UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

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In this issue:

Eggplant is flowering - time to remove row cover to allow for pollination!
Photo: G. Higgins

Cercospora leafspot on beet.

Crop conditions

We have had some more normal early-summer weather this last week, with warm daytime temperatures, cool nights, and scattered thunderstorms bringing more than an inch of rain throughout the week to some locations in MA. Summer fruiting crops like eggplant, peppers, and tomatoes are coming along, with flowers forming and the first fruit developing. Asparagus season is wrapping up for the year, right on schedule, and one farmer has reported that yields were on track with previous years. Sweet corn is right around the corner, with early corn just beginning to silk now.

There are two surveys that we want to draw your attention to, as they are great opportunities to voice your opinion about informational and monetary resources in the state and region. One is a survey asking about how you use the New England Vegetable Management Guide, to influence its 2022 revision. The other is a survey from MDAR asking for feedback on what topics relevant to COVID-19 should be prioritized in a special second round of Specialty Crop Block Grant Program funding this year. The MDAR survey is collecting responses through tomorrow, so don't wait to submit feedback and influence which types of projects will be prioritized under this round of funding.

Pest alerts

Basil downy mildew was reported last week in southern NJ and on Long Island, on seedlings being sold at large-scale garden centers. These plants may be a source of infection for basil being grown in the Northeast, in addition to spores blown up from the south. See the article in this issue for management recommendations and let us know (umassveg@umass.edu) if you see basil downy mildew in your fields.

Beans

Mexican bean beetle adults were present in one Hampshire Co. field this week and egg laying is expected to begin soon. See the article in this issue for more management information.

Brassicas

Continue to scout for **flea beetles** and **caterpillars** and protect new plantings with row cover if you will not be using chemical control. The threshold for flea beetles is 1 beetle per plant or >10% damage on 50% of plants scouted. In heading brassica crops prior to heading, treat for caterpillars if 20% or more of plants are infested. In leafy greens and heading crops after head formation, use a 10-15% threshold. Use a spreader-sticker. Drop nozzles can help achieve coverage of leaf undersides. See the appropriate crop section of the New England Vegetable Management Guide for labeled materials.

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.

Chenopods

Cercospora leaf spot was reported in other New England states this week, in direct-seeded beets. Controlling weeds to reduce humidity in the canopy can help reduce disease and increase fungicide efficacy. Resistance to FRAC group 11 fungicides has been reported, so use other materials in fields where group 11 products have been used repeatedly in the past. Other conventional options include Tilt (group 3), Fontelis (7), and Merivon (7+11). Use the highest labeled rate of any product for best control. Tank-mixed Double Nickel and copper provided the best control among OMRI-listed products in Cornell Cooperative Extension research trials.

Cucurbits:

Cucurbit downy mildew was reported on cucumber in NJ yesterday. The current forecasting model report has not been updated to show the risk of spread in the Northeast at the time we are writing this but will likely be updated within a few days. When the risk of disease development reaches our region, growers should begin spraying with targeted DM materials. Rotate between fungicide classes and follow label restrictions for number of consecutive applications of a given product to prevent the pathogen from developing resistance. See the article in this issue for detailed information about management of cucurbit downy and powdery mildews.

Squash vine borer: The first SVB moths have were caught in traps in MA and NH this week. We can expect egg laying to begin in about 2-3 weeks. Squash vine borer moths lay eggs at the base of host cucurbit plants (winter squash, pumpkins, zucchini are hosts, cucumber, watermelon, and butternut are not hosts) and the larvae tunnel into the stem, causing plants to wilt and die. There are two generations per year and the pest overwinters as larvae or pupae in crop residue. SVB is a resident pest on some farms and may never be seen on other farms. Sprays can be timed using pheromone trap counts – a spray is recommended if trap counts exceed 5/week. See our Squash Vine Borer article for chemical control recommendations.

Squash vine borer moth (left) and egg laid at the base of a cucurbit plant (right).
Photos: A. Eaton and K. Campbell-Nelson

Squash bug eggs are being laid now in cucurbit fields. Feeding from squash bug adults and nymphs disrupts cucurbit vascular systems, causing a disorder called Anasa wilt. See the article in last week's issue of Veg Notes for squash bug management recommendations.

Solanaceous

Large **Colorado potato beetle** larvae were reported this week in potato and eggplant. Large larvae can quickly cause significant feeding damage and if you are using pesticides that work by ingestion, the large larvae need to eat a lot of the material to be killed. Chemical control is most effective if sprays are targeted at small larvae (smaller than half-grown). Treat crops if a threshold of 4 small larvae or 1.5 large larvae per plant (or per stalk when potato plants are >12" tall) is reached. CPB readily develops resistance to insecticides, so do not use the same chemical class on successive generations of CPB. Labeled conventional products include pyrethroids, neonicotinoids, novaluron (e.g. Rimon), cyromazine (e.g. Trigard), and diamides (e.g. Verimark, Exirel). OMRI-listed materials include spinosad (Entrust), azadi-

Colorado potato beetle larvae. The larva on the right has eaten its fill of eggplant leaf; the larva on the left is unfed. Photo: J. Boucher

European corn borer larva (left) and shot-hole feeding damage. Photos: UMass Extension and S. Lewins

rachtin, pyrethrin (Pyganic), and *Beauvaria bassiana* (Mycotrol O, Botanigard), which can be tank-mixed and/or rotated.

Sweet Corn

European corn borer: We have reached or passed 650 GDDs at most locations in MA, indicating that we are in the midst or just past peak ECB flight. Scout tasseling corn weekly for larvae and treat if >15% of plants are infested.

Corn earworm was caught in traps in NH and NY this week. MA traps have not gone up yet. Begin trapping for this pest as soon as you have silking corn, which should be soon for the earliest corn in MA. Eggs are laid in corn silks and larvae move from the silks into the developing ears, where they are protected from insecticide sprays. Effective control can be achieved by monitoring population levels with pheromone traps and adjusting spray intervals according to trap counts. We will publish trap counts weekly from our trapping sites across MA but also recommend that growers trap on their own farms as populations can vary even from nearby locations.

Table 1. Sweetcorn pest trap captures for week ending June 16, 2021

Location	GDD (base 50°F)	ECB NY	ECB IA
Western MA			
Sheffield	508	-	-
Southwick	661	-	-
Whately	713	5	0
Central MA			
Bolton	676	2	0
Leominster	663	0	0
Spencer	669	-	-
Eastern MA			
Ipswich	613	-	-
Concord	664	-	-
Millis	-	0	3
North Easton	650	0	0
Sharon		0	1
Seekonk	752	4	0
Swansea		4	2

- no numbers reported for this trap
N/A this site does not trap for this pest

*GDDs are reported from the nearest weather station to the trapping site

Multiple Crops: Continue scouting for potato leafhopper and treating at the following thresholds. Bean: 2 adults per row foot for seedlings and 1 nymph or 5 adults per row foot from 3rd trifoliage leaf stage to bud stage. Eggplant: 1-1.5 adults per leaf. Potato: 1 adult per sweep net or 15 nymphs per 50 leaves. See the article in last week's issue of Veg Notes for management recommendations.

Effectively Managing Cucurbit Powdery & Downy Mildews

--Written by Meg T. McGrath, Cornell University, and published online. Links at end of article.

Effectively managing powdery and downy mildews is essential for producing a high-quality cucurbit crop. The two diseases are widely dispersed and occur every year. The key to successful management of both diseases is using resistant varieties when available and using targeted, mobile (translaminar) fungicides. See the table at the end of this article for mobile fungicides for managing major cucurbit diseases. Below are descriptions of the pathogens and links to more resources on choosing varieties with disease resistance and complete fungicide recommendations.

White powdery mildew sporulation can occur on both undersides and tops of leaves, and is not trapped by leaf veins. Photo: M.T. McGrath

Powdery Mildew

This foliar, fungal disease is common wherever cucurbits are grown, including in the northeastern U.S. This is because the pathogen produces an abundance of asexual spores (the powdery growth) that are easily dis-

persed by wind, allowing it to spread widely. The pathogen can also produce sexual spores in fall that enable the pathogen to survive over the winter. Leaves affected by powdery mildew die prematurely which results in fewer fruit and/or fruit of low quality (poor flavor, sunscald, poor storability).

Powdery mildew is managed with resistant varieties and fungicides. An integrated program with both management tools is the best approach for achieving effective control because the pathogen is adept at evolving new strains resistant to individual tools such as resistant varieties or a specific fungicide. It is more difficult for new pathogen strains to develop when an integrated program is used, and effective control is more likely. Powdery mildew management programs often need adjustments as the pathogen and management tools change.

Gray downy mildew sporulation develops between veins on undersides of leaves. Shown here on cucumber. Photo: G. Higgins

Downy Mildew

Similarly to powdery mildew, downy mildew is a common foliar disease in the Northeast because the pathogen produces a large quantity of asexual spores that are easily dispersed long distances by wind, which enables it to spread widely. Unlike powdery mildew, there has been no evidence that the pathogen is surviving between growing seasons where winter temperatures kill cucurbit crops (outdoors above the 30th latitude); however, recently both mating types have been found, albeit typically on different cucurbit crop types, meaning that there is the potential for the pathogen to produce sexual oospores that could enable the pathogen to overwinter in the northern U.S. The downy mildew forecasting program has documented movement of the pathogen throughout the eastern U.S. each year via its wind-dispersed asexual spores. The pathogen does not affect fruit directly; however like leaves affected by powdery mildew, leaves affected by downy mildew die prematurely which results in fewer fruit and/or fruit of low quality (poor flavor, sunscald, poor storability).

Since 2004, varieties with resistance, which include most hybrids, have provided some suppression of the new pathogen strains present, but substantially less than the excellent suppression that was achieved against strains present before 2004. Fortunately, new sources of resistance have been found and cucumber varieties with these new genes for resistance are starting to become available. Varieties DMR 401, NY264, Citadel, and Bristol are all currently available varieties with strong resistance reported from variety trials conducted by Cornell and the University of Massachusetts in 2016-18.

Powdery & Downy Mildew Management

The most important components of effective management program for powdery and downy mildews are resistant varieties and properly timed fungicides. Both diseases develop best on the undersides of leaves, so mobile (or translaminar) fungicides are needed to achieve successful control. Resistance to certain fungicides is widespread for both pathogens; fungicide recommendations change as new resistance develops or as new products are released. Always implement a resistance management program; do not wait until there is a problem. The goal is to delay development of resistance, not manage resistant strains afterwards. Because downy mildew is an oomycete and not a true fungus, targeted fungicides that control powdery mildew will not control downy mildew, and vice versa. Phytophthora blight, also caused by an oomycete, will usually also be controlled by fungicides that are effective for downy mildew.

1. **Select resistant varieties.** Lists of resistant varieties are available here: https://www.vegetables.cornell.edu/pest-management/disease-factsheets/disease-resistant-vegetable-varieties/
2. **Sign up to receive alerts about downy mildew** occurrence and routinely check the forecast web site (http://cdm.ipmpipe.org) to know where the disease is occurring and what crops are affected. When downy mildew moves closer to the Northeast, we will begin reporting on its movement in Veg Notes, so check Pest Alerts weekly for updates.

   The forecast web site is an important tool for determining when fungicide applications are warranted. Cucurbit plants are susceptible to downy mildew from emergence; however, this disease usually does not start to develop in the Northeast until later in crop development when the pathogen is dispersed by wind into the region. The forecast program monitors where the disease occurs and predicts where the pathogen likely will be successfully spread, based on weather patterns. The pathogen is thought to only be able to survive over winter in southern

Florida, and from there spreads northward. The risk of downy mildew occurring anywhere in the eastern USA is forecast and posted three times a week. Forecasts enable timely fungicide applications. Growers can subscribe to receive customizable alerts by e-mail or text message. Information is also maintained at the forecast web site of cucurbit crop types being affected by downy mildew. This is important because the pathogen exists as two clades and pathotypes within each that differ in their ability to infect the various cucurbit crop types. Success of the forecast system depends on knowledge of where downy mildew is occurring; therefore prompt reporting of outbreaks by growers is critical.

3. **Inspect crops routinely for symptoms of both powdery and downy mildews** beginning at the start of crop development. Scouting routinely for early symptoms is important to ensure targeted fungicides are applied starting at the onset of disease development. Photographs of symptoms are posted at: http://blogs.cornell.edu/livegpath/gallery/cucurbits/

4. In MA, powdery mildew usually appears before downy mildew. Apply protectant fungicides for powdery mildew control as crops develop. Protectant fungicides include Bravo and copper for both powdery and downy mildew, and sulfur and oils for powdery mildew. When you first detect powdery mildew in your crop by scouting, add a targeted material. Remember that targeted materials will be different for powdery mildew (a fungus) and downy mildew (an oomycete). When there is a risk of downy mildew for your specific crop in your area, incorporate a targeted downy mildew material into your spray program. See the table on the next page for targeted materials.

   Protectants include:

   - Sulfur: Very effective, inexpensive product for PM. Has no efficacy for DM or other diseases.
   - Oils: Effective for PM but not DM. Several botanical and mineral oils are available.
   - Chlorothalonil and copper: Effective against both PM and DM. Copper is also effective for bacterial diseases.
   - Mancozeb: Recommended when only downy mildew is occurring.

Fungicide	Price	Unit	Rate/A	Unit	Cost/A	Pkg Size	A/treated	AB	AL	A	ALS	BLS	DM	F	GSB	PhB	PIB	PM	S
Actigard	$57.08	oz	0.5-1	oz	$29-57	8 oz	8-16				R	R	L					L	L
Aprovia Top 1.62 EC	$389.91	gal	10.5-13.5	fl oz	$32-41	1 gal	9.5-12.2	R	R	R					R		R		R
Curzate 60 DF	$57.16	lb	3.2-5	oz	$11-18	4 lb	12.8-20						R						
Elumin 4 SC	$467.99	gal	8	fl oz	$29	1 gal	16						R			R			
Endura	$92.11	lb	6.5	oz	$37	6.5 lb	16	R							nr			nr	
Forum 4.17 SC	$391.96	gal	6	fl oz	$18	1 gal	21.3						R/nr			R			
Gatten	$125	qt	6-8	fl oz	$23-31	1 qt	4-5.3											R	
Gavel 75 DF	$12.49	lb	1.5-2	lb	$19-25	30 lb	15-20						R			R			
Inspire Super 2.82 EW	$325.13	gal	16-20	fl oz	$41-51	1 gal	6.4-8.0	R	R	R					R		R	nr	
Luna Experience 3.34 SC	$5.93	oz	6-17	fl oz	$36-101	32 oz	1.9-5.3		R	R					R			R	
Miravis Prime 3.34 SC	$569.08	gal	9.2-11.4	fl oz	$41-51	2.5 gal	28.1-34.8	R	R						R			R	R
Omega	$506.68	gal	0.75-1.5	pt	$48-95	2.5 gal	13.3-26.7		R				R		R	R			
Orondis Gold	$1,838.30	case			$92-184											R			
Orondis Opti	$210.49	gal	1.75-2.5	pt	$46-66	2.5 gal	8.0-11.4						R						
Orondis Ultra	$1,018.50	gal	5.5-8	fl oz	$44-64	1 gal	16.0-23.3									R			
Phiticide (phosphorus acid)	$21.40	gal	2.5-5	pt	$7-13	2.5 gal	4.0-8.0						nr			R			
Presidio 4 SC	$350.93	qt	3-4	fl oz	$33-44	1 qt	8.0-10.7						R/nr			R			
Previcur Flex 6F	$92.09	gal	1.2	pt	$14	2.5 gal	16.7						R/nr						
Pristine 38 WG	$3.90	oz	12.5-18.5	oz	$49-72	120 oz	6.5-9.6											nr	
Procure 480 SC	$113.69	qt	4-8	fl oz	$14-28	1 qt	4.0-8.0											R	
Proline 480 SC	$655.94	gal	5.7	fl oz	$29	2.5 gal	56.1							R	R			R	
Prolivo	$4.40	oz	4-5	fl oz	$18-22	32 oz	6.4-8.0											nr	
Quintec 2.08 SC	$4.46	oz	4-6	fl oz	$18-27	30 oz	5-7.5											R	
Rally 40 WSP	$3.93	oz	2.5-5	oz	$10-20	20 oz	4-8											nr	
Ranman 400 SC	$1,180.93	gal	2.1-2.75	fl oz	$19-25	1 qt	11.6-15.2						R			R			
Revus	$505	gal	8	fl oz	$32	1 gal	16.0						R/nr			R			
Rhyme 2.08 SC	$3.46	oz	5-7	fl oz	$17-24	50 oz	7.1-10.0								R			R	
Switch	$6.96	oz	11-14	oz	$77-97	28 oz	2-2.5	R	R						R			L	
Tanos 50 DF	$57.65	lb	8	oz	$29	7.5 lb	15						nr						
Torino 0.85 SC	$8.94	oz	3.4	oz	$30	34 oz	10.0											nr	
Vivando 2.5 SC	$311.87	gal	15.4	fl oz	$38	1 gal	8.3											R	
Zampro 525SC	$3.30	oz	14	fl oz	$46	140 oz	10.0						R			R			
Zing! 4.9 SC	$97.91	gal	36	fl oz	$28	2.5 gal	8.9						R			R			
PROTECTANT Fungicides:																			
Chlorothalonil 720	$51.47	gal	1.5-3	pt	$10-19	1 gal	6.7-13.3	R	R	R			R		R			R	R
Microthiol Disperss	$1.13	lb	2-10	lb	$2-11	30 lb	3-15											R	
Kocide 3000	$8.16	lb	0.5-1.25	lb	$4-10				L	L	R		nr		L			nr	

Disease name abbreviations: Alternaria blight (AB), Alternaria leaf spot (AL), angular leaf spot (ALS), anthracnose (A), bacterial leaf spot (BLS), downy mildew (DM), Fusarium blight aka Fusarium crown rot and fruit rot (F), gummy stem blight (GSB), Phytophthora blight (PhB), Plectosporium blight (PIB), powdery mildew (PM), scab (S)

R = recommended, nr = not recommended, L = labeled. R/nr= not recommended for DM on cucumber and cantaloupe because of resistance.

Prepared 1-15-21 by Margaret Tuttle McGrath, Cornell University

Tank-mix each of the fungicides in the table below with one of the protectants listed above, with the exception of Zing! or Gavel, which are both formulated with chlorothalonil or mancozeb. The need for tank-mixing is specified in use directions on many labels.

5. **Alternate among available chemistries based on FRAC codes** to manage resistance development and avoid control failure if resistance occurs, and also to comply with label use restrictions on number of consecutive and total applications allowed. Add new fungicides as they become available; substitute new for older products if they are in the same FRAC group.

Meg McGrath has conducted extensive fungicide resistance research on materials for both powdery and downy mildews. Her websites on each disease include detailed information about efficacy of labelled products and creating fungicide programs.

Click here for the complete guide to the most current DOWNY mildew fungicide recommendations.

Click here for the complete guide to the most current POWDERY mildew fungicide recommendations.

--Compiled from articles written by Meg McGrath, Cornell University, and published online: www.vegetables.cornell.edu/pest-management/disease-factsheets/cucurbit-powdery-mildew/ and www.vegetables.cornell.edu/pest-management/disease-factsheets/downy-mildew-of-cucurbits/current-management-guidelines-based-on-research-results/. Recommendations modified for Massachusetts by the UMass Extension Vegetable Program.

Managing Downy Mildew of Basil

The first reports of basil downy mildew have been starting to come in from the mid-Atlantic region, where plants found at garden centers were infected with the disease. As we have seen in other years and with other diseases, garden centers can be extremely efficient means for spreading diseases as plants get distributed across large areas and planted out widely in home gardens, so it may be an early year for basil DM. Basil DM occurrences are monitored at this website: https://basil.agpestmonitor.org/map/. Preventively applied fungicides can provide control of this disease with regular, timely applications. Resistant varieties have also been available for a few years and have been providing an extra ~2 weeks of basil harvest compared to standard varieties.

Basil downy mildew sporulation on the underside of the leaf (above) and interveinal chlorosis visible on upper side of the leave (below).
Photos: A. Madeiras and Univ. of Florida

Disease Spread. Basil downy mildew is caused by the oomycete, *Peronospora belbahrii*. It is an obligate parasite, meaning that it cannot survive outside of a living host. It does not produce overwintering oospores, but survives from year to year on living plants where basil production occurs year round, such as in Florida. From these sites the pathogen spreads via wind-dispersed sporangia that can travel great distances due to their dark pigmentation, which protects them from UV radiation. There is also evidence that the disease can be spread by contaminated seed, though we do not yet understand how this occurs and how important contaminated seed is as a source of primary inoculum.

Symptoms. Early symptoms can easily be mistaken for a nutritional deficiency. Infected leaves develop diffuse, but vein-delimited yellowing on the top of the leaf and a characteristic fuzzy, dark gray growth on the underside of the leaves, which may be mistaken for soil splashed onto the leaf under-surface, however, close inspection with a hand lens will show the sporangia. More photographs of the signs and symptoms are available at: http://vegetablemdonline.ppath.cornell.edu/NewsArticles/BasilDowny.html

Management Recommendations:

Purchase seed or transplants from reliable sources. We know that the pathogen may come in with seed, though the frequency and importance of seed as a source of primary inoculum are not well understood, and testing of seed is difficult. Therefore, our recommendation is to buy seed from a trusted source. Talk to your seed supplier about how the seed was produced, if it has been tested, and also if the variety exhibits any resistance to the pathogen. Basil seeds are not amenable to hot water seed treatment as they produce a gelatinous exudate when in water, though some seed companies are starting to use steam seed treatment.

Grow your own transplants and keep a careful eye on them. Basil DM has repeatedly been traced back to transplants grown out of state so buying in transplants should be avoided. If you do buy transplants, inspect them carefully before purchasing and if you find any signs of disease report it to the store manager or call your local Extension service. Inspect plants regularly by looking on the undersides of leaves for sporulation (see leaf photos).

Plan to plant and harvest early. The pathogen tends to arrive in MA around mid-July, though in some years it can be earlier. Keep track of where the disease is being found via Pest Alerts in Veg Notes and via the basil downy mildew monitoring program here: https://basil.agpestmonitor.org/map/.

Plant resistant varieties. There are now several varieties that provide good suppression of BDM, but not full immunity (see list below). Use resistant varieties for later plantings. It is recommended to use an integrated management program that includes applying fungicides to resistant varieties to ensure effective control. Meg McGrath at Cornell University has been conducting evaluations of resistant varieties as well as research on fungicide efficacy and is interested in hearing growers' feedback on occurrence of the disease and performance of these new varieties. Send feedback to Meg at mtm3@cornell.edu.

- **Obsession DMR, Devotion DMR, Thunderstruck DMR, Passion DMR:** Developed by the Rutgers University breeding program, these are all sweet basil varieties available from several seed companies, including organically-produced options. These have shown high levels of resistance in trials, though more symptoms were observed in 2020 than in previous years.
- **Prospera** series (CG1, ILL2, PL4, PS5). Available from several seed companies, these have performed well in Cornell disease trials over the past three years.
- **Amazel** is a Proven Winners variety. It is seed sterile and sold as cuttings primarily for producing plants for the home garden market
- **Pesto Besto** is another Proven Winners variety with the same source of genetic resistance as Amazel; sold by seed.
- **Eleonora, Emma, and Everleaf (aka Basil Pesto Party)** are older varieties that have demonstrated limited to moderate resistance in recent trials.
- **Other varieties** that tend to have fewer symptoms are the non-sweet types, including red leaf, Thai, lemon, lime, and spice types.

Reduce leaf wetness and humidity. Heat and vent greenhouses after cool nights, use fans, and water early in the day in the greenhouse. In the field, plant in well-drained sites, in rows parallel to prevailing wind direction, increase plant spacing, and control weeds.

Once detected, if the disease is not widespread, remove infected plants or seedling trays and begin chemical control, or try to harvest and sell plants immediately, before symptoms worsen.

Chemical Control. Excellent control of downy mildew can be achieved with conventional fungicides applied weekly on a preventive schedule, but control is greatly reduced when applications are started after disease detection. If the symptoms are widespread and severe, destroy the crop immediately to stop spread of the disease to other plantings on your farm.

Pay close attention to labels. Basil is a minor crop and is not always found on pesticide labels, and there are differences in registrations for use in field versus greenhouse production. Some products have supplemental labels for use on basil. Labels, including supplemental labels, can be found at www.cdms.net/Label-Database.

Research trials have shown that the phosphite fungicides (eg. K-Phite, Prophyt, Fungi-phite) are among the most effective

chemical controls. Other effective materials include mandipropamid (eg. Revus), cyazofamid (eg. Ranman), and azoxystrobin (eg. Quadris). All of these except Quadris can be used in both field and greenhouse in MA—Quadris is labeled for field use only.

Fungicides with targeted activity are prone to resistance development due to their single-site mode of action and thus need to be used within a fungicide resistance management program. Resistance to mefenoxam (Ridomil) developed quickly in Israel demonstrating the capacity of this pathogen to develop resistance. See here for example fungicide programs.

While several OMRI-listed products are labeled for downy mildew on basil or herbs, none have been found to be effective in controlling the disease. Cornell's results from evaluations of several of these products (as well as conventional products) can be found here.

–Susan B. Scheufele, Robert L. Wick and M. Bess Dicklow UMass Extension. Variety information updated for 2021 from Cornell's Basil Downy Mildew Management page.

Mexican bean beetle management

Adult bean beetles have been spotted on bean plants in western MA. If you plan to use the biological control agent *Pediobius* for control this year, start scouting your bean fields now for adults and egg masses, if you haven't already. Mexican bean beetles may be pests on snap beans, lima beans, and, more recently, soybeans. While they are not a pest on every farm, some farms report significant damage from these insects and have to take action to prevent crop loss. Populations often build up when beans are grown in the same location every year—often close to the farm stand for PYO customers or CSA members. Using a combination of cultural and biological controls can reduce the need for insecticides in these sensitive areas.

Clockwise from top left: Mexican bean beetle adult (UMass Vegetable Program), egg mass (J. Baker, North Carolina State Univ., Bugwood.net), larva (UMass Veg Program), and mummies (larvae that have been parasitized by the Pediobius *wasp (UMass Veg Program).*

Mexican bean beetle (MBB) adults are coppery brown with black spots. They look very much like large ladybeetles and in fact are closely related. Unlike ladybeetles, which feed on other insects, MBB adults feed on leaves. Adults spend the winter in hedgerows and usually move into fields in June. Shortly after adults arrive in a bean field, they lay yellow-orange egg masses on the underside of leaves in clusters of 40 to 50. These hatch into bright yellow, spiny, oval larvae, which feed, molt several times as they grow, and pupate on the underside of leaves. Feeding damage from adults and larvae can reduce yield and injure pods if numbers are high. There are 2-3 generations per season, usually increasing in numbers with each generation. Populations are usually less abundant on early plantings and may not build to damaging levels until August.

Cultural Control

- Promptly destroy crop residues after harvest to reduce overwintering populations.
- Maintain wide, clean headlands and brushless wood edges.
- Avoid sequential plantings in close proximity.
- Row covers can be used to exclude beetles until harvest, or for as long as it is practical.

- Reflective metallic and white plastic mulches have been shown to significantly reduce beetle densities and feeding damage relative to black plastic or bare ground.

Mexican bean beetle damage. Photo: UMass Vegetable Program

Biological Control. *Pediobius foveolatus* is a commercially available biological control agent for MBB and has a good track record in the mid-Atlantic states and among New England growers who have tried it. *Pediobius* (pronounced "pee-dee-OH-bee-us") is mass-reared and sold by the New Jersey Department of Agriculture and is also available from other beneficial insect suppliers (see contact information below). This small (1-3 mm), non-stinging, parasitic wasp lays its eggs in MBB larvae. Wasp larvae feed inside the MBB larva, kill it, and pupate inside it, forming a brownish case called a 'mummy'. About 25 adult wasps emerge from one mummy. The parasitoids are shipped to farms as mummies or as adults. Adult wasps will emerge from mummies within 2-3 days of receipt.

Pediobius is suited to our succession-planted snap bean crops. The first bean planting serves as a 'nurse crop' to establish the population of *Pediobius* that will be hard at work in successive plantings all summer. Control continues and in fact gets better as the season progresses and successive generations of the wasp emerge and search out new bean beetle larvae. Planning 2-3 releases at 7-10 day intervals will help ensure good timing and coverage on several plantings. After a release in the first planting, it is advisable to leave that planting intact for a while, until the new generation of wasps has emerged from their mummies.

As with any biological control, make releases as soon as the pest is present, not after it has built up to damaging numbers. The New Jersey Dept. of Agriculture Beneficial Insect Rearing Laboratory recommends two releases, two weeks in a row, coinciding with the beginning of Mexican bean beetle egg hatch. Wasps will lay their eggs in larvae of any size, but it is best to target the newly-hatched young MBB larvae. This will give control before damage has been done. Thus, timing is important. Watch for eggs and time the shipment for the first hatch of eggs into larvae. If in doubt about the timing of the hatch, release as soon as you see the eggs—if you wait for the larvae, you may be playing catch-up. The release rate should be at least 2,000 adult wasps per field for less than an acre, or 3,000 per acre for fields of one acre or more. Mummies are frequently shipped in screen bags. Simply secure to the underside of a bean plant. IPM Laboratories recommends 160 mummies/A, split between 2 releases for light infestations, 640 mummies/A, split between 2 releases for heavy infestations and for the home garden, a minimum of 10 - 15 mummies. Like beans, Pediobius wasps are killed by frost so annual releases are necessary.

Plan ahead by contacting a supplier to inform them of your acreage and expected release dates (based on what you're seeing when scouting).

Contact information for New Jersey State Dept of Agriculture: Philip Alampi Beneficial Insect Rearing Lab, (609) 530-4192. You'll also get advice on how to use the wasps from this office.

Pediobius is also available from the following suppliers:

- IPM Laboratories, NY, 315-497-2063. Contact to check availability
- ARBICO Organics, 800 -827-2847. Order online; orders ship on Wednesdays ONLY, minimum 7 day processing.

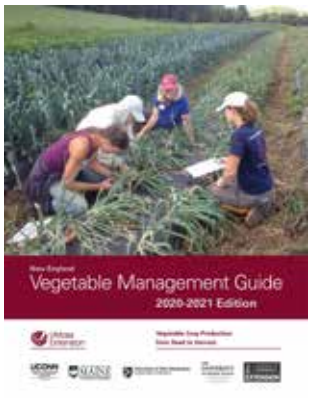
Chemical control. Treatment with an insecticide may be warranted to prevent economic losses. A suggested treatment threshold is >20% defoliation during pre-bloom or 10% during pod formation. Several conventional and organic insecticides are labeled for use against MBB, including several products that also effectively control potato leafhopper, which is also a major pest of beans and which we're seeing now in bean fields. Be sure to get coverage of lower leaf surfaces. Kaolin clay (Surround) may be used on seedlings and young plants to deter feeding and egg laying. For more information on chemical control options, see the New England Vegetable Management Guide and the Cornell Resource Guide for Organic Insect and Disease Management.

Chemical controls for MBB and potato leafhopper could have harmful effects on *Pediobius*, especially on adult wasps. If releasing *Pediobius*, avoid sprays shortly before or after releases; apply treatments to a succession planting 5 days before release.

--Written by the UMass Vegetable Program

News

Let us know how you use the New England Vegetable Management Guide!



Do you use the New England Vegetable Management Guide as a resource? If so, we want to hear from you!

The authors of the New England Vegetable Management Guide want to learn more about how the guide is used, so that we can make it as useful as possible. While we are revising the guide, we have designed a short survey to better understand what YOU value in the guide. Please consider taking 5 minutes to provide your feedback and suggestions here: https://unh.az1.qualtrics.com/jfe/form/SV_9Ag68WJ1uyjreE6.

Specialty Crop COVID-19 Priority Area Survey

The Specialty Crop Block Grant Program funds projects that aim to enhance the production and competitiveness of Specialty Crop industries, including vegetable crops, in Massachusetts.

Through H.R. 133, USDA will be distributing additional funds for a second round of FY21 Specialty Crop Block Grant Program funding. Projects addressing COVID-19 priority areas will receive preferential scoring. MDAR is collecting feedback from the agricultural community to set the priority areas that will be outlined in the second round FY21 Specialty Crop Block Grant RFR.

Your response to this survey will help determine the priority areas for the Specialty Crop Block Grant Program. MDAR will be accepting responses until June 18, 2021. Questions, contact Keri.Cornman@mass.gov.

Click here to take this survey.

Hemp pest research priorities survey

A group of hemp researchers and Extension faculty from across the US and Canada are collecting information from growers and agricultural service providers in efforts to determine the types and distributions of major disease and insect pests of hemp. Their aim is to map pests and pathogens by region and to set research priorities moving forward.

Grower survey: https://uky.az1.qualtrics.com/jfe/form/SV_6Du84alnDmH587I

Agricultural service provider survey: https://uky.az1.qualtrics.com/jfe/form/SV_eCIdn6y4UHsLVpI

Food Security Infrastructure Grant Contract End Date Info

Those farms that received FSIG money last year have likely already received this information, but just a reminder that the contract end date for all awards is June 30, 2021. This means all approved items on your budget (located on Attachment A) are paid and in your possession and/or constructed by June 30, 2021. July 31, 2021 is the deadline for submitting reimbursement requests for projects completed by June 30.

*If there is a chance your project will not be completed by your contract end date of June 30, 2021 you must email Holly.Velleca@mass.gov by 5PM next Thursday June 10 and provide the following information:

1. Estimate of award funds that can definitely be reimbursed prior to June 30
2. Estimate of award funds that may need to be reimbursed after June 30
3. Anticipated project completion date

If projects not completed by June 30 and not contact Holly by June 10th, you will risk losing funding. Questions, contact Holly Velleca, Food Security Infrastructure Grant Program Coordinator, Holly.Velleca@mass.gov.

Events

UMass Worker Protection Standard (WPS) Train-the-Trainer

When: Wednesday, June 30, 4-7:30 pm

Where: Online

All farmworkers must receive annual training under the EPA Worker Protection Standard (WPS) if the farm where they work uses any pesticides in their crop production, **including those approved for organic production and other general use pesticides**. The agricultural worker employer is responsible for complying with all components of WPS including the training of farmworkers. This training can only be provided by an individual who has a pesticide certification license or has attended **an approved EPA WPS Train-the-Trainer workshop**, such as this one.

This training is appropriate for farmers and supervisors who want to be able to train farm employees on WPS without having to have a pesticide license. For farmers who do already have a license, 3 pesticide contact hours are available for this training.

***3** pesticide recertification credits are available for this program*

Cost: $60

Register here: https://forms.gle/ZoTAdTiB7N4Wc3Lt7

UNH North Country Lunch and Learn

UNH Extension is offering this online series, open to all but focused on growing vegetables commercially. So, grab your lunch and let's learn!

This event is free, but registration is required. Register once for all days.

- **July 7, 12-1pm:** Onions: Over Wintering and Direct Seeded
- **August 4, 12-1pm:** Brussels Sprouts: Growing and Storage

Registration: Click here to register for these workshops.

Questions? Contact nicholas.rowley@unh.edu or heather.bryant@unh.edu or call 603-788-4961 ext. 207

Save the Date! In-Person UMass Summer Field Day

When: Tuesday, July 27, 2021, 3-7pm. Dinner at 7pm (Rain date: Thursday July 29)

Where: UMass Crop & Livestock Research & Education Farm, 91 River Rd, South Deerfield, MA

Come to see the newly purchased no-till transplanter in action. Also, learn about several new innovative research projects on a wide range of topics including soil health, cover crop termination strategies, summer and fall cover crop mixtures, vegetables, forages, and more. The field day includes a four-hour tour by the Vegetable and Crops, Dairy, Livestock extension teams. Dinner will be provided at the end of the tours. More details about the projects, researchers, and tours will be available in early July.

This event will be made possible by UMass Center for Agriculture, Food, and the Environment, MDAR, Northeast SARE, the UMass Stockbridge School of Agriculture, and American Farmland Trust.

THANK YOU TO OUR 2021 SPONSORS!

Become a sponsor!

Vegetable Notes. Genevieve Higgins, Lisa McKeag, Susan Scheufele, co-editors. All photos in this publication are credited to the UMass Extension Vegetable Program unless otherwise noted.

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