



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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CROP CONDITIONS

Dear 2,790 subscribers,

Our year is coming to a close after making at least 130 on-farm consultations to over 30 farms, conducting and presenting at 33 educational programs for 1,747 people, providing certified produce safety training to 148 individuals, donating over 2,000 lbs of our produce to the local Food Bank, and conducting 11 research trials on 7 farms. That's our year by the numbers. For more details about our work this year, you may find our full annual report here: https://ag.umass.edu/sites/ag.umass.edu/files/umass_vegetable_program_annual_report_2017.pdf. We've heard that your numbers have been pretty good this year too! One farm reported record sales after expanding their retail shop and prepared food offerings. Another farm reported their coolers packed to the gills with winter storage crops: carrots, sweet potatoes, potatoes, beets; a welcome relief after last year's drought when their storage carrots didn't germinate. "If the crop of any one year was all, a man would have to cut his throat every time it hailed. But the real products of any year's work are the farmer's mind and the cropland itself." Thanks Wendell Berry, but surely a little profit doesn't hurt? However, in the interest of feeding our minds, we look forward to seeing many of you at next week's New England Vegetable and Fruit Conference (December 12-14) in Manchester, NH. See events section for registration info.



See our 2017 annual report for information about the trials we did this year--like Sue Scheufele's work on insectary plantings for control of cabbage aphids.

blight and powdery mildew is caused by a fungus, so fungicides used to control one may not control the other. Be sure to properly identify the pathogen or submit a sample to the diagnostic lab.

Symptoms

The disease causes leaf yellowing in angular patches, as the spots are vein-limited. On red leaf varieties the initial spots may appear more grayish and water-soaked. Under humid conditions, white crusty sporulation forms when sporangiophores emerge from stomata and produce sporangia in distinct

LETTUCE DOWNY MILDEW

Downy mildew (*Bremia lactucae*) is a common disease of lettuce in cooler growing environments, where temperatures are low and there are long periods of leaf wetness caused by overnight dew. These conditions are common in late-fall and in cool-season greenhouses. This fall we have seen downy mildew in field lettuce and in a heated winter greenhouse. Symptoms include white sporulation on leaf surfaces, which growers may assume to be powdery mildew. Importantly, downy mildew requires cool weather and leaf wetness while powdery mildew occurs during warm weather and under dry conditions. Downy mildew is caused by an oomycete like late



Vein-limited angular patches on the upper leaf surface. Photo, S. Scheufele

white projections, as with brassica downy mildew. Sporulation usually forms on the underside of the leaf but may also be seen on the upper leaf surface. Later, lesions turn tan or brown and papery as the tissue is killed. Older leaves close to the ground usually are the first to show symptoms.

Crop Injury

Downy mildew can reduce yields and quality of the crop. Infected wrapper leaves must be removed at harvest. Infections on the cap leaves or of leaf lettuce may result in leaving heads or whole plantings behind in the field. Downy mildew damaged leaf tissue can be an entry site for secondary rot producing organisms. These rot organisms may compound crop losses in the field, and can also cause losses later when the lettuce is in transit.

Life Cycle

Damp, cool conditions and moisture on leaves are required for the pathogen to infect lettuce and cause symptoms to develop. The short-lived sporangia are dispersed by winds. Cultivated lettuce is the main host but it has also been reported on other plants such as artichoke, cornflower (*Centaurea cyanus*), and strawflower (*Helichrysum bracteatum*). *Bremia lactucae* is a complex organism, consisting of multiple races (pathotypes), which may affect different cultivars. New races continue to occur as the pathogen changes. Within each pathotype, some isolates have developed a lack of sensitivity to some fungicides. It is not entirely clear whether or not *B. lactucae* produces more persistent overwintering spores (oospores) in our area, if it is blown in from other growing regions, or is associated with seed.

Cultural Control

Planting resistant varieties is the most effective strategy for preventing lettuce downy mildew. However, choosing the right resistant variety necessitates that one knows which strain(s) of the pathogen is present. We are currently conducting experiments to determine the strain(s) present here in MA but this process may take some time. In the meantime, we are interested in hearing from anyone who has or has had the disease on their farm in the last few seasons to learn more about this disease and to compile a list of varieties which do and do not seem to get disease that growers could use. **Please email or call Sue at sscheufele@umext.umass.edu or 413-577-3976 and let me know when you have seen the disease and which varieties were and were not affected.**

Other cultural controls may include:

- Destroying crop residues promptly after harvest
- Crop rotation into unaffected fields
- Buying quality seed
- Reducing leaf wetness by using drip irrigation, increasing spacing, orienting rows parallel with wind, controlling weeds, and so on
- Heat and vent greenhouses to remove moist air

Chemical Control

Many fungicides are labeled to control downy mildew and can be effective if a spray program is started early, before disease occurs when conditions are favorable. Oomycete-specific materials (e.g. Tanos, Ranman, Curzate) should be mixed with a broad spectrum fungicide (e.g. mancozeb or copper). For organic growers, contact fungicides, e.g. Oxidate or Milstop, on a tight spray schedule (no residual activity) have been found by growers to be most effective. See the [New England Vegetable Management Guide](#) for a complete list of registered fungicide. Check labels for pre-harvest intervals.



*Grayish, water-soaked lesions on red lettuce.
Photo, S. Scheufele*



Crusty, white sporulation forms under humid conditions. Photo, S. Scheufele.

-Written by Susan B. Scheufele, UMass Vegetable Program

GETTING STARTED USING NATURAL ENEMIES IN GREENHOUSES

Many growers in Massachusetts and Connecticut are successfully using natural enemies (beneficial insects, mites, nematodes and other organisms) as an alternative to pesticides to manage pests in greenhouses. If you are considering using natural enemies on your spring crops, prepare by taking some important steps three months prior to releases. The success of any biological control program relies on patience and a commitment to detail such as sanitation, scouting and record-keeping.

Sanitation and Disinfecting: Greenhouse sanitation and disinfecting are steps that growers can take now to prepare for the spring growing season. Clean as early as possible to eliminate over-wintering sites for pests to reduce their populations prior to the growing season. Greenhouse pests will over-winter in weeds and protected areas in unheated greenhouses and especially during years with unseasonably warm temperatures. Remember that pests are much easier to prevent than to cure.

Floors: Begin by thoroughly cleaning the floor of soil, organic matter and weeds. Pay particular attention to areas around furnaces or along side walls where small weeds may exist. Install physical weed mat barriers if floors are bare dirt or gravel and repair existing ones. Weed barriers not only prevent weeds, but also make it easier to manage algae. Avoid using stone on top of the weed mat that will trap soil and moisture, creating an ideal environment for weeds, diseases, insects and algae. Fix any low spots or poorly drained areas in the greenhouse that allow water to accumulate.

Benches, Hose Nozzles, Media Mixing Area: Benches, preferably made of wire, should be disinfected and pots, flats and trays should be either new or disinfected. Bench tops and work tables should be made of a non-porous surface such as a laminate that can be easily disinfected. Avoid using bare wood for these tasks. Disinfect hose nozzles, hang hoses to keep ends off the floor and provide a clean and covered area for growing media. Avoid holding plant material and contaminated pots, media or debris in the media mixing area.

Disinfectants: Disinfect the growing and plant handling areas, and irrigation system. There are several different types of disinfectants that are currently used in the greenhouse for plant pathogen and algae control. They are quaternary ammonium compounds (Green-Shield®, Physan 20®, and Triathlon®), hydrogen dioxide (ZeroTol®, Oxidate®) and chlorine dioxide (Selectocide™). All these products have different properties, so read and follow label directions. Chlorine bleach

may be used for pots or flats, but is not approved for application to walls, benches or flooring. Alcohol is flammable and therefore not used as a general disinfectant. However, it is useful as a dip or swipe treatment to disinfect propagation tools. If possible, disinfectants should be used on a routine basis both as part of a pre-crop clean-up program and during the cropping cycle.

Organic Options: Organic growers have fewer options for disinfectants. Oxidate® is the only material mentioned above that is currently listed by the Organic Material Review Institute (OMRI), see www.omri.org. Ethyl or isopropyl alcohol is also allowed under the organic standards. Organic growers should always check with their certifying organization before using any material new to their growing practices.

Outside Weeds: Check weeds around the greenhouse perimeter for aphids and other pests. When weather permits, use horticultural oil on weeds outside, around the greenhouse perimeter to smother over-wintering pests



Releasing natural enemies in your greenhouse can help reduce pesticide use, but planning and good sanitation are key to effectiveness.

Photo, K. Campbell-Nelson



Good sanitation, including removing weeds from inside and around the perimeter of greenhouses, will help to control greenhouse pests.

Photo, UMass Floriculture

such as aphids. Clean up the weeds in the fall to prevent pests next spring.

Fallow Greenhouses: Finally, pest populations will be reduced significantly with a fallow period of four weeks, but having an empty greenhouse for even two weeks can help.

Pesticide Use: If planning to use biological control, it is important to phase out the use of pest control materials in the organophosphate, carbamate, and pyrethroid chemical classes prior to releasing natural enemies since many materials in these chemical classes can persist for up to four months in the greenhouse. Beneficials should not be released onto plants previously treated with incompatible pesticides because residue will be toxic to the natural enemies. For more information on the compatibility of pest control materials with natural enemies refer to on-line databases, such as Koppert Biological Systems (<https://www.koppert.com>), or Biobest Sustainable Crop Management (<http://www.biobestgroup.com>). Check under “Side Effects.” Biobest also has a free smartphone app for pesticide side effects. Information is available on their website.

Plan to release beneficial predators and parasitoids early in the crop before pests build to outbreak levels. Read up on using biologicals from the list of fact sheets (some with videos) on the UMass and UConn Extension websites: http://ipm.uconn.edu/pa_greenhouse and <http://extension.umass.edu/floriculture/fact-sheets/pest-management>. Our greenhouse pest guide web-based app is another good resource with options for biological control. See: <http://greenhousepestguide.umass.edu>. If you plan to use banker plants to rear and distribute natural enemies, they also need to be started early.

Contact suppliers/distributors of biological control agents early, before the spring growing season. Most companies offer assistance either over the phone or through a regional technical representative to get you started and will help with release rates. Other considerations include having someone available when shipments arrive and checking shipments for viability (remember they are living organisms).

Here is a partial list of suppliers or distributors of natural enemies used by greenhouse growers in Connecticut and Massachusetts:

- IPM Laboratories, Inc., Lock NY, www.ipmlabs.com
Contact: ipminfo@ipmlabs.com, (315) 497-2063
- Syngenta Bioline, CA, www.syngentabioline.com
Contact: info@syngentabioline.com
(805) 986-8265 or (978) 851-4346 (Griffin Greenhouse Supply)
- Koppert Inc. MI, www.koppert.com
Contact: info@koppertonline.com, 1-800-928-8827
- Biobest Biological Systems. www.biobest.be
Contact: info@biobest.ca or info@biobest-usa.com, (519) 322-2178 or (855) 224-6237.
- Beneficial Insectary, CA, www.insectary.com, www.greenmethods.com
Contact: info@insectary.com, 1-800-447-3715
- Applied Bionomics, BC Canada, www.appliedbio-nomics.com
Contact: brianabl@telus.net, (250) 656-2123

--From articles by Leanne Pundt, UConn Extension and Tina Smith, UMass Extension (retired).



Banker plants, such as this basket of oats infested with bird cherry oat aphids, which serve as early hosts for aphid parasites, can help to build and maintain beneficial populations.
Photo, K. Campbell-Nelson

2018-2019 NEW ENGLAND VEGETABLE MANAGEMENT GUIDE AVAILABLE NOW!

A collaborative project of the Cooperative Extension vegetable programs in the six New England States, this guide provides up-to-date production and pest management information for both conventional and organic commercial vegetable growers, on small and large farms.

The 2018-2019 New England Vegetable Management Guide is a comprehensive guide to current production and pest management techniques for commercial vegetable crops. There are in-depth sections on cultural practices, vegetable transplant production, integrated pest management for insects, weeds and diseases, and on individual vegetable crops. New information included in this edition on:

- Post-harvest handling and storage
- Soil fertility and nutrient amendments, including biostimulants, foliar amendments, and microbial inoculants
- Wildlife management
- Weed management
- New varieties
- Pesticide label information

Purchase copies of the Guide at the [UMass Extension Bookstore](#). Purchases can be made online or by printing your confirmation and mailing it in with a check. You can also order by phone: (413) 545-2717.

Buy the Guide by itself, or as a package with the NE Vegetable & Strawberry Pest ID Guide. The Pest ID Guide contains over 200 full-color images of the weeds, insects, diseases, and disorders that may be affecting your crops, and beneficial insects too. The Pest ID Guide is an indispensable companion to the Vegetable Guide, and you save big when you buy them together!

Guide pricing:

- 2016-2017 New England Vegetable Management Guide alone: \$25.00
- Northeast Vegetable & Strawberry Pest Identification Guide alone: \$15.00
- Veg Guide & Pest ID combo pack: \$30.00

EVENTS

New England Vegetable and Fruit Conference

When: Tuesday, December 12 to Thursday, December 14, 2017

Where: Radisson Hotel, 700 Elm St, Manchester, NH 03101

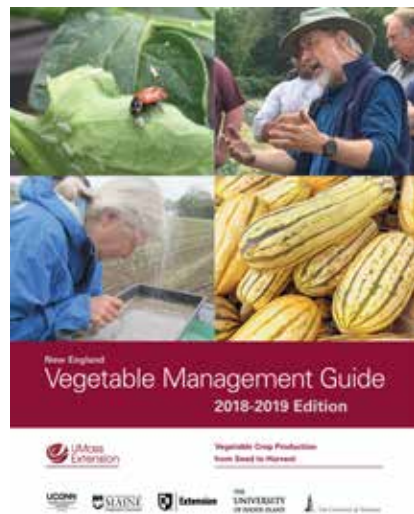
The New England Vegetable & Fruit Conference and Trade Show will include more than 25 educational sessions over 3 days, covering major vegetable, berry and tree fruit crops as well as various special topics. A Farmer to Farmer meeting after each morning and afternoon session will bring speakers and farmers together for informal, in-depth discussion on certain issues.

There is also an extensive Trade Show with over 120 exhibitors. We hope that you will enjoy your time here, and meet with fellow growers, advisors, researchers, and industry representatives. We want you to leave with new ideas and new information that will have a positive impact on your farm. [Click here to register](#).

NEVBGA & Cooperative Extension 595th Growers' Meeting

When: Friday, January 5, 2018 from 9:00am to 3:30pm

Where: Hadley Farms Meeting House, 41 Russell St. Hampton Village Barn Shops on Rte 9 Hadley, MA 01035



This edition's cover features recently retired Extension Educators, Jude Boucher (UConn) and Ruth Hazzard (UMass)



Program includes:

- Downy mildew and phytophthora update – *Angie Madeiras UMass Plant Diagnostics Lab*
 - Grower Roundtable: Pick Your Own crowd management, pricing, theft--the good, the bad and the ugly
 - Crop Insurance Update – *Tom Smiarowski & Paul Russell, University of Massachusetts Extension Risk Management/Crop Insurance Education*
 - Land For Good: Land transfer and preservation – *Jason Silverman Massachusetts Field Agent*
 - Tick-borne diseases facts & fiction – *Dr. Thomas Mather “The tick guy from URI”*
 - Choosing the right strawberry and raspberry varieties for your market – *Nate Nourse, Nate Nourse Consulting*
 - Spotted Wing Drosophila Update – *Mary Concklin Associate Extension Educator- Fruit Production and IPM University of Connecticut*
- *3 pesticide recertification credits have been approved for this meeting*

Commercial members are welcome to put up table-top displays.

There is a \$20 registration fee, which is waived for members of NEV&BGA. Lunch buffet is an additional \$20.

To register, please RSVP to 978-423-6694 or secretary@nevbga.org by December 30, or visit our Eventbrite page: <http://goo.gl/Lyidaq>

Co-sponsored by the UMass Extension Risk Management/Crop Insurance Education Program

[UConn Extension’s Vegetable and Small Growers’ Conference](#)

When: Monday, January 8, 2018

Where: Maneeley’s Conference Center, 65 Rye St., S. Windsor, CT 06074

Topics and Speakers include:

- Spotted Wing Drosophila Research Update – Rich Cowles, CAES
- Appropriate Manager Response to Difficult Employee Situations – Alexandra Gross, Bishop’s Orchards, Guilford, CT
- Managing Common Diseases in Tomato and Pepper - Christine Smart, Cornell University, Finding Your Sweet Spot – Michele & Billy Collins, Fair Weather Acres, Rocky Hill, CT
- Bicolor Sweet Corn Varieties, and Understanding and dealing with Bird Damage - Ray Samulis, Rutgers Extension Edibles 52 Weeks a Year – Sal Gilberties, Gilberties Petite Edibles, Easton, CT.
- What’s Working with Bramble Production– Tim Nourse, Nourse Farms, S. Deerfield, MA,
- Tapas Peppers from Padron, Spain - Ray Samulis, Rutgers Extension
- Efficacy and Cost Effectiveness of Foliar Nutrient Applications to Vegetable Crops – Andy Radin, URI Extension.

Pre-registration \$40 per person, ends January 3rd. Contact MacKenzie.White@UConn.edu, 860 875-3331. Or, Follow this link to fill out a registration and mail it in: http://ipm.uconn.edu/events_98_3393567609.pdf

[31st Annual NOFA/Mass Winter Conference](#)

When: Saturday, January 13th, 2018

Where: Worcester State University, Sheehan Hall, 486 Chandler Street Worcester, MA

Join us this January and take food production beyond sustainability to regenerative practices. Growers of all levels and land sizes gather at this year’s NOFA/Mass Winter Conference to embark on regenerative practices that produce robust nutritious food, rebuild soils, keep healthier animals and create healthier humans!

Lisa McKeag, UMass Extension Vegetable Program and **Michael Botelho**: Coordinator for the Massachusetts Department of Agricultural Resources’ (MDAR) Commonwealth Quality Program (CQP) will be presenting:

Preparing Your Farm for the Food Safety Modernization Act (FSMA)

Massachusetts' new Produce Inspection Program to implement FSMA's Produce Rule integrates with existing food safety audit programs, supporting farms of all sizes with technical assistance, education and grant funds to prevent foodborne illness and expand market access. Learn what to expect from an audit or inspection and get tools to help with recordkeeping and training.

Early Bird rates available until December 15! Fees range from \$30 - \$100. Click Here to Register: <https://www.regonline.com/builder/site/default.aspx?EventID=2054087>

Our Farms, Our Future Conference

When: Tuesday, April 5 to Thursday, April 5, 2017

Where: Hyatt Regency, 315 Chestnut Street, St. Louis, MI 63102

This national event will bring together our diverse agricultural community including farmers and ranchers, agribusiness stakeholders, students, researchers, scientists, agency representatives and nonprofit leaders. Every decade SARE hosts a conference to look at the progress of sustainability in agriculture and to understand our trajectory for the future.

Please join us for a stimulating set of sessions on the future of sustainable agriculture in the United States.

Special Rates for Farmers if you register by the Earlybird Deadline of February 22nd, 2018! [Click here to Register.](#)

THANK YOU TO OUR SPONSORS



FARM CREDIT EAST



Vegetable Notes. Katie Campbell-Nelson, Lisa McKeag, Susan Scheufele, co-editors.

Where trade names or commercial products are used, no company or product endorsement is implied or intended. Always read the label before using any pesticide. The label is the legal document for product use. Disregard any information in this newsletter if it is in conflict with the label.

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