



UMass  
Extension

## Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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*With daylengths stretching longer than 10 hours, we are out of the Persephone period in MA and winter greens crops like this spinach should start to grow more quickly now. A sign that winter is slowly turning around!*

*Photo: G. Higgins*

### **CROP CONDITIONS**

It's February and suddenly the 2021 season feels right around the corner! ...despite the snowstorm this week that had folks busy clearing snow to protect greenhouses and tunnels... Folks are rapidly trying to fill out their 2021 crews, and many are still wondering how COVID-19 may continue to affect the H2A program and other labor decisions—there is no news yet to report but we are monitoring this issue closely and will report any changes here and via email.

Other early season tasks include cleaning and sanitizing greenhouse surfaces, tools, and supplies, reviewing soil tests and making fertility plans, and of course preparing for pest problems by creating an IPM plan! We have some resources online to make all these jobs easier, but as always, feel free to reach out with any crop or pest question and we will do our best to help sort it out.

- [Scouting resources](#)
- [Fertility Planning Resources](#)
- [Crop Planning Resources](#) (including crop-specific fertility recommendations) from “The Guide”

Many of you have been growing all winter long, with spinach and other greens in high tunnels and overwintering crops in low tunnels—for those of you doing winter spinach, we hope you were able to catch our virtual Field Day last Thursday but if not be sure to check it out on our website [here](#), or on [our YouTube channel](#) where you can find that video and many more. We are in the midst of a big spinach project and are working with a few MA farms to create some enterprise budgets for winter spinach at different scales. If you would like to keep in the loop and/or do your own benchmarking, we'd love to work with you—complete [this short form](#) to join the group! For those selling greens, roots, storage crops, and value added products through the winter, sales continue

to be up due to the ongoing pandemic, and some are reporting an uptick in restaurant sales in the last week. Consumers are still shopping small and local, at farmstands and farmers' markets, and often through new online formats. Bulk sales are way up this winter, as people are still trying to limit their shopping trips. The outlook for 2021 sales is similar to last year, as COVID-19 cases are still very high in the Northeast and vaccinations are still just in phase 2a in MA, so we anticipate similar restrictions being in place and similar sales trends for the time being.

# PEST ALERTS

## Lettuce

Aphids are continuing to be an issue in high tunnel greens. We have seen several lettuce crops infested with **lettuce aphid**, which feed on the inside of the head on the undersides of the leaves. They frequently have red eyes and a waxy coating on their bodies that gives them a striped appearance. Control options include biocontrols (primarily lady beetles at this time of year, but parasitic wasps and predatory midges and lacewings during warmer seasons) as well as insecticides. For a full description of high tunnel biocontrol options, see the article in the [August 27, 2020 issue of Veg Notes](#). 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 list of products labeled for control of lettuce aphid, see [the lettuce insect section of the New England Vegetable Management Guide](#). Note that some materials cannot be used in a greenhouse. If a product is not approved for indoor use, it will be noted on the label; otherwise it is okay to use in a greenhouse or tunnel. To check whether a product is labeled for indoor use, check out this tool from Michigan State University: [Can I use it in the greenhouse?](#)

**Powdery mildew** is also popping up on high tunnel lettuce. This fungus is specific to lettuce and we see it every year in winter lettuce. It produces powdery white sporulation on the tops and bottoms of leaves. There is also a different [downy mildew of lettuce](#) that produces fuzzy, white, interveinal sporulation on the undersides of leaves only. There is little efficacy data for OMRI-listed fungicides, but sulfur (e.g. Microthiol Disperss) is likely effective, and surface sterilizers like OxiDate also likely have some efficacy. Many conventional fungicides have efficacy against lettuce PM; in recent efficacy trials, Quintec (FRAC Group 13), Luna Sensation (7+11), and Torino (U6) all provided the best control and are allowed for use in high tunnels.

## Tomato

**Edema** has been reported in tomatoes from one grower with a heated greenhouse production system. Edema is a physiological disorder caused when the rate of water uptake in a plant is faster than the transpiration rate, or the rate that water is lost through the leaves. The buildup of water pressure causes cells to burst in the leaves, resulting in raised, blister-like areas. This often occurs after long cloudy stretches when low light levels decrease plant transpiration rates. High humidity can also decrease transpiration rates, leading to edema. Managing water and humidity are key to controlling edema: use



*Lettuce aphid*  
Photo: Claude Pilon



*Powdery mildew on lettuce*  
Photo: Meg McGrath



*Edema in tomato*  
Photo: OSU Extension

## 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](mailto:umassveg@umass.edu)

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

well-draining growing media and don't over-water, especially during extended periods of low-light; take measures to reduce humidity (venting, increasing plant spacing).

**Powdery mildew** was also reported this week in hydroponic tomatoes. Powdery mildew is a common disease in high tunnels and greenhouses where humidity is usually high. Unlike other fungal diseases, PM doesn't need leaves to be wet to infect, but it thrives in high humidity. There are two PM pathogens that can cause disease on tomato but the more common species is *Oidium neolycopersici*, which only infects tomato. For organic growers, the most effective chemical control options are micronized sulfur (e.g. Microthiol Disperss) and mineral oil (e.g. JMS Stylet Oil), and both are good options for conventional growers as well. Conventional fungicides labeled for PM and allowed for indoor use include Inspire Super, Switch, Revus Top, and Vivando. For details about effective applications, see the article by Meg McGrath of Cornell University in the [May 24, 2018 issue of Veg Notes](#).

## **SOIL BIODEGRADABLE MULCH: WHY YOU SHOULD MAKE THE SWITCH**

*--Written by Shuresh Ghimire, UConn Cooperative Extension and Andy Radin, URI Cooperative Extension*

Something important for you to consider: your use of plastic mulch in vegetable production. This is especially worthy to think about given that plastic mulch isn't just for tomatoes, peppers, and eggplant anymore. Most small-scale growers use it for onions, lettuce, herbs, and more. You've no doubt heard about biodegradable mulch, but possibly not so great things. Here are some important questions you may have, and some real answers.

### **1. Can plastic mulch actually “degrade?” Yes, and no.**

#### **First, the NO.**

Degradation caused by sunlight, heat, moisture, and mechanical stress results in ever-smaller fragments of plastic, ultimately becoming what are called “microplastics.” According to a quick search on Google Trends, this word as a topic has increased dramatically over the last 5 years, which corresponds to an increase in our understanding of just how pervasive these pollutants are on land and in the oceans, and the possible and probable effects they have on species richness and diversity. It's a disturbing and inescapable fact that plastics are changing the planet for the worse.

#### **Now for the YES!**

Degradation of plastic by microorganisms, known as biodegradation, is very much a real thing, provided the plastic is made of the polymers that microbes can consume. Soil-biodegradable plastic mulch breaks down into CO<sub>2</sub>, water, and microbial biomass.

But let it be stated right here up front: except for paper-based mulches, there are no biodegradable plastic mulches that are approved for use by certified organic farms in the United States. (See sidebar with NOP standards for reasons why.) If you are a certified organic grower, you cannot make the switch. You are permitted to use paper-based mulches, as long as they do not contain any synthetic materials. However, these do not perform well in our climate. Our (usually) plentiful rainfall and warm summer weather causes rapid break-down of these materials.

But if you are not certified organic and do use plastic mulch, please read on as we consider a list of potential issues with the use of biodegradable mulch (BDM).

### **2. How much do BDMs break down during the growing season?**

Shuresh Ghimire (UConn) and his colleagues at Washington State University and University of Tennessee found that among 4 BDM products they tested, by the end of August, less

#### **USDA NATIONAL ORGANIC PROGRAM RULES**

Biodegradable biobased mulch film was added to the list of allowed substances in October 2014. However, it **MUST**:

1. be 100% biobased (ASTM D6886)
2. be produced without use of synthetic polymers (minor additives such as colorants and processing aids not required to be biobased);
3. be produced without organisms or feedstock derived from excluded methods (i.e., synthetic or GMO);
4. meet compostability specifications (ASTM D6400, ASTM D6868, EN 13432, EN 14995, or ISO 17088); and
5. reach ≥ 90% degradation in soil within 2 years (ISO 17556 or ASTM D5988)



than 10% of the soil originally covered became exposed, and that remained under 15% by the end of October. (This was in an area that averages 42 inches of rainfall, annually, versus RI, which is closer to 50 inches.) These mulches really hold up during the season they are applied!

### 3. How do yields on BDM compare to yields on polyethylene (PE) mulch materials?

Shuresh and colleagues have also looked at that over several years and found relatively similar yield results between BDM and PE mulch. Unfortunately, it's difficult to state this definitively because in a survey of comparative studies, Martín-Closas *et al.* (2017) found better performance, worse performance, and equal performance between BDM and PE. But these were in a wide range of soil and climate conditions. The chances of BDM performing better than PE in an exceptionally wet summer in eastern North Carolina are slim – the stuff will break down more rapidly, so you do take something of chance there.

### 4. Will last year's mulch bits disappear by the time I am prepping beds this coming year?

Shuresh and colleagues found that traces of several tested products could be found 2, 3 and even 4 years after use. This longevity was strongly influenced by soil texture [see footnote], climatic factors (annual rainfall, annual average air temperatures), and product formulations. As you might expect, biodegradation is more rapid in warmer, wetter climates and in medium textured soils, which have the benefits of good water-holding capacity as well as decent porosity. Yes, there is differential breakdown among the products, and some of it remains in the soil for a few years. Products that perform the best within a season also probably leaves residues for longer. These are often thicker. But that doesn't mean it leaves behind microplastics. The limits of instrumentation make it nearly impossible to document the final-most end-stage of decomposition of soil biodegradable plastic, whereas microplastics are actually detectable.

### 5. Isn't BDM more expensive than PE mulch?

Yes, it really is more expensive to purchase the material – two to three times more, depending on thickness. Plan to lay out more cash on the front end of the season. BUT: don't forget to calculate how much you can save on the back end. There's an easy to use calculator available for download [here](#). [Note: this link will take you to an Excel spreadsheet in your browser. You can download it by clicking on the "File" menu in the upper left-hand corner of the spreadsheet and then click on "download." After doing that, make sure that you enable the macro features.]

Below is what the calculator generated based on using three 3,000-foot rolls of mulch on an acre:

Per Acre Cost Comparison		
	PE Plastic Mulch	Biodegradable Mulch
Mulch Installation		
Machinery	\$435.00	\$435.00
Material	\$405.00	\$1,050.00
Installation labor	\$240.00	\$240.00
End-of-season		
Mulch removal	\$682.50	\$0.00
Mulch disposal	\$15.59	\$0.00
Mulch tilled into the soil	\$0.00	\$244.50
<b>Total cost</b>	<b>\$1,778.09</b>	<b>\$1,969.50</b>
<i>Difference in using biodegradable mulch</i>		\$191.41

There are many assumptions built into this output, and the spreadsheet allows you to adjust all of those. But going with what they filled in for default estimates (labor rates, tractor time, dumping fees, and more), take a look.

In this case with all of the default values they started with (again, which you can adjust), it costs \$191 or 11% more per acre to use BDM than PE mulch. In case you're wondering, many of the dollar values they used are on the generous side, so this may be an overestimate. Overestimating is always good in enterprise planning, at least to a point.

Other factors not accounted for in the spreadsheet:

- Aggravation/Procrastination factor: There's nothing like an un-fun job to persuade you to do other things that seem less aggravating. But pulling out the drip tape is the only thing stopping you from disking over your

plastic-mulched beds.

- Interference with timeliness of cover crop planting: Getting those beds cleaned up speeds you towards getting your cover crop seed planted. Getting deep into the financial analysis, it's entirely possible that the earlier cover crop planting recovers more nutrients and increases organic matter in your soil, which are things you can take to the bank.
- If you grow into the fall and winter, you have tunnels to clean up but also fall planting deadlines to keep. Deadlines like that can easily cause a delay of field cleanup because every day of waning daylight in mid- to late-September reduces fall tunnel crop growth.
- You are putting less polyethylene mulch onto the land and eventually, into the ocean. Hard to calculate costs associated with that, but they are real.

## 6. Can it be applied in the field just like PE mulch?

Yes, more or less, BUT three caveats:

1. It is more delicate than PE so it has to be handled a little more gently.
2. If it does get damaged while laying it down, decomposition will be accelerated
3. MOST IMPORTANT – it should not be applied as tightly as PE mulch because it continues to tighten as the weather warms. If it is installed too tightly at first, it will split as it tightens up, and this will allow early summer weeds to take over.

Think it over – it could change things for your late summer-into-fall transition... for the better. For a video testimonial from a Connecticut farmer, watch [this video](#).

**Footnote:** Shuresh and colleagues did not specifically look at the relationship between soil texture and mulch biodegradation rate. However, a study from Brazil (Duarte *et al.* 2019) reports that the CO<sub>2</sub> production was much higher when a biodegradable mulch was tested in sandy-loam textured soil compared to clay and sand-textured soil. In general, degradation rate would be higher in the soil where there are greater populations of microbial communities, the soil is not too dry or not too wet (balance of water and air in the soil pore/capillaries). This probably means greater degradation rate in sandy loam or silty loam soil than clay or sands.

## NEWS

### FEDERAL PROGRAM DEADLINES FOR VEGETABLE PRODUCERS

#### **February 26 – Modified Coronavirus Food Assistance Program 2 (CFAP 2) Applications**

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.

#### **March 15 - 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](#).

#### **March 15 - Noninsured Crop Disaster Assistance Program (NAP)**

NAP is available on all annual vegetable crops not insured by Federal Crop Insurance. Given trends toward increasing weather variability, NAP can provide crucial disaster relief for producers of non-insurable crops. Check with your [local USDA - Farm Service Agency \(FSA\) Office](#), which administers NAP for more details.

#### **March 31 - Paycheck Protection Program (PPP)**

[PPP](#) is a program you should definitely look into if you employ outside labor on your operation! PPP has reopened and is accepting new applications (First Draw) as well as subsequent applications (Second Draw) from previous PPP participants. While PPP is a loan, 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.

For more information, please contact UMass Risk Management Specialists Paul Russell at [pmrussell@umass.edu](mailto:pmrussell@umass.edu) or Tom Smiarowski at [tsmiarowski@umass.edu](mailto:tsmiarowski@umass.edu)

## A SURVEY FOR ALL BASIL GROWERS IN THE US

As a follow-up to the virtual Basil Workshop held by UMASS, Rutgers University, and the University of Florida in December 2020, UMASS has created a short survey for any US basil grower to participate in. Below is a link to the survey and additional information that basil growers might find useful.

Survey: <https://forms.gle/NyNz9MuwubFMnHnh8>

The slides for the workshop presentations will be posted soon!

Below are some useful basil links:

- Maps & reports for basil downy mildew (BDM) and other basil monitoring: <https://basil.agpestmonitor.org/>  
*Note that you can submit reports to this site and help us map the annual spread of BDM.*
- Anyone can follow the Rutgers basil breeding program on Instagram: [@rutgersbasil](https://www.instagram.com/rutgersbasil)

## 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>

## 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.*

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

**When:** TODAY! 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](https://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](http://ag.umass.edu/vegetable/events/high-tunnel-fertility-research-update)

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

- **Pests of the Year Recording:** <https://www.youtube.com/watch?v=IadfeJ1dWVo>

- **Virtual Spinach Field Day Recording:** [https://www.youtube.com/watch?v=IDtJO8IKiCg&list=PLW8rjcpjh11Y7veLKCAV3IMF8-ebG\\_Oib&index=2](https://www.youtube.com/watch?v=IDtJO8IKiCg&list=PLW8rjcpjh11Y7veLKCAV3IMF8-ebG_Oib&index=2)

## **CLIMATE SMART FARMING TEAM WINTER WEBINAR SERIES**

**When:** February 12, 19, and 26, 12-1pm

The Cornell Climate Smart Farming Program has 3 upcoming winter webinars for farmers, Extension specialists, and agriculture consultants. Registration is required, but events are free and open to the public. Please join us!

- February 12: Implications of Large Solar Installations and Leasing on Farmland
- February 19: Using the CSF Growing Degree Day Calculator for Cropping Decisions
- February 26: Irrigation Management in Processing Vegetables Using the CSF Water Deficit Calculator

More information and registrations: <http://climatesmartfarming.org/news/csf-team-winter-webinar-series/>

## **WEBINAR: MDAR ENERGY GRANTS & RURAL ENERGY FOR AMERICA PROGRAM (REAP)**

**When:** Wednesday, February 17, 10-11:30am

**Registration:** Free! [https://us02web.zoom.us/webinar/register/WN\\_NftNXTZ2S2WPT1G3KpbGGA](https://us02web.zoom.us/webinar/register/WN_NftNXTZ2S2WPT1G3KpbGGA)

The Massachusetts Farm Energy Program will provide an overview of the application process and requirements for MDAR's energy grants, as well as the USDA's Rural Energy for America Program (REAP) Grant.

For more information, please contact Megan Denardo at the Massachusetts Farm Energy Program at [megan.denardo@cetonline.org](mailto:megan.denardo@cetonline.org) or 413-727-3090.

## **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**

### **EASTERN NY COMMERCIAL HORTICULTURE PROGRAM CONFERENCE**

**When:** February 1 – 26, 2021

The CCE Eastern NY Commercial Horticulture Team is happy to invite vegetable and berry growers to our virtual series of production and business management webinars held this February! Sessions include sweet potatoes, three berry workshops, transplant production, a farm stand virtual tour, sweet corn, and several other exciting topics! Register for individual sessions or save money with one of our bundle options.

More information and registration: <https://cce-enychp.teachable.com/>

### **VIRTUAL HARVEST NEW ENGLAND AGRICULTURAL MARKETING CONFERENCE AND TRADE SHOW**

**When:** February 24 and 25, 2021

**Registration:** <https://www.harvestnewengland.org/events/registration/>

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.

### **MASSACHUSETTS URBAN FARMING CONFERENCE**

**When:** March 5 – 11, 2021

**Registration:** <https://www.eventbrite.com/e/7th-massachusetts-urban-farming-conference-tickets-136974220581>

The Massachusetts Urban Farming Conference (UFC) hosted by the Urban Farming Institute and in partnership with the Massachusetts Department of Agricultural Resources (MDAR), is designed to advance opportunities and address barriers involved in cultivating a resilient and thriving Urban Farming sector.

We will convene local and regional experts, advocates, and innovators to support and promote urban farming enterprises across Massachusetts. Our local urban farming community, along with cross-sector partners, will address challenges, highlight successes, and share resources at one of the best educational and networking events for this thriving sector.



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