



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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CROP CONDITIONS

The prolonged hot and dry conditions are really starting to take a toll on plants and people alike. We are hearing reports from around the region of poor crop growth, dropping flowers and wilting leaves, and slow ripening of fruit, all leading to lower yields. Corn ears are not filling properly leading to shortages. There are also widespread reports of irrigation disasters like broken pumps, pumps pulling mud in low ponds, empty ponds not refilling, and acres of crops being tilled in because they cannot be adequately watered. On top of everything else we've gone through already this season, the drought feels like another heavy burden to carry. There is still a lot of uncertainty about school re-openings, and the impact that will have on farm employees and farm families during the busy harvest season. Many farm workers are worried about whether and when they might be able to return home at the end of the season. Farming is always difficult, but there's a lot to worry about this year. We've pulled together some resources on managing stress in the article later this issue, but as always, feel free to reach out directly if you need assistance of any kind—we are here to serve all of our vegetable farmers and will work to connect you with folks who can help if we can't. There's still a lot to be grateful for, like understanding customers who continue to show up in droves to support their local farms, good prices, and our resilient farm community. There's a lot of food out there to harvest, tomato season is ripping along and without a lot of moisture there is less disease—no late blight! Also there is rain in the forecast! We will be hoping that these clouds will materialize, and we get a break from the hot sun and a nice, even, soaking rain for all!! 🍌🍌



Tomatoes are going out the door as fast as they come in!

Photo: S.B. Scheufele

PEST ALERTS

Basil

Basil downy mildew was found on the resistant variety 'Devotion' this week in Worcester Co. There are four resistant varieties that were developed by Rutgers University—Obsession, Devotion, Thunderstruck, and Passion. These varieties are not fully resistant but usually offer several

weeks of production after susceptible varieties succumb to disease.

Brassicas

Cross-striped cabbageworm (CSCW) were spotted in Worcester Co., MA this week. Unlike the three other major caterpillar pests on brassicas, CSCW lays its eggs in batches of 3 to 25 rather than singly. The large number of CSCW larvae hatching on one plant means infested plants are often skeletonized. Egg clusters are yellow, flattened, and attached to undersides of leaves. Larvae grow to 3/4"-long in 2 to 3 weeks. The caterpillars are light bluish-grey on top and green underneath, with numerous



Cross-striped cabbageworm.
Photo: T. Kuhar

black bands across their backs and a yellow line down each side. We are still seeing lots of imported cabbageworms, diamondback moth caterpillars, and cabbage loopers as well, so regular scouting of brassicas is recommended. Spray when threshold of 15% infested is reached for leafy crops or headed crops and 35% for heading crops that have not yet formed heads.

Swede midge adults have been found in pheromone traps in Franklin Co., MA in the last 2 weeks. Swede midge has been established in New York state for several years and has also been confirmed in VT and ME, but its range is likely much larger than reported. The larvae of this tiny fly feed in the growing tips of brassicas, causing distortion that is often not visible until the larvae drop to the soil to pupate. Blind heads (no growing tip), multiple growing tips, petiole scarring, and leaf puckering are common symptoms. We will continue to monitor for this pest in additional MA counties this summer to get a better sense of its range. If you see these symptoms in your fall brassica plantings please let us know!

Celery

Symptoms of **celery anthracnose** were observed on a farm in Franklin Co., MA this week. Symptoms include twisted, distorted leaves and slimy brown-black heart rot. The biology of the fungal pathogen that causes celery anthracnose isn't well understood yet—we don't know how well it overwinters in soil or how it arrives on farms. Varieties Merengo, Hadrian, Geronimo, and Balado have shown some tolerance in trials. Especially if applied before the disease arrives, strobilurin (Group 11) fungicides have shown good efficacy. Apply with a protectant and rotate with a non-Group 11 fungicide to prevent resistance development. Cuprous oxide materials can help when environmental conditions are *not* favorable for disease development but do little when weather is warm and wet. For more information on this disease, see the article in the [June 20, 2019 issue of Veg Notes](#).



Twisted leaves, characteristic of celery anthracnose.

Photo: K. Campbell-Nelson

Cucurbits

Cucurbit downy mildew: is continuing to spread across the region on cucumbers, and to a lesser extent on cantaloupe, but there have been no reports on any squash or pumpkins in the greater Northeast region so far. Cucumber and cantaloupe should be protected with targeted downy mildew sprays at this time. Rotate between classes of fungicide to avoid resistance development.

Heat and drought stress, manifesting as low numbers of female blossoms, flower drop, and wilting and yellowing of foliage are all being reported this week. Both heat and drought stress can cause cucurbits to produce more male flowers at the expense of female flowers, eventually causing yield decreases

Verticillium wilt was diagnosed on watermelon this week, causing wilt and dieback of vines. *Verticillium dahlia* is a soilborne fungus that infects a wide range of vegetable, fruit, and ornamental crops. It survives in soil up to 14 years as microsclerotia produced in infected plants. It infects via roots and invades water-conducting vessels, spreading systemically throughout the plant. Moist soil and temperatures between 70°F and 81°F favor the disease. No resistant or tolerant varieties are available, but in the Pacific Northwest where this disease is common, growers graft watermelon onto resistant squash rootstock—the variety ‘Tetsukabuto’ squash is effective. Young plants can be infected but symptoms may be delayed until flowering or fruit-set.

Tomato

Potassium deficiency has been showing up in the field and in tunnels on several farms over the last few weeks. Symptoms of K deficiency include purpling of foliage and dieback of leaf edges. Other symptoms include spindly growth, graywall, yellow shoulder, flower drop, and slow ripening. It is common for tomato plants to experience potassium deficiency starting with fruit set, as the fruit draws K out of the rest of the plant. Once fruitset begins, increase potassium feeding to a 3:1 ratio of K:N.

Rootstock incompatibility has been reported on several farms in New England that are using the rootstock variety ‘Shin Cheong Gang’. Symptoms on one farm included root rot and hollow stems. On both farms, plants lacked vigor and were significantly smaller than plants grown on other rootstocks.



Marginal leaf purpling can be one symptom of K deficiency in tomato.

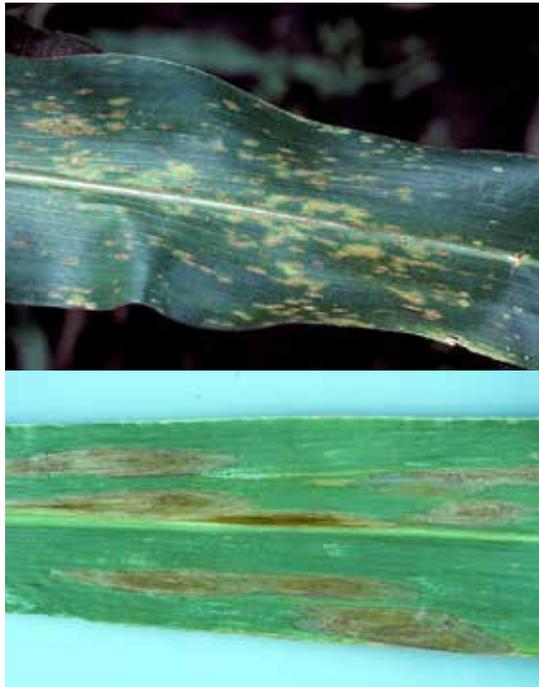
Photo: G. Higgins

Table 1. Sweetcorn pest trap captures for August 7 -13, 2020

Location	GDD (base 50°F)	ECB NY	ECB IA	FAW	CEW	CEW Spray Interval
Western MA						
Sheffield	-	0	0	N/A	3	6 days
Southwick	2064	5	1	30	3	4 days
Whately	2063	5	0	N/A	17.5	4 days
Central MA						
Bolton	1952	0	1	3	4	5 days
Leominster	1922	3	0	4	212	3 days
Spencer	1890	2	1	1	15	4 days
Eastern MA						
Ipswich	1783	6	0	17	60	4 days
Concord	1903	10	0	0	21	4 days
Millis	2104	-	-	N/A	-	-
Sharon		0	0	N/A	37	4 days
Seekonk	2142	2	0	26	11	4 days
Swansea		6	2	12	25	4 days
- 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						

Table 2. Spray intervals for corn earworm based on Heliothis net trap captures

Moths/Night	Moths/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



Orange-brown sporulation of corn rust (above) and elongate, “canoe-shaped” lesions of northern corn leaf blight. Photos: R. L. Wick

Two-spotted spider mites are exploding in many crops including cucumbers, melons, tomatoes, and eggplant. Sprays may be warranted in these crops. Choose selective materials when possible and be sure to pay attention to pre-harvest intervals in frequently harvested crops. Portal is one such selective product with a 1-day PHI that growers are having luck with for cukes and fruiting crops.

Sweet corn

The second flight of **European corn borer (ECB)** continues this week, with moderate numbers. Both corn and peppers are susceptible to ECB damage at this time. **Corn earworm (CEW)** and **fall armyworm (FAW)** numbers remain quite high after the moths were blown up from the south with Hurricane Isaias last week. Damage is being seen in the field from both worms. At sites where CEW are high enough to warrant spraying, those applications should be sufficient to clean up other worm pests. These CEW are likely to be resistant to pyrethroid insecticides so growers should switch to things like the diamides (e.g., Coragen) and the spinosads (e.g., Radiant), being sure to rotate these materials. At sites where CEW numbers indicate that no spray is necessary, scout to be sure ECB and FAW are not above threshold of 15% of plants infested. In emerging tassels, combine counts for ECB and FAW. For example, if 10% of plants have FAW and 12% have ECB, the combined infestation is 22%, which is above the 15% threshold.

We are also getting reports of **corn rust** and **northern corn leaf blight** in the region. Rust does not overwinter here, but rather, blows in from the south. Northern corn leaf blight can develop very rapidly resulting in a complete blighting of leaves. Northern corn leaf blight (*E. turcicum*) overwinters in and on leaf debris and is becoming more common, perhaps due to increasing adoption of reduced-till systems. Corn varieties are available with resistance to both diseases. Fungicides can be effective if resistant varieties cannot be planted, but should be applied pre-tassel in the case of rust—consult the [New England Vegetable Management Guide](#) for recommendations.

Birds remain a problems for most sweet corn growers, but many report success with the product Avian Control, which smells like grape juice and causes the birds to get sick to the stomach and stay away from treated fields.

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.

The [UMass Plant Diagnostic Lab](#) and the [UMass Soil & Tissue Testing Lab](#) are both now open.

FARMER STRESS AND MENTAL HEALTH

Farming is stressful in the best of times, but the particular challenges of the 2020 season have added to the pressures that farmers normally face. The ongoing COVID pandemic has brought increased customer demand for local farm products, but while trying to meet that demand, growers are also dealing with new safety protocols, labor shortages, and continued uncertainty heading into the fall. High temperatures and lack of rain across the state are making the situation even more difficult. Normal outlets for socializing and commiserating during a tough year, like on-farm twilight meetings, or even just meeting up for a beer after a long day, aren't available right now. Stress management and self-care are always important, but these topics deserve special attention now.

Below are some points adapted from a fact sheet by [Iowa State Extension](#) about recognizing and responding to stress on the farm, followed by some resources that might be helpful if you or someone you know needs assistance.

1. We know that farming is dangerous. Farming ranks among the most hazardous of professions.
2. Farmers also have the highest mortality rate from stress related illnesses. Individuals working in the farming, fishing, and forestry group also have one of the highest rates of suicide as compared with other professions. This is primarily due to stressors, such as job-related isolation, stressful work environments, and work-home imbalance. More importantly, stress is caused by those conditions beyond the farmer's control, such as weather, fluctuating commodity prices, variable crop yield, and machinery breakdowns.
3. Stress is simply a response to a threatening event, such as receiving some type of bad news.
4. Unfortunately, our brain and body do not know the difference between being threatened by a saber-toothed tiger, being late for work, or having machinery breakdown during harvest. Our brain and body still respond by being prepared to either jump into a fight or run away quickly.
5. This response causes the body to produce stress related chemicals that make the heart beat faster, our muscles to tense, and the eyes to dilate. Blood is shunted away from the midsection (including stomach), and the mucous membranes dry up. All so you can fight harder, run faster, see better and breathe easier than you would without this response.
6. As stress is experienced over longer periods, our bodies may begin to experience high blood pressure, muscle tension, headaches, stomach upset, heartburn, ulcers, and diarrhea/constipation, which can eventually progress into issues that are more serious.
7. Serious wear and tear on the body can occur if the stress continues too long or becomes chronic. That is why chronic stress is a risk factor for heart attacks, weight gain, stroke, and diabetes. Individuals also become more prone to severe viral infections, such as the flu or common cold. It is also a risk factor in depression, anxiety, addiction and suicide.
8. Other emotional responses can include isolation or withdrawal. For example, a person may frequently miss work or not go to school or church activities they once attended.
9. Individuals who are stressed might talk in a monotone voice or have a lack of expression on the face. You could observe bursts of anger or abrasive behavior towards children or others. Worry or fearfulness about the future could become a key topic of conversation. You may notice confusion, forgetfulness or difficulty concentrating.
10. Others may respond to stress by trying to screen out unpleasant circumstances in a variety of ways. For example,

some people might deny their problems. They may blame others, such as banks or their spouses. Other times, people try to escape through eating or gambling binges, spending sprees or excessive use of alcohol or other drugs. Some may sleep too much or not enough. Most of these are maladaptive attempts to cope, as a person tries to avoid dealing with the stress.

11. A person may notice a lack of pride in the way the farm building and grounds appear. Cattle or livestock might not be cared for in the usual way. Accidents may occur due to fatigue or loss of ability to concentrate. Farm children may act out, decline in academic performance or be increasingly absent from school.
12. In farmers, a lack of social support, such as having few or no friends, is a predictor of depression. The person may not take care of their physical appearance or hygiene. A major concern would be if the farmer starts talking about shooting himself or herself or others. These are signs of hopelessness or depression.
13. Many things can minimize our natural stress response. Taking three slow and deep breaths, stopping to daydream or taking a short mental vacation for 10 minutes, or using repetitive prayer or other grounding words can help. A regular exercise program can provide a break in the daily routine and is a constructive way to relieve stress. Having a strong network of friends, co-workers, and family can provide helpful support during difficult times.
14. Sometimes managing those items an individual does have control over can help to reduce stress. Set priorities about what has to be done today and what can wait. It is OK to say “No,” especially to those commitments you do not have time for.
15. If stressed, first talk with someone you trust, such as friends, family or a trusted physician or minister. Taking your partner on a date, or just a walk, helps to strengthen that very important relationship. Getting a good night’s sleep, avoiding alcohol and drugs, and eating healthily help us to better manage our current stressors.
16. You may be concerned about someone, or a person’s friend or family member, banker, veterinarian, FSA representative or other service provider might express concern about someone you know. You could start a conversation with that person with care and compassion by saying, “I’ve noticed you’re feeling upset” or asking, “What’s going on in your life?” Then let the person talk. Listen carefully, provide support and share personal experiences, if you feel that would be helpful. Don’t feel that you need to solve their problems, just give them some time to express what’s going on.
17. When the person is finished and if you are concerned that they might hurt themselves, be direct and ask, “Are you thinking about suicide?” If he or she says “Yes,” get immediate help. Call 911 or take the individual to a hospital emergency room. If he or she says “No,” ask, “What do you think might help?” or maybe “Where would you like to go for help?” Offer to make the contact to a local resource and suggest, “Why don’t we make the call together?” It helps to have an awareness of or list of the resources available in your area.

Resources

- **Farm Aid hotline:** (800) FARM-AID / (800) 327-6243
- **National suicide hotline:** (800) 273-TALK / (800) 273-8255
- **Crisis text line:** Text HOME to 741741
- **Mass.gov mental health crisis resource page:** <https://www.mass.gov/info-details/mental-health-crisis-support>
- **Farm Bureau resources** for taking care of your mental health: <https://www.fb.org/programs/farm-state-of-mind/>
- **National Farmers Union Farm Crisis Center:** <https://farmcrisis.nfu.org/>
- **Farm Credit East Customer Assistance Program:** <https://www.farmcrediteast.com/industry-support/customer-assistance-program>
- **Michigan State University Managing Farm Stress:** https://www.canr.msu.edu/managing_farm_stress/

MANAGING FALL DISEASES OF BRASSICAS

While it’s still hot and dry out there, we’ve had some cooler nights and dewy mornings recently. These conditions, along with cooler daytime temperatures that will be coming soon (hopefully!), set the stage for brassica diseases to quickly take off and reduce yield and quality. The three major diseases of brassicas outlined here—black rot, Alternaria leaf spot, and

downy mildew—share much in common. They can be seed-borne, they can survive in crop residues in soil for about two years, they are spread by wind, splashing water, and insects like flea beetles, and are favored by moist conditions. This means that the following preventive, cultural practices will go a long way in reducing the impacts of all the diseases described later in this article.

Variety selection. In some cases, varieties exist that are totally resistant to a given disease and hold up well even under very high disease pressure. There are no varieties of any brassica crop that are totally immune to black rot or *Alternaria* (wouldn't that be a dream!), but there is a spectrum of tolerance to both of these diseases, and to downy mildew as well. You have probably noticed on your farms that some varieties get more or less disease than others. Plant breeders and researchers are aware of this too and are choosing varieties to bring to market based on their observations and studying the performance of available varieties. [A study done by Chris Smart at Cornell University](#) showed differences in susceptibility to black rot of 35 cabbage varieties. The study showed that several varieties were extremely or very susceptible and 6 or 7 were “tolerant”. Plant these tolerant varieties in fall, when environmental conditions typically favor disease, or in fields with a history of disease.

Start with disease free seedlings. All of these diseases are commonly introduced on infested seed. Either talk to your supplier to be sure the seed has been tested or, better yet, hot water treat your seed to eradicate bacteria, fungi, and oomycetes that may be present. You can do this at home with some simple equipment, or use the [UMass Hot Water Seed Treatment service](#). When raising seedlings in the greenhouse, avoid overwatering and encourage air flow to reduce leaf wetness. Monitor transplants in the greenhouse and remove any symptomatic plants.

Plant into a clean field. Rotate out of brassicas for 2-4 years, and control weeds in the brassica family like shepherd's purse, wild radish, and field pennycress. Any amount of rotation you can do will help—the further away the better, as these diseases are dispersed by wind and insect feeding. Chopping and burying infested residue quickly after harvest will shorten the period of time the organisms persist in the soil (e.g., avoid leaving diseased Brussels sprout stalks standing in the field through the winter; mowing them is better than nothing if you can't disk them in). Manage cull piles so that crop residue breaks down and they do not become sources of inoculum.

Reduce leaf wetness. All of these diseases require moisture to grow and spread. Increase plant spacing so plants will dry off more quickly and so the pathogens can't spread as easily from plant to plant. If overhead irrigation is necessary, or when watering in the greenhouse, water on a sunny day when leaves will dry quickly.

Control insects and remove weeds. Flea beetles can move fungal spores and bacteria from plant to plant and field to field. A study by Helene Dillard at Cornell University showed that spores of *Alternaria brassicicola* are present on flea beetles' bodies, in their mouths, and in their feces, and that flea beetles actually concentrate *Alternaria* spores in their mouthparts when they clean their antennae. The insects move from plant to plant, basically injecting spores and bacteria into wounds they create through their feeding. Therefore, reducing flea beetle pressure will also reduce the spread of diseases through the field. Similarly, cruciferous weeds can harbor diseases and act as bridges between fields and between seasons. Weeds also crowd the crop, increasing moisture and leaf wetness and reducing efficacy of sprays.

Chemical control. There are many effective pesticides to control these diseases. Please see the [brassica disease section of the New England Vegetable Management Guide](#) for a full list of labeled fungicides. Copper products and plant defense activators like Actigard or Regalia are the best choices for managing black rot. Avoid using excessive pressure when spraying for black rot, as this can cause abrasions and wounds on leaves through which the bacteria can enter the plant—use only enough pressure to get good coverage. Many OMRI-approved fungicides are labeled for these diseases, but those tested in our studies have not shown good efficacy for *Alternaria*.

Black rot is one of the most devastating diseases of brassica crops, and can result in high losses of yield and quality. The bacterium, *Xanthomonas campestris* pv. *campestris*, plugs the water-conducting tissue of the plant with xanthan, a mucilaginous sugar, causing leaf yellowing and wilt. Seedlings are commonly affected but symptoms can appear at any growth stage and not all infected plants show symptoms. The most common and characteristic symptom is a yellow V-shaped lesion that extends from the leaf margin toward the base of the leaf (see photo). This symptom is caused by bacteria entering the plant through hydathodes, tiny openings into the plant's vascular system at the leaf edges. Lesions can also occur mid-leaf, as darkened dead patches of tissue between the veins, where wounding from insect feeding, hail, or mechanical injury has occurred. Infected veins turn black as they are plugged with xanthan. Blackened veins may also appear in root crops like rutabagas even though foliar symptoms may not be present. On heading crops, infection may spread into the

leaves of the head and is often followed by invasion by soft-rotting organisms.

Black rot is commonly transmitted by seed, and a seed lot with as little as 0.03% infected seed can cause an epidemic in the field. The bacteria can persist in infected plant debris for up to two years, but can only survive for 40–60 days in the soil in the absence of host tissue. Disease development is favored by warm, wet weather and the pathogen is spread within the field by splashing water, wind, equipment, workers, and insects (e.g. flea beetle feeding).

Alternaria leaf spot is a fungal disease that affects all cultivated brassicas. The disease can be caused by several fungi in the genus *Alternaria*, but the most damaging species in vegetable brassicas are *A. brassicae* and *A. brassicicola*. There are other *Alternaria* species that cause disease on essentially every other major vegetable crop family, but each species is host-specific, meaning that the *Alternaria* that affects brassicas cannot infect tomato or onion or cucumber, and vice versa. The disease can spread in storage so management is especially important for cabbage and other storage crops and crops should be inspected for early symptoms before storing.

The initial symptoms of *Alternaria* leaf spot are small black dots surrounded by chlorotic haloes. As the disease progresses, lesions expand into characteristic, dark-brown to black circular leaf spots with target-like concentric rings. The centers of lesions often turn brown and crack or fall out, giving the leaf spots a shot-hole appearance. Individual spots coalesce into large necrotic areas and leaf drop can occur. Lesions can occur on petioles, stems, flowers, flower pedicels, and seed pods. Brussels sprouts can be rendered unmarketable by numerous small spots on the buds. Brown, sunken spots on heads of broccoli and cauliflower can make those crops unmarketable.

Alternaria species overwinter primarily in diseased crop debris. Lignin-rich stalk tissues can persist in the soil for over two years, and the fungi can remain active on that tissue as long as it is present. Disease development is favored by cool temperatures (60–78°F) and 12 hours of at least 90% relative humidity. The main means of introduction into new areas is on infested seed. However, once the disease is established on a farm, spores can spread easily between crops on wind, splashing water, equipment, workers, and insects.

There are many fungicides with efficacy against *Alternaria* leaf spot including Quadris, Endura, and Bravo, among others—please see the [brassica disease section of the New England Vegetable Management Guide](#) for recommendations.

Brassica downy mildew is caused by the oomycete (a fungal-like organism) *Hyaloperonospora parasitica* and can cause disease in both waxy and leafy brassicas. Similarly to *Alternaria*, there is a downy mildew for almost every vegetable crop family, but they are all unique and very host specific—cucurbit downy mildew does not affect brassicas, and vice versa. Infection can occur at any stage of growth. Infected seedlings can also be symptomless until they are transplanted into the field and conditions become favorable. On seedlings, slight yellow patches appear before



Black rot in cabbage. Photo: UMass Veg Program



Alternaria leaf spot in broccoli. Photo: G. Higgins



*Brassica downy mildew sporulation.
Photo: S.B. Scheufele*

whole leaves and cotyledons turn yellow and drop. In larger plants, irregular, angular yellow to brown spots develop on both the top and bottom of the leaf and a characteristic grayish-white, fluffy growth on the undersides of leaves appears. In broccoli and cauliflower, the first symptom is often darkened flower head stalks, or stalks with black streaks. Dark brown areas will develop internally in curds or floral buds. In cabbage, internal darkening and purplish spots appear in the inner layers of the head or move upward in the head from stem infections. The disease can spread in storage and infected plants are susceptible to secondary infection with soft rot bacteria, resulting in a stinky puddle of rotten cabbage.

Unlike other downy mildews that blow in from afar each year, *H. parasitica* can overwinter as thick-walled resting spores, called oospores, in the soil or crop debris. These sexual spores can survive in the soil for extended periods and produce asexual spores when conditions are moist and cool, especially at night. Other sources of initial inoculum are infested seeds, and cruciferous weed hosts. Disease development is favored by abundant moisture on leaves provided by dew, drizzling rain, or heavy fog, and by temperatures of 50-60°F. Sporulation, germination, and reinfection can occur in four to five days. Sporangia (secondary, asexual spores) are spread throughout the field by wind, splashing rain, and by feeding insects. Varieties of broccoli with tolerance to downy mildew have been developed; our sources list Marathon and Arcadia among these.

--Written by Susan B. Scheufile, UMass Vegetable Program

SQUASH BUG MANAGEMENT

Squash bugs (*Anasis tristis*) have been out for many weeks now across the region, feeding in cucurbit crops. There was also recently a confirmed report of cucurbit yellow vine decline, a rather elusive disease vectored by squash bugs. Now is the time to notice if you have a damaging population of this pest and either take control steps or make a plan for next year, and to look for symptoms of yellow vine decline in your crop--if you suspect the disease please let us know!

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. Sheltered and protected areas such as field borders, woods edges, brush or wood piles provide a home for unmated adults through the winter.

Host crops and damage. The most susceptible and attractive crops are yellow summer squash, zucchini, and pumpkin (*Cucurbita pepo*) as well as Hubbard squash (*Cucurbita 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 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 confirmed from one site in CT this summer. The bacterium is inoculated 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 ac-

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, made from neem). This can be achieved by mixing separate products or with a pre-mixed product called Azera, which has both. This would be easier 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

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NEWS

MASSGROWN EXCHANGE PLATFORM LAUNCHED!

The Baker-Polito Administration today announced the launch of [MassGrown Exchange](#), an online platform designed to facilitate business-to-business connections within the local food system for products and services. The platform was developed following recommendations from the Administration's [Food Security Task Force](#), which promotes ongoing efforts to ensure that individuals and families throughout the Commonwealth have access to healthy, local food.

Developed by the Massachusetts Department of Agricultural Resources (MDAR), in collaboration with the Division of Marine Fisheries (DMF), this platform was originally established to address COVID-19 disruptions to the local food supply in order to assist Massachusetts growers and producers in accessing markets. Given its broad applicability to the food sector in the Commonwealth, this platform will remain in place as a helpful tool and resource beyond the duration of the COVID-19 emergency.

The MassGrown Exchange platform will assist Massachusetts food businesses looking to sell and purchase products and services, including:

- Farmers, fishermen, specialty food producers with wholesale products to sell to restaurants, grocery stores, and other outlets, or searching for equipment or services, such as storage, distribution.
- Buyers (including supermarkets, institutions, schools, food banks, restaurants, and retail outlets) looking for local food products.
- Service and equipment providers working with businesses in the food system.

The platform offers a simple registration process for Massachusetts food businesses, which can operate as a buyer or supplier, depending on whether they are looking to acquire products or provide products or services. Potential sellers and buyers are encouraged to register their business and start listing products and services.

Please visit the [MassGrown Exchange webpage](#) for details on registering as well as a training video on using the platform.

OPEN APPLICATION PERIOD FOR FOOD SECURITY INFRASTRUCTURE GRANT PROGRAM

The Executive Office of Energy & Environmental Affairs (EOEEA) is accepting online applications for The Food Security Infrastructure Grant Program (FSIG) on a rolling basis now through **September 15, 2020**.

The goal of the Food Security Infrastructure Grant Program is to ensure that individuals and families throughout the Commonwealth have access to food, with a special focus on food that is produced locally, and equitable access to food. The Program also seeks to ensure that farmers, fisherman, and other local food producers are better connected to a strong, resilient food system to help mitigate future food supply and distribution disruption. Participants selected to participate in the Program will be provided with reimbursement grants broken into three funding categories: \$0 to \$10,000; \$10,000 to \$75,000; or \$75,000 to \$500,000.

Eligible projects include: (i) information technology needs; (ii) facility adaptation to new safety guidelines; (iii) storage, processing, and delivery equipment, and (iv) other strategies that connect local food production with food insecure communities and residents. Project categories are broken into three funding sections.

For more information, or to submit an online application go to: www.mass.gov/service-details/food-security-infrastructure-grant-program. Please refer to the Request for Response (RFR) available on this website for full Program details. To apply online please review the RFR and then click on the 'Food Security Application Questions' to submit your application.

NORTHEAST CENTER FOR OCCUPATIONAL HEALTH & SAFETY FARMWORKER SURVEY

The Northeast Center for Occupational Health and Safety (NEC) is conducting a survey with farmworkers in the Northeast to assess the impact of the pandemic on them and how we can best serve their needs. Farmworkers could

complete the survey online, by a mail copy, or by telephone interview. This is voluntary and confidential. Attached is information about the survey which is available in English and Spanish.

English version: <https://redcap.bassett.org/redcap/surveys/?s=NH8CHXX499>

Spanish version: <https://redcap.bassett.org/redcap/surveys/?s=LND3MR9TPD>

To learn more about the Northeast Center, visit our website: <https://www.necenter.org/>

ADDITIONAL COMMODITIES ELIGIBLE FOR CORONAVIRUS FOOD ASSISTANCE PROGRAM (CFAP)

The USDA, Coronavirus Food Assistance Program (CFAP) adds additional commodities, and expands funding for seven previously funded commodities. USDA's Farm Service Agency (FSA) is accepting applications through **August 28, 2020**. Read more about these changes [here](#), or contact your local FSA office.

EVENTS

PREVENTIVE CONTROLS WEBINAR FOR SMALL AND MEDIUM FOOD PROCESSORS

Is your business a small or medium food processor? If yes, have you ever thought about what food safety laws you should be following, and what the possible consequences are for not doing so? This 1-hour webinar is the first in a series of three specifically designed for small and medium sized processors affected by the Food Safety Modernization Act's Preventive Controls for Human Foods Rule. The webinar will give you an easy-to-understand overview of the FDA Preventive Controls Rule and will help you learn what it means to be in compliance with these laws. This webinar is the first in a series of opportunities to learn about and receive subsidized training and technical assistance to bring your business into compliance with the Preventive Controls Rule – more details on future programs to come.

The webinar will be held on three separate dates:

- **August 20th from 12pm - 1pm**
- **August 27th from 8am-9am**
- **September 10th from 7pm - 8pm**

To be eligible for future programming and technical assistance, you must attend one of the above sessions.

To register: https://umassherst.col.qualtrics.com/jfe/form/SV_6QA5XrtoOPyFZ2d

Please contact us at valueaddedfood@umass.edu for information regarding the series of events.

SAVE THE DATE! – [UMASS AGRICULTURAL WATER TWILIGHT SERIES](#)

The UMass Extension Vegetable Program is offering a series of online twilight meetings next month all about water! We will welcome extension specialists and farmers from Massachusetts and beyond to cover a range of water-related topics. More details and registration info coming soon!

Wednesday, Sep. 16, 6-7:30 pm: Water use monitoring tools and efficient irrigation, water use regulations

Wednesday, Sep. 23, 6-7:30 pm: Water sources, mapping and inspecting water distribution systems, and water testing for FSMA

Wednesday, Sep. 30, 6-7:30 pm: Post-harvest water quality and sanitizer use

VIRTUAL LISTENING SESSIONS: FEASIBILITY OF INSURING LOCAL FOOD PRODUCTION

You are invited to participate in a Virtual Listening Session with Agralytica, which is working under contract for USDA's Risk Management Agency (RMA).

Why? As part of the 2018 Farm Bill, Congress required RMA to solicit feedback about improved crop insurance coverage options for farmers and ranchers selling to local food markets (including but not limited to farmers markets, Community Supported Agriculture (CSAs), road-side stands, restaurants, retailers, schools, and institutions). This includes discussing how existing crop insurance programs can be improved, as well as exploring the possibility of a new crop insurance program.

The feedback we receive will help us identify potential changes and/or additions to insurance options for producers supplying local markets.

Who? The sessions are primarily for farmers and ranchers who sell to local food markets and their representatives in the federal crop insurance industry.

When? Sessions relevant to MA growers:

- Tuesday, September 1, 12noon: Session for producers
- Wednesday, September 2, 12noon: Session for approved insurance providers
- Thursday, September 3, 12noon: Sessioin for floriculture industry

[For more information on these sessions, including Zoom links, and instructions on how to join by phone, click here.](#)

UPCOMING UNH WEBINARS

- Wed, Sept 9. Noon-1pm. [Crop storage: Hold on to what you've got. North Country Lunch and Learn.](#)

For years Lunch and Learns were a staple of Coos County Cooperative Extension's connection with the community. We will be bringing back the Lunch and Learns as a way for people to get together as we continue to practice social distancing. Do your part for society by eating lunch in front of your computer! These occur monthly on various topics and hope everybody can learn something new and interesting. Learn more and register at the link above.

THANK YOU TO OUR SPONSORS!



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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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