other growers found them in the field, in leeks that are still out there frozen in the field. Look for more info on this pest in next month's issue of Veg Notes, and for now start keeping an eye out for this new pest which does seem to be present now in CT and MA. If you find anything suspicious please send a photo to umassveg@umass.edu or your local Extension office.



RESEARCH RECAP: PROFITABILITY OF FROZEN PRODUCE IN RETAIL MARKETS

--Written by Amanda J. Kinchla, Associate Extension Professor, UMass Food Science

Department ALM pupae in Ulster Co. leek from fall 2016. Note the soft rot in the larval mines. Photo by T. Rusinek

Is it profitable for farmers in the Northeast to sell high-quality, local frozen produce in the retail market? UMass Amherst Department of Food Science researcher Amanda Kinchla and Department of Resource Economics researchers Dr. Jill Fitzsimmons and Dr. Dan Lass have been working with The Western Mass. Food Processing Center at the Franklin County Community Development Corporation to find out. The research is funded by Northeast SARE (Sustainable Agriculture Research & Education).

In 2016, the research team and a group of regional farmers started talking about whether frozen local fruits and vegetables could be profitable new products for local farms. The farmers were interested in the idea but needed better information before they would decide to give freezing their own produce a try. In particular, they wanted to know more about processing and production costs; packaging requirements; how to ensure that products were high-quality and met food safety standards; if there was enough consumer demand for frozen foods; and how much such products would be worth.

To answer these questions, the team focused on two examples: blueberries and spinach. They conducted market research to identify whether consumers would want to buy retail frozen blueberries. The project also ran production trials using blueberries and spinach as products to identify the best way to process a safe, high-quality product, and conducted a cost/return analysis. Using these results, the team developed a food safety plan and other tools to help farmers determine if frozen local produce is appropriate for their business.

The market research tested two populations of consumers – a representative sample of consumers in the Northeast region, and a convenience sample of “buy local” consumers, sent from local farms and organizations to their email lists. Results show that consumers think where they purchase the product is very important, and they value information about where the product was grown, as well as where it was frozen. Of course, consumers also care about the price, but consumers who already purchase local foods are less sensitive to high prices than the general consumer.

The production trials (blueberries and spinach) included experiments that tested quality attributes as a function of time



Research and development at The Western MA Food Processing Center at The Franklin County Community Development Corp. in Greenfield MA for blueberries. Photos: UMass Food Science Department

and temperature. Among the many quality attributes tested, drip loss and overall appearance were the key attributes that had the biggest impact on quality. Drip loss is a measurement of the loss of fluid in the thawing of food, in this case produce. The disruption of cellular tissue during freezing can cause water weeping. A large drip loss is an indicator of poor quality as the water loss can result in change in texture, loss in nutrients and/or flavor. Through the blueberry trials, it was determined that shorter processing times at a moderate temperature resulted in high quality blueberries. Spinach trials revealed that it was a labor-intensive, time-consuming, low-yield product with a low probability of success at processing facilities such as the WMFPC. Production costs depend significantly on the type of equipment used. For blueberries, production costs using the WMFPC equipment are low enough that the product is likely to be profitable, while spinach is unlikely to be profitable since it requires costly manual labor.

How does a farmer or food hub know if creating a frozen product is a fit for their business? In February 2021, a cost calculator tool will be posted online on our [project page](#). Businesses interested in this market can use the tool to customize their operational considerations (equipment, production volume, scale, labor, etc.) to estimate the potential profitability of frozen retail blueberries for their own operation. Businesses can also use the tool for other potential frozen products by entering their specialized knowledge of production costs and price premiums for other fruits and vegetables. In addition, the process parameters (SOPs), quality protocols and food safety plan are available to aid others that may be interested in processing safe, high-quality frozen blueberries and spinach. It's worth noting that

frozen produce is considered processed food and must be produced according to the FSMA Preventive Controls Rule for Human Food. The food safety plan created through this project is available as an educational resource to help producers comply with the rule.

The overall project summary, access to past programming, and details of the project can be found at the UMass Value Added Website (<https://ag.umass.edu/value-added-food/nifa-planned-research-initiative/extending-season-new-frozen-products-for-new-market>). Or contact Amanda Kinchla at amanda.kinchla@foodsci.umass.edu.

WORKER PROTECTION STANDARDS APPLY TO ALL FARM WORKERS

The Worker Protection Standards (WPS) are federal regulations designed to reduce poisonings and injuries among agricultural workers and pesticide handlers. The WPS require that farm owners and employers provide protection from potential pesticide exposure to workers and handlers, train them about pesticide safety, and provide mitigations in case exposures occur. These regulations apply to all farm workers on farms that use any kind of pesticide: restricted- or general-use, synthetic or organic—all farms need to be in compliance with these laws. (Some exemptions apply to farm owners and their immediate family members). Luckily, the regulations are straightforward and relatively easy to implement.

Below is a detailed list of WPS requirements, you can find more information on [this EPA website](#), read through the “[How to Comply](#)” Manual for free online by following the link, and download training materials including the required WPS safety poster [here](#).

- **Pesticide safety training**—for workers and handlers
- **Access to labeling information**—for pesticide handlers and early-entry workers including product labels and safety data sheets (SDS)
- **Access to specific information**—for workers and handlers, which includes providing information about when and where on the farm pesticide applications are made, emergency information, and a pesticide safety poster at a central location
- **Keep workers out of areas being treated** with pesticides
- **Keep workers out of areas that are under a restricted-entry interval (REI)**, with a few narrow exceptions,

- **Protect early-entry workers** who are doing permitted tasks in pesticide-treated areas during an REI, including special instructions and duties related to correct use of personal protective equipment,
- **Notify workers about pesticide-treated areas** so they can avoid inadvertent exposures,
- **Monitor handlers** using highly toxic pesticides,
- **Provide required personal protective equipment** to handlers,
- **Decontamination supplies**—a sufficient supply of water, soap, and towels for routine washing and emergency decontamination, and
- **Emergency assistance**—making transportation available to a medical care facility in case of a pesticide injury or poisoning, and providing information about the pesticide(s) to which the person may have been exposed.

A **worker** is any farm employee who does tasks directly related to the production of plants, such as harvesting, weeding, carrying nursery stock, repotting plants, pruning or watering. A worker does not mix or apply pesticides and only handles unopened or decontaminated containers, and does not enter a treated area before the re-entry interval has passed.

A **handler** is any farm worker who applies general-use pesticides and/or performs tasks such as mixing and loading pesticides, transferring or cleaning opened pesticide containers or spray equipment, or goes into a treated area before the restricted entry interval (REI) has expired.

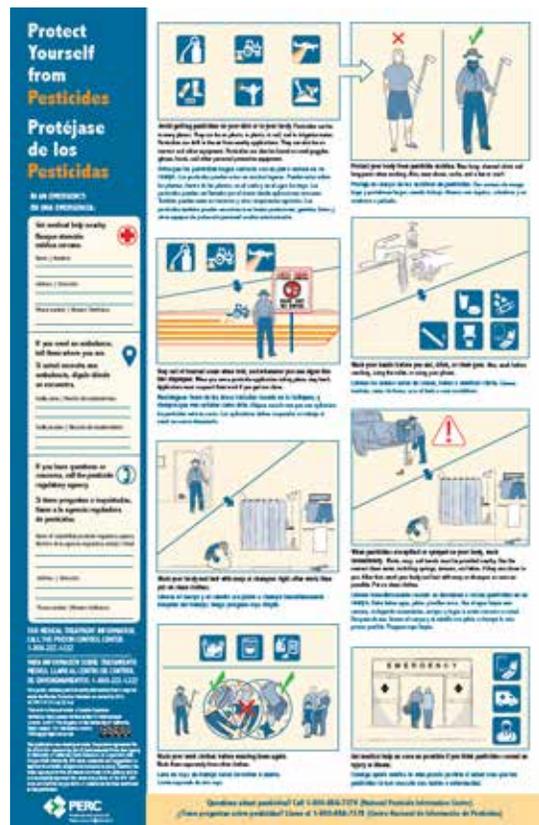
“**Restricted-use**” is a federal EPA designation that restricts a pesticide to use only by a **certified pesticide applicator**, or under the direct supervision of a certified applicator. Only about 25% of all pesticides fall into this category, with atrazine being the most common restricted-use active ingredient. Massachusetts Department of Agriculture (MDAR) requires that farmers who want to apply restricted-use pesticides on their farms have a private certification for pesticide application—they must pass a test to get the certification and must attend continuing educational programs throughout the year in order to maintain it.

Most pesticides fall into the “**general-use**” category. In Massachusetts¹, farmers that use only general-use pesticides are not required to be certified or licensed by MDAR—but they still must comply with WPS regulations and provide training for workers and handlers as described. There is often a misconception that pesticides used in organic systems are exempt from these regulations but this is not at all the case and **organic farms must also comply with WPS**. For example, copper formulations which are widely used on organic farms tend to have “warning” hazard labels, as opposed to the lower “caution” label, because they are corrosive, can be fatal if swallowed, and can cause blindness if gotten in the eye. They have some of the longest REI’s (24-48 hours). Since organic farms don’t use any restricted-use pesticides, they don’t need to be certified or licensed, so **how do they get the training they need to train their workers and handlers according to WPS?**

One simple way to get the needed training is to get and maintain a pesticide applicator license (check the [MDAR Pesticide Exam and Licensing website](#) for more details). Another way is to attend a “train-the-trainer” course—if you need this training and would like to participate in a train-the-trainer workshop this year, please let us know by completing this [simple form](#). The train-the-trainer courses are great because they are designed specifically to help you deliver training to your employees to comply with WPS.

WPS Farm Inspections. All farms using restricted or general use pesticides are subject to a pesticide inspection to ensure the WPS regulations are being met. State agencies generally have primary jurisdiction for enforcing WPS misuse violations. If you are contacted by MDAR to schedule an inspection, they will be looking to see if your workers have had WPS training, if you have a WPS Central Posting Area, and if you are following all the other requirements of the WPS

¹ Please note that other states may require pesticide certification for farmers who apply general use products. Check with your state department of agriculture to determine pesticide use requirements in your state.



regulations. Please feel free to contact us if you have questions:

UMass Extension Vegetable Program: umassvegetable@umass.edu; 413-577-3976

UMass Extension Pesticide Education Program: nclifton@umass.edu; 413-545-1044

--Written by Susan B. Scheufele, UMass Extension Vegetable Program

ARE YOU INTERESTED IN ATTENDING A WPS TRAIN-THE-TRAINER WORKSHOP?

All farms using restricted or general use pesticides, including those that are OMRI-approved for organic production, are subject to a pesticide inspection to ensure the [Agricultural Worker Protection Standard \(WPS\) regulations](#) are being met. Inspectors will, among other things, verify that your employees have received the appropriate WPS annual training.

Only **Qualified Trainers** can deliver this training to employees. Qualified trainers must either:

- Be a certified applicator of restricted-use pesticides, or
- Be designated as a trainer of certified pesticide applicators, handlers or workers by the EPA or the state, or tribal agency having jurisdiction, or
- **Have completed an EPA-approved pesticide safety train-the-trainer program** for trainers of workers or handlers.

UMass Extension and the UMass Pesticide Education Program are seeking feedback about the need for WPS Train-the-Trainer programs in Massachusetts this year. Programs in 2021 will likely continue to be delivered remotely due to the ongoing pandemic.

Please complete [this form](#) if you or anyone from your farm requires this training and is interested in attending a WPS Train-the-Trainer workshop: <https://forms.gle/DX7JDjHhgzyct5U7>

CUCURBIT DOWNY MILDEW RESEARCH UPDATE: VARIETIES & FUNGICIDES FOR 2021

In the last 15 years, late-summer and fall cucumbers have become increasingly hard to grow—long gone are the days when you could reliably harvest cucumbers until the frost. This is largely due to cucurbit downy mildew, a disease that overwinters in the southern US and is blown northward on storm fronts annually, arriving in MA around mid-August and effectively ending the cucumber season. Previously, cucurbit downy mildew was not a concern for MA growers because all cucumber varieties were bred to have resistance to the disease. However in 2004, the pathogen evolved and overcame that resistance, and breeders have been working hard to develop new resistant varieties ever since.

For the past 5 years, the UMass Extension Vegetable Program has worked with the NEVBGA and Johnny's Selected Seeds to conduct cucumber variety trials to evaluate varieties' susceptibility to cucurbit downy mildew (DM). Over the years, these trials have helped to identify DM-resistant cucumber varieties appropriate for New England markets, including Bristol, DMR401, NYS264, and Citadel. Results from our 2016-17 trials are available in the [March 15, 2018 issue of Vegetable Notes](#).

In our 2020 trial, we evaluated 8 cucumber varieties—7 slicers and 1 pickler—with 4 replications of each variety organized in randomized complete blocks. We planted three-week old seedlings into raised beds with black plastic mulch, with 1 line of drip irrigation per bed. Each plot was made up of 6 plants, 18 inches apart in-row, with 10 feet of unplanted bed between plots. We then measured downy mildew severity in each plot weekly, and total and marketable yield twice a week. Cucumbers were deemed “unmarketable” if they were misshapen or had significant insect damage (most commonly, striped cucumber beetle damage).

Despite the drought conditions in 2020, DM arrived relatively early in our trial, on July 24. Normally in these trials, we also evaluate the varieties for powdery mildew resistance, but powdery mildew didn't develop in our trial



SV4149, a pickling variety.

at all in 2020 since all the varieties tested had resistance to that disease as well. DM appeared first on the variety TSX CU201AS, followed by Marketmore 76 and Green 18 the following week. Plant pathologists commonly compare disease incidence over time using a single value, called the Area Under the Disease Progress Curve, or AUDPC. A higher AUDPC value means more disease over time, and a lower AUDPC means less disease over time.

- Marketmore 76 and Green 18 had significantly higher AUDPC levels than all other varieties in this trial, showing that they had lower resistance to the disease.
- **TRI-CU234AS** and **TRI-CU236AS** had the lowest AUDPC of all varieties in this trial, and **CU231AS** had a slightly numerically higher but not significantly different AUDPC. This means that these 3 varieties performed equally well and had the lowest downy mildew incidence over time.
- **SV4149**, the only pickling variety in this trial, had the highest marketable yield. Of the slicing varieties, TSX CU201, TSX CU234, Raceway, and Marketmore 76 produced the highest marketable yields. Marketmore 76 had high downy mildew incidence but produced one of the highest marketable yields—this has been a trend observed over the last few years in these trials.
- Of the slicing varieties, **TRI-CU234** performed consistently well in regards to marketable yield and disease resistance.
- TSX CU201AS and CU231AS were also evaluated in the 2019 trial. In 2019, TSX CU201AS was the overall best-performing variety, with high marketable weight and low downy and powdery mildew incidence, and CU231AS had low disease incidence but low marketable yield. In 2020, TRI-CU234AS performed better than both TSX CU201AS and CU231AS.

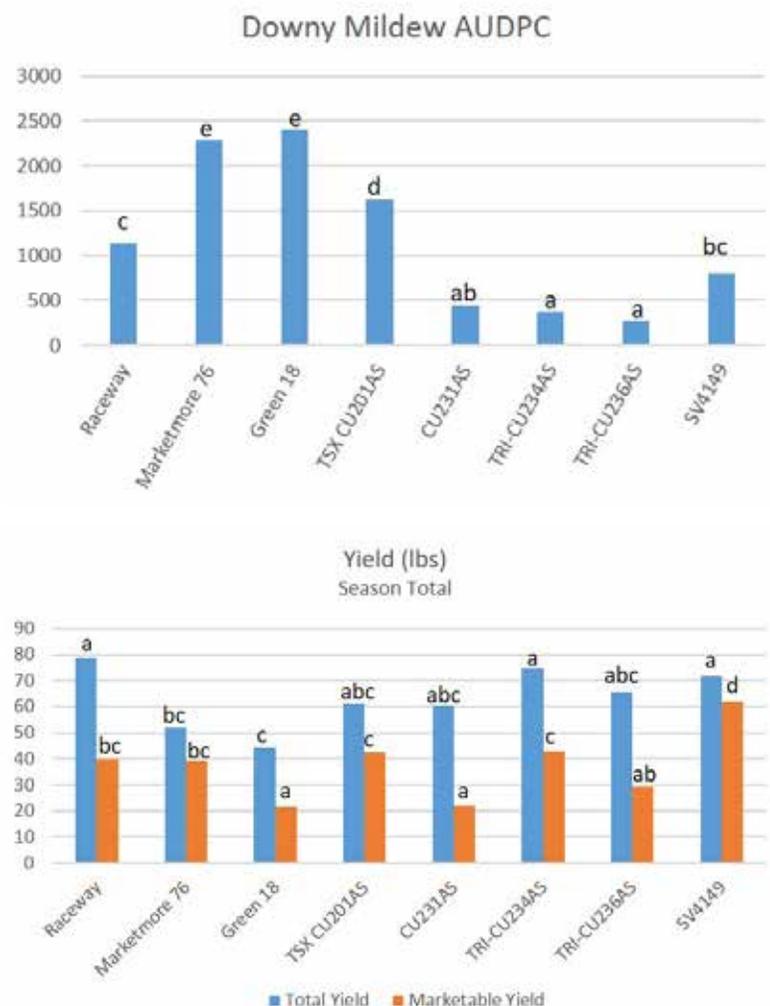


Tri-CU234 performed consistently well regarding AUDPC and yield.

Figure 1 shows the AUDPC, which again represents the disease incidence over time—a higher AUDPC means more disease. Values that are followed by the same letter are not significantly different from each other. For example, the marketable weight for Green 18 is not significantly different from those of CU231AS or TRI-CU236AS, and the marketable weight of TRI-CU236AS is also not significantly different from that of Raceway or Marketmore 76.

2021 Chemical Control Recommendations

Below are chemical control recommendations from Mary Hausbeck of Michigan State University, as presented at this year's Great Lakes Expo. Chemical control of cucurbit DM is evaluated every year at MSU, as the efficacy of available materials changes frequently and materials come on and off of recommendations list every year. Fungicide applications should consist of a targeted downy mildew material tank-mixed with a broad-spectrum fungicide like chlorothalonil or mancozeb. Rotate between FRAC groups with every application. Some products, including Orondis Opti, Gavel, and Zing! already contain either mancozeb



or chlorothalonil, so be aware of that when making up your mixes and rotations.

- Of the targeted materials in the 2020 MSU trials, **Orondis Opti** (FRAC Groups M5 & 49) provided the best control, followed by **Omega** (29), **Gavel** (22 & M3), **Zampro** (45 & 40), **Zing!** (22 & M5), and **Ranman** (21).
- Elumin (22), Previcur Flex (28), Forum (15), Presidio (43), and Cabrio (11) are no longer effective. Elumin and Previcur Flex performed fairly well in the early season but were overcome by DM in the later season.
- Mancozeb and chlorothalonil remain effective broad-spectrum protectants.
- The most effective fungicide program was **Orondis Opti alternated with Elumin + Bravo alternated with Ranman + Bravo alternated with Zampro + Bravo**. Applying **Orondis Opti** early in the program had a significant effect on the program's overall success.

--Written by Genevieve Higgins, UMass Extension Vegetable Program

NEWS

FEDERAL PROGRAM UPDATES FOR VEGETABLE PRODUCERS

Coronavirus Food Assistance Program 2 (CFAP 2)

Vegetable producers who received a CFAP 2 payment and also received a Federal Crop Insurance indemnity payment and/or a payment under the Noninsured Crop Disaster Assistance Program (NAP) for the **2019 crop year** may **modify** their original CFAP 2 application to include those payments as part of their eligible sales amount. The modification can be processed through the FSA Office that handled the original CFAP 2 application. Deadline to complete this modification is **February 26, 2021**.

Paycheck Protection Program (PPP)

PPP has **reopened** and is accepting **new** applications (First Draw) as well as **subsequent** applications (Second Draw) from previous PPP participants. The deadline to apply for the PPP is **March 31, 2021**.

As a recap, PPP is a program administered by the U.S. Small Business Administration (SBA) with applications being processed through an SBA-approved lending institution. While PPP is a loan, an important point to note is that the loan will be **fully forgiven** if the funds are used for payroll costs (minimum %), interest on mortgages, rent, and utilities. Forgiveness is based on the employer maintaining or quickly rehiring employees and maintaining salary levels. Special consideration under PPP is provided for seasonal businesses such as farming operations. More detailed information, including a list of SBA-approved lending institutions that process PPP applications can be found at [sba.gov](https://www.sba.gov). **PPP is a program you should definitely look into if you employ outside labor on your operation!**

Federal Crop Insurance

March 15, 2021 is the deadline to purchase the following Federal Crop Insurance policies: Fresh Market Sweet Corn, Potatoes (Franklin & Hampshire Counties), and, the Whole Farm Revenue Program. Producers interested should contact an approved Federal Crop Insurance agent.

Noninsured Crop Disaster Assistance Program (NAP)

NAP is available on all annual vegetable crops not insured by Federal Crop Insurance. NAP offers Catastrophic (CAT) Coverage which ensures 50% of your actual production history of the crop and any losses are paid out at 55% of the approved market price for the crop. "Buy-Up" coverage is also available under NAP. Producers can cover between 50 - 65% of their actual production history and losses are paid out at 100% of the approved market price for the crop. Under CAT, producers pay an administrative fee and for "Buy-Up" coverage, producers pay an administrative fee and a premium based upon the coverage level selected. **Beginning, historically underserved (which includes female operators), and limited resource farmers receive a waiver of the NAP administrative fee and receive a 50% reduction on the "Buy-Up" premium.** Check with your local USDA - Farm Service Agency (FSA) Office, which administers NAP for more details. **March 15, 2021** is the deadline to purchase NAP coverage for all 2021 Spring-planted crops. **With the wide variations in weather over the past several growing seasons, NAP is a program producers should take a close look at to provide disaster protection on your valuable vegetable crops.**

This material is based upon work supported by USDA/NIFA under Award Number 2018-70027-28588. UMass Ex-

ension works in partnership with the USDA National Institute of Food and Agriculture and the Northeast Extension Risk Management Education Center to educate Massachusetts producers about Federal Crop Insurance and USDA Disaster Assistance Programs. For more information, please contact UMass Risk Management Specialists Paul Russell at pmrussell@umass.edu or Tom Smiarowski at tsmiarowski@umass.edu

GROWER SURVEY: CLEANING & FOOD SAFETY

Struggling with cleaning and sanitizing practices? You're not alone.

You asked, we listened, and now we have a few follow-up questions... Partners at the University of Vermont, Cornell University, USDA, and National Farmers Union Foundation are working together to develop a new training program to help small and medium-scale farmers take their businesses to the next level of safe and efficient vegetable handling systems. Do you have a few minutes to complete a short survey to help us? The voice of farmers is invaluable to the process.

Survey: <https://forms.gle/zXYeYdXYo9P2ZAqt7>

Project Site: <http://go.uvm.edu/scrub>

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.

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!

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

Watch the Pests of the Year recording here:

• 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.](#)

ONTARIO PROCESSING VEGETABLE GROWERS & OMAFRA: TOMATO DAY

When: Thursday, January 28, 2021, 2-5pm

Join District 1 of the Ontario Processing Vegetable Growers and the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) for the 45th Annual Tomato Day! Sessions include Tomato Industry: A World View, Insect and Disease Updates, Weed Control Updates, and Crop Management Updates.

[Click here for full agenda and Zoom link.](#)

UMASS EXTENSION GREENHOUSE & FLORICULTURE PROGRAM: GET READY FOR SPRING PROGRAM

When: Friday, January 29, 2021, 8:30am-12pm

Every season comes with its own challenges. Join us via GoToWebinar on January 29, 2021 for a virtual education program that will provide you with updates and tips for managing pests in spring greenhouse crops. This program will be held as a live webinar from 8:30 AM to 12:00 PM. Presentations will go onto detail on the following hot topics:

- **Pesky Pythium: How to Steer Clear with your Spring Greenhouse Crops** - Dr. Angela Madeiras, Plant Pathologist, UMass Extension
- **Pest Management Update: Insect News to Use for Spring Plant Production** - Dan Gilrein, Entomologist, Cornell Cooperative Extension, Suffolk County

- **Using Biopesticides to Manage Greenhouse Pests** - Dr. Michael Brownbridge, BioWorks Inc.

For complete information and to register: <https://ag.umass.edu/greenhouse-floriculture/events/2021-virtual-get-ready-for-spring-greenhouse-program>

3 pesticide recertification credits in categories 26, 29, 31 and the applicator's license (000) have been approved for this program, valid for licenses in all New England states.

Registration deadline: January 28, 2021 at 12:00 PM

Questions? Contact Geoffrey Njue at gnjue@umass.edu or Jason Lanier at jdl@umass.edu

UNH PLANT PRODUCTION LUNCH & LEARN WEBINAR SERIES FOR GREEN INDUSTRIES

When: Every Tuesday from February 2 to March 30, 12-1pm

Cost: \$20 for each webinar; \$100 flat rate for registration in 6 or more webinars

The UNH Cooperative Extension Landscape and Greenhouse Team is hosting a Plant Production lunch and learn webinar series. You can attend as many or as few as you like. Register and select the sessions you would like to attend. You will receive an email with a link to the webinar.

One pesticide credit will be available for each of the talks indicated and will be available to participants from New England states who attend live.

[Click here for full event listings and registration.](#)

UNH WEBINAR: GETTING EVEN MORE OUT OF YOUR COVER CROPS

When: Thursday, February 25, 2021, 1-2:30pm

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

With a wide variety of cover crop species and mixes available, it can be a challenge to choose the right one to fit into your crop rotation plan. Cover crops are tools we can use on farm to provide nutrients, reduce erosion, suppress weeds and much more! However, not every tool is right for the job and selecting the one that works for you and your farm is key to being successful with cover crops.

Come join UNH Extension staff and guest speaker Jason Lilly from UMaine Extension to learn about web-based cover crop selection tools, crop rotation-based cover crop planning, and cover crop management in vegetable production systems

REGIONAL CONFERENCES

2021 MID-ATLANTIC FRUIT AND VEGETABLE VIRTUAL CONVENTION

When: February 8-11, 2021

Registration: <https://amr.swoogo.com/mafvc2021/begin>

The 2021 virtual Mid-Atlantic Fruit & Vegetable 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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