



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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Summer staff, Manan and Ben, planting basil at the UMass Research Farm for a downy mildew resistance variety trial. Join us August 2 for a field day to see results from this and other trials. More details coming soon!

Photo: H. Whitehead

CROP CONDITIONS

Happy Solstice! Crops are chugging along out there. Western MA got a good rain yesterday but the eastern part of the state remains dry. All the growers we've spoken to would greatly prefer dry weather to wet, though – lots of growers invested in additional or new irrigation equipment after the 2020 drought year and are now set up to irrigate crops. Farm stands are full of all of the usual fare, including summer squash, zucchini, and cucumbers, cabbage and bunches of greens, and garlic scapes. Most everyone has increased prices pretty significantly from last year, and customers have generally been willing to pay these higher prices, although in many cases the price hike hasn't been enough to truly offset increased production material costs and labor.

UMass Extension hosted a great Soil Health Demo Day at the South Deerfield Research Farm on Tuesday, with demonstrations of reduced tillage equipment and techniques and great hands-on presentations of the effects of various soil management strategies on soil water filtering from the New York Soil Health Trailer. The presentations really drove home the message about how much of the biomass of a cover crop is *underground* (about 35% for rye!) and how reducing tillage supports the development and survival of soil microbial populations that play crucial roles in soil structuring, water and air pore space, nutrient cycling, and water filtration.

PEST ALERTS

Basil

Basil downy mildew has been reported in VT and RI, in addition to the report from Berkshire Co., MA last week. We are tracking the basil varieties that contract DM in order to understand more about how the new resistant varieties interact with the disease, so **please let us know if you see DM in your basil!** Send us a photo at umassveg@umass.edu. Sunburn in basil can look very similar to DM—see below. See the article in this issue for management recommendations and photos of basil DM.

Sunburn was reported on basil in Hampshire Co. this week. Sunburn can look very similar to symptoms of basil downy mildew! See photos of sunburn on the next page. Basil DM will produce fuzzy gray sporulation on the undersides of the leaves, but if sporulation is sparse, it can be hard to see. The undersides of leaves damaged by sunburn, comparatively, will be smooth and gray. Sunburned leaves often have a triangle of undamaged tissue at the base of the leaf, where the younger leaf above it provided shade. Leaves affected by DM and sunburn can both have a striped appearance – in the case of DM this is because the pathogen is trapped by the leaf veins, and in the case of sunburn because the interveinal areas are often slightly domed and the domed tissue becomes damaged first by the sun.

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.



Sunburn on basil can look very similar to basil downy mildew. Look for V-shaped unaffected tissue at the base of burned leaves that is often present with sunburn. Photos: G. Higgins



Bacterial wilt in squash.

Cucurbits

Bacterial wilt is developing in cucurbits that experienced early [striped cucumber beetle](#) (SCB) feeding. The bacterium that causes bacterial wilt is vectored by SCB; there is no management technique for the wilt alone aside from [controlling SCB](#).

Cucurbit downy mildew: MA is still at no forecasted risk for CDM development. [Forecasts are available here](#) and are updated every few days based on reported cases and weather forecasts. At this point, no fungicide applications are recommended for CDM control. When MA becomes low risk for development, applications of protectant fungicides (chlorothalonil and mancozeb are most effective and chlorothalonil is also effective against cucurbit powdery mildew; copper is the best protectant for organic growers but is less effective than chlorothalonil or mancozeb) will be recommended. See the article in this issue for more details on management of cucurbit downy mildew, including updated pesticide recommendations for 2022.

Squash vine borer moths were reported at 3/3 trapping sites this week (Table 1), and an adult was observed laying eggs in squash in Hampshire Co. Eggs are usually laid at the base of susceptible cucurbit plants (thick-stemmed cucurbits like zucchini, summer squash, acorn squash, and giant pumpkin are hosts; thin-stemmed cucurbits like butternut squash, cucumber, and melons are not). Eggs hatch 10-15 days after they are laid, and the larvae will bore into the stems. The threshold for chemical treatment is based on pheromone trap counts, which we will publish from several sites every week. Use a threshold of 5 moths/week for bush-type cucurbits and 12 moths/week for vining cucurbits. Small-scale growers can wrap the base of stems of susceptible cucurbits in aluminum foil or cardboard toilet paper rolls to prevent egg-laying. Kaolin clay (e.g. Surround) will also deter moths from laying eggs. Young plants that are not yet flowering can be protected using row cover.

Whately	2
Leominster	1
Sharon	4



A squash vine borer egg at the base of a squash transplant.

Squash bug: Increased numbers of egg masses are being seen at one farm in Hampshire Co. this week, compared to 2 weeks ago. See the article in this issue for more information and management recommendations.

Solanaceous

Tomato leaf roll was seen in high tunnel tomatoes this week. This is often a response to water stress, either because soil water content is low or the plant is demanding more water due to hot, dry weather. The plant will induce leaf rolling to reduce the leaf surface area exposed to solar radiation. Other stresses like high temperatures, excessive pruning, fast growth, the onset of heavy fruit production, or root damage can also cause leaf rolling. This physiological response may or may not reverse itself later on but usually does not cause yield losses.

Sweet corn

Corn earworm: Our MA CEW traps went up last week, and moths were captured at 11 out of 16 trapping sites in the last week, with a high of 12.5 moths in Deerfield, MA. (CEW is trapped for using 2 traps in different stages of corn; the counts from both traps are averaged for a single reported number, hence the potential for ½-moths!) Most trapping sites are at 4- to 6-day spray intervals. CEW adults prefer laying eggs in silking corn; eggs are very difficult to find in the silk by scouting, and the caterpillars are protected from sprays once they tunnel into ears, so spray timing is determined by pheromone trap captures (see Table 2). Pyrethroids (IRAC group 3A, e.g. Mustang, Brigade, Hero, Warrior, Asana, Pounce, Declare, Delta Gold, Fastac, Baythroid) alone should *not* be used to control CEW because of resistance. Combine with another material from a different IRAC group (e.g. Lannate or Blackhawk/Radiant). CEW sprays should also control ECB and FAW, if present.

European corn borer trap counts are decreasing across the region, indicating that we're nearing the end of the first flight. Larvae will be feeding in tassels now, and moving into ears when tassels fully open.

Fall armyworm (FAW) moths were reported in low numbers in pheromone traps in NY and CT this week. FAW is generally the latest corn moth pest to show up in the northeast and does not usually appear until after ECB and CEW are already present. Adults prefer to lay eggs in whorl-stage corn and larvae cause extensive ragged feeding damage. Sprays that are warranted by CEW trap counts will usually take care of FAW also. If CEW trap counts are not high enough to warrant spraying,

Table 2. Spray intervals for corn earworm based on moth captures in Heliothis net traps.

Moths per Night	Moths per Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 - 0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 - 7	5 days
1 - 13	7 - 91	4 days
Over 13	Over 91	3 days

Table 3. Sweetcorn pest trap captures for week ending June 23

Location	GDD ¹ (base 50°F)	ECB NY	ECB IA	FAW	CEW	CEW Spray Interval
Western MA						
Deerfield	746	0	-	-	12.5	4 days
Feeding Hills	779	4	0	0	5	5 days
Granby	763	11	0	0	11	4 days
Hatfield	724	0	0	-	-	-
Whately	771	1	0	-	2	6 days
Central MA						
Leominster	699	1	0	-	0	no spray
North Grafton	657	8	0	0	10	4 days
Spencer		10	0	0	5	5 days
Spencer	680	13	0	0	0	no spray
Eastern MA						
Bolton	703	1	0	-	0	no spray
Concord	717	7	0	0	5	5 days
Ipswich ²	600	0	10	0	10	4 days
Littleton	-	6	0	0	4	5 days
Millis	-	0	0	n/a	0	no spray
Sharon	737	1	1	n/a	3	6 days
Sherborn	720	3	0	0	7	5 days
Seekonk	827	0	0	-	0	no spray
Swansea		6	1	-	-	-

- no numbers reported for this trap

N/A this site does not trap for this pest

¹GDDs are reported from the nearest weather station to the trapping site

²Ipswich trap was checked Saturday, June 18

scout corn for FAW and ECB together and treat if 15% of plants have at least 1 caterpillar.

Miscellaneous

[Saltmarsh caterpillars](#) were observed feeding in onion in Hampshire Co. this week. Saltmarsh caterpillars are generalists that will feed on a wide variety of plants, including many vegetable crops. They do not usually reach damaging levels or warrant insecticide sprays.



Saltmarsh caterpillar. Photo: S. Vyavhare

MANAGING DOWNY MILDEW OF BASIL

Basil downy mildew (DM) was reported in the last week in Massachusetts, Vermont, and Rhode Island. In MA, the disease was found on seedlings at a garden center, where it is likely to spread quickly into the wider community through plant purchases. 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 several years and have been providing an extra ~2 weeks of basil harvest compared to standard varieties.

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. Sporulation 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 on Cornell's [Basil Downy Mildew Management](#) page. Symptoms often look similar to those of sunburn; the undersides of sunburned leaves will also appear gray, but will not be fuzzy.



Basil downy mildew sporulation on the underside of a leaf (above) and symptoms on the top side of a leaf (below). Photos: A. Madeiras and University of Florida

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 contact your local Extension service (MA growers can contact us at umassveg@umass.edu or 413-577-3976). Inspect plants regularly by looking on the undersides of leaves for sporulation.

Plan to plant and harvest early. The pathogen tends to arrive in MA around mid-July, though in some years (like this one) 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 and 2021 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. It is being replaced by Pesto Besto (below).
- **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. 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 <http://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 2022 from [Cornell's Basil Downy Mildew Management](#) page

SQUASH BUGS OUT NOW

Squash bug (*Anasis tristis*) adults are just starting to move into summer squash and zucchini plantings to mate and lay eggs. These are their favorite host plants, especially when these plants are large and provide ample shelter, food, and egg-laying sites. Sheltered and protected areas such as crop residue, field borders, woods edges, brush or wood piles provided a home for unmated adults last fall through the winter, and now they are busy locating mates and host plants.

Life stages and identification. Squash bugs are a type of true bug, a group that also includes other pests like the native brown stink bug and brown marmorated stink bug, as well as beneficial insects like the spined soldier bug. Adults are 0.5-0.75 inches long, flattened and grayish-brown. The edge of the abdomen is marked with alternate gold and brown patches. Adults frequently shelter beneath debris in the field at night, and it's common to see many bugs congregated beneath a squash fruit in the field. Adults are long-lived and lay eggs over several weeks. A single female can lay up to 250 eggs. Yellow- to bronze-colored eggs are usually laid on the underside of leaves, often in the junction of leaf veins, in an orderly cluster, and hatch in 7-10 days in summer conditions. Wingless nymphs are light green when small, with a brown head and dark legs, and are usually found in groups. Nymphs become darker gray and more solitary as they grow and molt through 5 nymphal stages. There is one generation per year in the Northeast, and the complete life cycle requires 6-8 weeks.

Host crops and damage. The most susceptible and attractive crops are yellow summer squash, zucchini, and pumpkin (*Cucurbita pepo*) as well as Hubbard squash (*C. maxima*) and other *C. maxima* crops. Watermelon, cucumber, muskmelon, and butternut resist damage, and provide poor food quality for adults and nymphs. Resistant varieties also include sweet cheese pumpkins (*C. moshata*) and royal acorn squash (*C. pepo*). Both adults and nymphs feed by inserting their beak and sucking sap from plant tissue. Adult feeding on seedlings can cause wilting of the whole plant.

Places on the leaves where the bugs feed develop small, yellow specks that eventually turn brown due to a toxin released by the bug while it feeds. High densities and intensive feeding cause foliage to wilt, turn black and die in a condition known as "Anasa wilt". Squash bugs also feed on the fruit, causing scarring that can make the fruit unmarketable.

Squash bugs also vector the bacterium, *Serratia marcescens*, which causes the disease [yellow vine decline](#). Yellow vine decline was first observed in the US in 1988 in Texas and Oklahoma and has since spread throughout the southern US and



Squash bug eggs and nymphs (above) and adult (right).



Squash bug look-alikes: spined soldier bug (left, Photo: M. Price) and brown marmorated stink bug (right, Photo: USDA APHIS PPQ, Bugwood.org)

has been reported intermittently in New England. It is not thought to be widespread in the Northeast, but it was found in MA in 2003 and was again confirmed from one site in CT in 2020. The bacterium is introduced into a cucurbit plant by the piercing-sucking mouthparts of the squash bug and enters the phloem of the plant. Symptoms of yellow vine decline include a general yellowing of the entire vine within a two- to three-day period. Infected plants usually collapse completely approximately 10 to 14 days before the fruit matures. Plants infested with [squash vine borer](#) can display similar symptoms—leaf yellowing, wilt, lack of vigor—but will have an entry hole in the stem where the borer entered, usually accompanied by lots of sawdust-like frass. If you are seeing symptoms that you suspect could be yellow vine decline in your cucurbit crops, let us know! umassveg@umass.edu or (413) 577-3976.

Cultural strategies. If possible, rotate cucurbit crops between fields as far apart as possible. Placing row covers over the young crop prevents adult access until blooming, when covers must be removed. Natural enemies of the squash bug include the tachinid fly (*Trichopoda pennipes*) which is a parasitoid that attacks nymphs and adults, and several wasps that parasitize eggs (Hymenoptera: *Encyrtidae* and *Scelionidae*). Squash bugs like sheltered hiding places, so keep headlands and field borders mowed and free of debris to reduce overwintering sites. Plastic and straw mulch and reduced tillage systems encourage higher populations, probably by providing good hiding places. In small plantings, boards can be used to attract adults seeking a protected hiding place; check in evening or morning and spray with insecticide or capture and remove. A study conducted by Oklahoma State University found that squash bugs prefer to lay eggs on yellow straight-neck and crookneck squash (Bonjour *et al.* 1990) and these cucurbits can be used effectively as a trap crop planted earlier in the season along field edges. The trap crop must receive an insecticide application or be mechanically destroyed before eggs hatch. Remove crop residues and/or till field immediately after harvest to kill adults before they move to field edges seeking shelter.

Scouting and Chemical Control. Scout plants from seedling to vining/flowering stage to detect adults as well as eggs and nymphs. After flowering, thresholds are based on egg masses and young nymphs, but also note adults and large nymphs while scouting.

There are two key windows for control:

Target adults on young plants (before flowering or vining). An insecticide application made when adults are colonizing plants in June will prevent subsequent egg and larval populations. Coverage is easier at this time, and broad-spectrum pyrethroids (e.g. bifenthrin, lambda-cyhalothrin, permethrin) or carbaryl, which are reported to be effective on adults at this stage, can be used without risk to bees on the crop. OMRI-approved pyrethrin products are available (e.g. PyGanic). The threshold for targeting adults has been determined for watermelon crops at an average of 1 adult per plant (Dogramaci *et al.* 2006), but in more susceptible crops such as summer squash and zucchini, it might be appropriate to use a lower threshold (e.g. 1 adult per 2 or more plants). Aim for coverage of underside of leaves and stems where bugs hide. Systemic furrow, drip, or seed treatments and sprays for cucumber beetle at the seedling stage may also control colonizing squash bug adults.

Target smaller nymphs on flowering plants. Scout for egg masses and note first emergence of nymphs. The threshold is reached at an average of 1 egg mass per plant and when the first nymphs are seen. Good coverage of undersides of leaves is needed. For newly laid eggs and nymphs, consider a foliar application of acetamiprid (Assail 30 SG) which has moderate toxicity to bees (lower than other neonicotinoids). Adults and larger nymphs are more difficult to control, partly because they hide in the lower canopy and near the soil. An organic option for nymphs is a mixture of pyrethrin (a contact toxin) and azadiractin (an insect growth regulator, derived from neem). This can be achieved by mixing separate products or with a pre-mixed product called Azera, which has both. This would be gentler on bees than a high rate of pyrethrin alone, and would include two modes of action. Insect growth regulators work to disrupt the molting process so are useful only on immature stages. Treat late in the day when the flowers are closed to reduce risk to bees.

Take note of re-entry and pre-harvest intervals of materials used on summer squash and zucchini that are being harvested frequently.

For more information on rates and products for squash bug control, see the [Cucumber, Muskmelon, and Watermelon insect section](#) and the [Pumpkin, Squash, and Gourds insect section](#) of the New England Vegetable Management Guide.

--UMass Vegetable Program

MANAGING CUCURBIT DOWNY AND POWDERY MILDEWS IN 2022

--Recommendations written by Meg McGrath and adapted for MA growers. Introduction and recommendation adaptation by G. Higgins, UMass Extension Vegetable Program.

Last week, we published updated recommendations from Meg McGrath, plant pathologist at Cornell University, for management of cucurbit powdery mildew. Cucurbit *downy* mildew is a separate and equally important disease of cucurbit crops. This week we'll provide some background on downy mildew and Dr. McGrath's 2022 downy mildew management recommendations, along with a few notes about managing powdery and downy mildews together.

Downy Mildew

Cucurbit downy mildew (CDM) is a common foliar disease of cucurbits in the Northeast. The pathogen is not a true fungus—it is a fungal-like organism called an oomycete. The pathogen produces wind-borne spores that can be carried long distances on wind. When the spores land on susceptible cucurbit host leaves, they infect, grow within the leaf, and produce fuzzy gray sporulation only on the undersides of the leaves. Lesions are angular because the pathogen cannot grow across the leaf veins. Comparatively, *powdery* mildew produces round patches of powdery white sporulation on both the top and bottom surfaces of leaves (although it develops best on the undersides of leaves). Both downy and powdery mildews do not infect cucurbit fruit directly, however leaves infected by either pathogen will die prematurely, resulting in significant yield losses and/or decreased fruit quality.



Cucurbit downy mildew symptoms on the top side of a leaf (left) and sporulation on the underside of a leaf (right). Photos: G. Higgins

CDM is an obligate parasite, meaning that it must have a living host in order to survive. For that reason, it does not overwinter in the Northeast, where winter temperatures kill cucurbit crops. The pathogen overwinters in Florida, where cucurbits are produced year-round, and is blown northward on storms as the season progresses. It may also move southward from Canada where their large greenhouse industry also produces cucurbits through the winter months.

Cucurbit downy mildew is specific to cucurbit crops and will not infect any other vegetable crops. There are 2 clades of the pathogen. Clade 1 infects cucumber, pumpkin, and cantaloupe, and clade 2 infects squashes and watermelon. Cucumber is often the first crop to develop CDM in the Northeast. There is a CDM monitoring network that tracks CDM cases and forecasts infection risk for different crops based on location of cases and forecasted weather patterns.

Resistant varieties. Prior to 2004, cucumbers were bred to have resistance to CDM and farmers could easily grow cucumbers through October. In 2004, the pathogen overcame that resistance and breeders have been working hard to develop new resistant varieties ever since. There are now several CDM-resistant varieties available on the market that can provide several weeks of production beyond fully susceptible varieties, after CDM has arrived in the area. Resistant varieties include Bristol, DMR401, NYS264, Citadel, and Espirit. The UMass Extension Vegetable Program has conducted variety trials to identify resistant varieties for several years—find research reports on varieties we've trialed [here](#), and keep an eye out in Veg Notes for 2022 trial results!

Powdery & Downy Mildew Management

The most important components of an 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](#).** There are PM-resistant varieties of many types of cucurbits, and DM-resistant cucumber varieties available.
2. **Sign up to receive alerts about downy mildew occurrence** and routinely check the [Cucurbit Downy Mildew Forecast website](#) to know where the disease is occurring and what crops are affected. [*We will also report the movement of cucurbit downy mildew in Pest Alerts weekly, so keep an eye out there for news.*]

The forecast website 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. The pathogen is thought to only be able to survive over winter in southern Florida, and from there spreads northward. There has been no evidence that the pathogen is surviving between growing seasons where winter temperatures kill cucurbit crops (outdoors above the 30th latitude).

3. **Inspect crops routinely for symptoms of both powdery and downy mildew**, 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. [Click here to view images of symptoms of downy and powder mildews](#).

4. **Make preventative and targeted pesticide applications based on forecasted and reported risk.** For both powdery and downy mildews, apply protectant fungicides weekly before symptoms develop in your crop. For **powdery mildew**, begin these preventative sprays when crops start producing fruit or when powdery mildew is reported in the area. For **downy mildew**, begin when your area is forecasted at low risk [*as opposed to no risk, or moderate-high risk*]. When you first detect PM in your crop by scouting, add a PM-targeted material. When the DM risk level increases in your area, add a DM-targeted material. Targeted materials will be different for PM (a true fungus) and DM (an oomycete). Rotate between FRAC groups for the targeted materials.

Add new fungicides to the program when they become available; substitute new for older products if they are in the same FRAC group, unless efficacy trials indicate they are not as effective.

Protectant materials 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 (search [Table 23 in the New England Vegetable Management Guide](#) for “oil”).
- **Chlorothalonil and copper:** Effective against both PM and DM. Copper is less effective against DM than chlorothalonil or mancozeb, but is effective against bacterial diseases.
- **Mancozeb:** Recommended when only DM is occurring.

Downy mildew-targeted fungicides: There is more information available about each material, including maximum number of sprays and application recommendations, available at Dr. McGrath’s [Cucurbit Downy Mildew Management website](#).

Targeted fungicides below are currently recommended:

- Orondis (FRAC 9)
- Omega (29)
- Ranman (21)
- Zampro (40 + 45)
- Zing! or Gavel (22)

- Ariston, Curzate, or Tanos (27)
- Previcur Flex (28)

Targeted fungicides below are not recommended:

- Presidio (43)
- Revus and Forum (40)

See the [article in last week's Veg Notes issue](#) for recommended powdery mildew-targeted fungicides.

[Click here for Meg McGrath's complete guide to the most current DOWNY mildew fungicide recommendations.](#)

[Click here for Meg McGrath's complete guide to the most current POWDERY mildew fungicide recommendations.](#)

NEWS

2022-23 SMALL FRUIT MANAGEMENT GUIDE - NOW AVAILABLE!

The newly updated New England Small Fruit Management Guide is now available – both online AND in hard copy. This resource is the result of a collaboration between Cooperative Extension systems of all the New England states, and is a valuable resource for any small fruit grower - strawberry, blueberry, raspberry, ribes, and grapes are covered in the guide. The Small Fruit Management Guide is available for purchase through the UMass Extension Bookstore: <https://www.umassextensionbookstore.com/products/48>

SOME PESTICIDES CONTAINING NEONICOTINOIDS TO BECOME RESTRICTED USE IN MA AS OF JULY 1, 2022

On July 1, pesticides containing neonicotinoids that are labeled for turf, trees, shrubs, golf courses, and ornamentals will become state restricted use in Massachusetts. This includes any product that has the above use patterns on the label, even if the product is also labeled for vegetable or fruit use. Products containing neonicotinoids that are labeled for agricultural use only (aka labeled for use on food crops only) will remain general use. You do not need a pesticide license in order to apply general use products, but you do need a license to apply restricted use products. As of July 1, in order to apply these newly restricted use products, you will have to have a Commercial Certification Pesticide License. You can also apply these materials without a license if you are working under the direct supervision of someone with a Commercial Certification.

[Click here for a complete list of products that will become restricted use as of July 1.](#)

[Click here to begin the process of obtaining a pesticide license.](#) (A helpful guide to the ePLACE Portal is available [here](#)). The [UMass Pesticide Education Program](#) provides education around pesticide safety and classes to prepare individuals for pesticide license exams.

UMASS EXTENSION HIRING URBAN AGRICULTURE EXTENSION EDUCATOR - EXTENDED DEADLINE!

UMass Extension is excited to add some dedicated capacity in the important and growing area of Urban Agriculture with the hire of an Extension Educator to be based at the Mt. Ida campus in Newton, MA. We hope to develop a great pool of candidates who are capable of integrating well with others in Extension while developing and maintaining strong relationships with urban agriculture practitioners and organizations in Greater Boston and beyond. The position was posted without a closing date and will remain open until filled, but we encourage potential candidates to complete their application **by July 5 in order to be considered in the first applicant review round.**

[Click here for more details about the position and to apply.](#)

CENSUS OF AGRICULTURE SIGN-UP CLOSES JUNE 30

Agriculture producers who did not receive the 2017 Census of Agriculture and do not receive other USDA surveys or censuses have until June 30 to sign up to receive the 2022 Census of Agriculture at nass.usda.gov/AgCensus. USDA's National Agricultural Statistics Service (NASS) will mail ag census survey codes for responding securely online to every known U.S. producer this November. Hard copy questionnaires will follow in December.

The ag census, conducted for over 180 years, remains the only source of comprehensive and impartial agricultural data for every state and county in the nation. It includes every operation – large or small, urban or rural – from which \$1,000 or more of agricultural products are produced and sold, or would normally be produced and sold, in the ag census year.

“The information provided by the Census of Agriculture is an invaluable source of information, especially for smaller acreage states that may not participate in some national surveys on an annual basis” said Pam Hird, NASS New England State Statistician. “The information gathered from the Census survey is used for a five-year period to tell the story of Agriculture in every state. It highlights agricultural information, production, trends and needs that impact agriculture on every level in the United States as well as around the world.”

USDA ANNOUNCES ASSISTANCE FOR ON-FARM FOOD SAFETY EXPENSES FOR SPECIALTY CROP GROWERS

The [Food Safety Certification for Specialty Crops Program](#) (FSCSC) will assist specialty crop operations that incurred eligible on-farm food safety certification and expenses related to obtaining or renewing a food safety certification in calendar years 2022 and 2023. For each year, FSCSC covers a percentage of the specialty crop operation’s cost of obtaining or renewing their certification, as well as a portion of their related expenses.

To be eligible for FSCSC, the applicant must be a specialty crop operation; meet the definition of a small business (average 3-year value of specialty crops sold between \$250,000 and \$500,000) or very small business (average 3-year value of specialty crops sold not more than \$250,000); and have paid eligible expenses related to the 2022 (issued on or after June 21, 2022) or 2023 certification.

Specialty crop operations may receive assistance for the following costs:

- Developing a food safety plan for first-time food safety certification.
- Maintaining or updating an existing food safety plan.
- Food safety certification.
- Certification upload fees.
- Microbiological testing for products, soil amendments and water.
- Training

FSCSC payments are calculated separately for each category of eligible costs. A higher payment rate has been set for socially disadvantaged, limited resource, beginning and veteran farmers and ranchers.

For more information about the program and to apply for funding, see <https://www.farmers.gov/pandemic-assistance/food-safety#program-eligibility>

MASSDEP’S GAP III ENERGY GRANT PROGRAM EXPANDED TO INCLUDE NEW SECTORS

Nonprofit agricultural/food distribution and small food distribution and processing businesses, among other categories, may now apply for a [GAP III Energy Grant](#). Eligible projects include energy efficiency projects such as HVAC upgrades and clean energy projects such as solar photovoltaic and battery storage systems.

For more examples and for full eligibility and application information, see <https://www.mass.gov/info-details/massachusetts-gap-energy-grant-program>. The grant application deadline for nonprofits and small businesses is Friday, July 29, 2022.

MA FARM ENERGY PROGRAM (MFEP) - ENERGY AUDITS

Remember, [MDAR’s Farm Energy Program](#) has funds to help farms cover audits, energy efficient projects, and select renewable energy projects. We are still providing these services remotely.

You will need a technical assessment to file an energy grant application whether with MDAR or USDA. Start planning now. If you wait too long you may not be able to have one scheduled in time! MFEP pays 75% of the technical assessment, first come, first served. Our MFEP is providing tele-assessments during this trying time.

Contact MFEP now for more information through the Center for EcoTechnology (CET), our 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.

NEW MDAR HEALTH & WELLNESS PROJECT

Last fall, MDAR received a [USDA Farm and Ranch Stress Assistance Network \(FRSAN\) grant](#) to address the current mental health and wellness gaps that exist within the state and expand the availability of resources to farmers, state staff, service providers, and partner organizations. Greg Porell was contracted to lead the program and is researching state mental health models and getting input from stakeholders with the goal of developing a mental health and wellness toolkit. The toolkit will include print graphics, social media, website development, and educational/awareness materials that can be utilized by farmers, service providers, and stakeholders.

The team is also developing trainings, which will be offered both in person and virtually, starting in late fall/early winter 2022. There will be two tracks for the trainings, including farmer and producer focused trainings as well as trainings for service providers and MDAR staff.

Keep an eye out for a survey sometime in the next couple of months so you can provide input to the program on farmers' health and wellness needs!

EVENTS

SAVE THE DATE -- UMASS RESEARCH FARM FIELD DAY

When: Tuesday, August 2, 2022, afternoon (exact time TBA)

Where: UMass Crop & Livestock Research & Education Farm, 89 River Rd., South Deerfield, MA

Registration: Event is free, but registration will be required

Join us for a tour of our current research projects at the farm. Registration information and more details coming soon!

TWILIGHT MEETING AT HARVEST FARM

When: Wednesday, August 24, 2022, 4-6pm

Where: Harvest Farm, 125 Long Plain Rd., South Deerfield, MA 01373

Harvest Farm in Whately/South Deerfield will host us for a twilight meeting covering several post-harvest topics, including the vacuum cooler Harvest Farm recently purchased with a MA Food Security Infrastructure Grant. More information coming soon!

MDAR'S AGRICULTURAL BUSINESS TRAINING PROGRAM - OFFERING FALL CLASSES

[Click here for more information on both courses.](#)

Exploring the Small Farm Dream Course

When: Wednesdays, October 5 to November 2, 2022, 6-9pm

Where: TBD

Registration: \$100 for up to 2 participants. Visit the website above for application information.

This 5-session course provides guidance to aspiring farmers through the decision-making process of whether to start a farm business. Participants will learn about the many aspects of starting a farm business, assess their own skills and knowledge, and get help finding resources for support, including marketing, financing, and regulations. The Exploring the Small Farm Dream course utilizes the curriculum and workbook developed by the New England Small Farm Institute. Through four guided group sessions and a farmer panel session, participants will analyze the feasibility of their small farm dream and clarify their vision together with other class participants. This course is sponsored and financially supported by MDAR and is intended for new agricultural entrepreneurs intended to start their farm business in Massachusetts.

Plans are for an in-person class with the location to be determined based on interest from those who submit an application and are added to the waiting list.

Growing Your Farm Business Planning Course

When: Tuesdays, October 11 to November 29, 2022, 5:30-8:30pm

Where: MDAR Southborough Office, 225 Turnpike Rd., Southborough, MA 01772

Registration: \$150 per farm. Visit the website at the beginning of this event listing for application information.

A hands-on course to help established farmers develop a business plan and financial projections for their farm business. This course covers topics including resource assessment, marketing strategy, financial management, risk management, quality of life, and goal setting. The course is taught by a professional business planner with years of experience working with Massachusetts farms and guest speakers on topics such as succession planning and online marketing. Enrollment is open to farmers who have been operating a farm business in Massachusetts for at least the two prior years.

The Growing Your Farm business planning course has been approved as a certified USDA Farm Service Agency (FSA) borrower training for financial management.

THANK YOU TO OUR 2022 SPONSORS!



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

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