UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

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In this issue:

We had a great turnout at yesterday's twilight meeting at Small Farm in Stow MA. Hope to see you at our August 11 twillight meeting in Ipswich!

Crop conditions

It is finally drier but we are still seeing the fallout of the enormous amount of rain the state received this month. Reports of bacterial diseases, which are spread by splashing water and people/equipment moving through wet fields, are coming in from across New England on many crops. In fields that were not compromised by flooding or taken down by root rots caused by waterlogged soils, crops are still coming in – tomatoes, peppers, eggplant, watermelon and cantaloupe, root vegetables, sweet corn, fresh onions, and heading brassicas.

We had two grower meetings this week—our annual research farm field day and a twilight meeting in Stow, MA—and it was great to see so many people in person. We have another twilight meeting coming up on August 11, at Appleton Farms in Ipswich, MA. We'll have several presentations on cover crops, including their uses for weed control, soil health and fertility, and attracting beneficial insects. We hope you can join us! Click here to register for the August 11 twilight meeting.

Pest alerts

Basil

Bacterial leaf spot, caused by *Pseudomonas*, was diagnosed last week in a field in Hampshire Co. Symptoms were dark-brown, irregular lesions on the leaves and stems. Seed, infected cuttings, and infected plantlets are the most likely source of this pathogen, and seed development is favored by high humidity and extended periods of leaf wetness. Bacterial pathogens are spread easily by splashing water and equipment and people moving through plantings, so removing and destroying diseased plant material when leaves are dry and avoiding working in infected fields when plants are wet can help reduce spread. Copper is an effective bactericide but is largely ineffective when bacterial diseases are already widespread in a crop.

Basil bacterial leaf spot Photo: G. Higgins

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.

Brassicas

Alternaria leaf spot and **black rot**, two of the most common foliar diseases of brassicas, are being widely reported across New England, as expected after 2 weeks of rain. Although Alternaria is caused by a fungus and black rot is caused by a bacterium, both are spread by splashing water and thrive in warm, humid conditions. Cultural control strategies for both include tilling under crop residues thoroughly and promptly after harvest, crop rotation both within the season and between seasons, limiting work in fields when foliage is wet, and starting with clean or hot-water-treated seed. See the article in the August 27, 2020 issue of Veg Notes for information on managing Alternaria leaf spot, including labeled fungicides. Copper can provide some control of black rot.

Table 1. Squash Vine Borer trap captures, week ending July 28, 2021

Location	SVB
Deerfield	2
North Easton	11
Westhampton	9
Whately	0
Sharon	5
Leominster	7

Cucurbits

Cucurbit downy mildew (CDM) was found in cucumber in our sentinel plot on Tuesday this week—this is the first report of CDM in MA this year. Early symptoms are small areas of leaf yellowing, trapped by veins, and gray sporulation on the underside of the leaves (a 10X hand lens may be required to see sporulation). In our area so far, CDM has only been reported on cucumber. Cucumber growers using fungicides to control this pest should now be including targeted DM materials—rotate between FRAC groups of targeted materials to avoid resistance development. See the article in the June 17, 2021 issue of Veg Notes for material recommendations.

Alternaria leaf spot was diagnosed in cantaloupe this week in Worcester Co. Conventional fungicides can slow the spread of this disease if applied when symptoms are first observed. See the cucumber, muskmelon, and watermelon or pumpkins, squash, and gourds disease control sections of the New England Vegetable Management Guide for full lists of labeled products. Working in fields with wet foliage will spread the disease. This fungal pathogen will overwinter in crop residue, so practice a 2-year crop rotation out of cucurbits and till under crop residues promptly after harvest.

Bacterial wilt has been developing in susceptible cucurbit crops for a few weeks now. Cucumber, muskmelons, summer squash, and zucchini are highly susceptible; watermelon, butternut, and most pumpkins are less susceptible. The causal bacterial of this disease is vectored by striped cucumber beetle (SCB), so while there is no effective chemical control for bacterial wilt, controlling SCB will prevent bacterial wilt from developing in your crop. Row covers work well to exclude beetles before flowering. Trap cropping—planting attractive varieties and treating with insecticides to reduce the overall SCB population and minimize sprays to your cash crop—is effective. If using foliar sprays, use a threshold of 1 beetle every 2 plants for highly susceptible crops and 1-2 beetles/plant for less-susceptible crops. See the article in the June 3, 2021 issue of Veg Notes for spray material recommendations.

Top to bottom: curcurbit downy mildew, alternaria leaf spot and bacterial wilt. Photos: S.B.Scheufele, G. Holmes, Cal Poly San Luis Obispo, Bugwood.org, UMass Extension

Solanaceous

Tomato hornworms are feeding in field and high tunnel crops now. It is fairly common for hornworms to become parasitized by a braconid wasp; if you see the oblong, white cocoons of the parasitic wasp covering the body of a hornworm, leave it be to allow the parasitoids to complete their life cycle. Chemical control is usually not warranted in field tomatoes but may be worth it in high tunnel crops. Targeted materials like Bt (e.g. XenTari, Dipel, Javelin) are effective against hornworms and will not affect non-target (non-caterpillar) insects, although large larvae will have to eat a lot of foliage in order to receive a lethal dose.

Tomato hornworm covered with braconid wasp cocoons
Photo: J. Wheeler

Several common foliar diseases of high tunnel tomatoes are being widely reported across the region: powdery mildew, leaf mold, and botrytis blight (as well as **ghost spot** on fruit caused by *Botrytis*). These diseases thrive in the humid high tunnel environment (although unlike other fungal pathogens, powdery mildew does not need leaves to be wet in order to infect them), so pruning and providing adequate ventilation are key to managing them. Resistant varieties are extremely effective for managing leaf mold (see here for a list of resistant varieties). See the article in this issue for more information on managing powdery mildew in tomato.

From left to right: leaf mold, botrytis leaf blight and ghost spot caused by botrytis
Photos: R.L.Wick (left) and G. Higgins (center and right)

Pith necrosis was reported in several New England states this week, including in MA. Initial symptoms of this bacterial disease are yellowing and wilting of young leaves; this often appears just as the first fruit clusters reach the mature green stage. Brown to black lesions may form on infected stems and petioles. The center of infected stems may be discolored or hollow and stems may crack open. Numerous adventitious roots may form. There is no effective treatment for this disease; providing adequate ventilation, avoiding excessive nitrogen levels, incorporating crop debris or removing from high tunnels, and crop rotation can help minimize the disease.

Pith necrosis in tomato, causing adventitious roots and hollow stem
Photo: S.B. Scheufele

Sweet Corn

Western bean cutworm is being reported in sweet corn in New York. In past years, we have not found WBC to be a significant pest of sweet corn, but this may be changing. Please let us know if you are seeing damage from WBC in your corn. Reports from NY show that adults like to lay eggs in pre-tasseling corn. Larvae feed on leaves and will move into ears when silks start developing. Late-instar larvae have two distinctive dark bands immediately behind their head capsule, separated by a light line (see photo).

Western bean cutworm larvae
Photo: J. Obermeyer

Second generation European corn borer moths are still being caught in pheromone traps this week, and damage from first generation larvae is still being seen in the field. Corn earworm traps are capturing moderate numbers that vary from farm to farm—it's not uncommon to see very high populations on one farm and no moths at a neighboring farm in one week. These CEW moths should be "home-grown" by now, as opposed to individuals that were blown in from other locations on storms. Spray intervals dictated by CEW trap captures range from no spray to

4-day schedules. **Fall armyworm** is also continuing to be captured. Over the last few years, we have routinely seen low ECB trap counts despite high levels of feeding damage in the field, so if CEW trap counts on your farm aren't warranting a spray, be sure to scout your corn for ECB and FAW feeding damage and spray if more than 15% of plants have damage (ECB and FAW damage combined). For information on identifying these three different caterpillars in your corn, see the article in this issue.

Table 2. Sweetcorn pest trap captures for week ending July 28, 2021

Location	GDD (base 50°F)	ECB NY	ECB IA	FAW	CEW	CEW Spray Interval
Western MA						
Deerfield	1582	0	1	12	0.5	*no spray*
Southwick	1525	0	0	0	2	*6 days*
Whately	1638	23	2	1	0	*no spray*
Central MA						
Bolton	1551	3	0	-	0	*6 days*
Leominster	1512	2	0	-	6	*5 days*
Northbridge	1417	0	0	0	0	*no spray*
Spencer	1497	0	0	0	4	*5 days*
Eastern MA						
Ipswich	1452	0	0	1	22	*4 days*
Concord	1534	0	0	0	1	*no spray*
Millis	-	8	4	N/A	10	*4 days*
North Easton	1572	0	0	-	1	*no spray*
Sharon		0	0	N/A	3	*6 days*
Seekonk	1737	0	0	0	0	*no spray*
Swansea		1	0	0	2	*6 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

Northern corn leaf blight (NCLB) was reported this week. This fungal disease overwinters in crop residue on the soil surface and infects susceptible varieties in the spring or early-summer. Evidence suggests that NCLB can be more severe in no-till systems. Disease development is favored by warm, humid conditions. Leaf lesions are elongate and brown, often described as cigar- or boat-shaped, and usually appear after silking. There are many sweet corn varieties that are resistant to or tolerant of NCLB—see here for details. See the sweet corn disease control section of the New England Vegetable Management Guide for labeled fungicides. Do not make back-to-back applications of products in the same FRAC group.

Multiple Crops

Phytophthora blight has been widely reported across the state over the last few weeks. *Phyotophthora capsici* survives in the soil for many years and produces swimming zoospores when soils are wet. This pathogen causes fruit rot in cucurbits and root and crown rot in cucurbits and peppers, causing cucurbit plants to collapse and causing pepper stems to turn brown from the soil-line upwards. See the article in the July 15, 2021 issue of Veg Notes for management recommendations.

Cover Crops in Walkways

--Written by Andy Radin, University of Rhode Island Extension. Originally published as 'Weeds between plastic-mulched-beds: UGH!' in The Week in Vegetables, September 5, 2020. https://web.uri.edu/coopext/files/9-5-20-TWIV.pdf

There are few who grow warm season crops on plastic mulch who aren't driven crazy by weeds in walkways between plastic covered beds, and especially those that grow on soil that covers the edges. Besides making harvest more difficult, those weeds, if allowed to grow up high, block out light and block off air movement, which is vital to minimizing disease problems. They can also rob the vegetables of water and nutrients.

In the last few years, more and more growers are using "landscape fabric", more generically known as Geotextiles. These synthetic fabrics were originally developed for civil engineering applications and are now commonly also used in horticultural and agricultural settings. For intensive production areas, like the insides of high tunnels, or on small-scale farms, this material makes a lot of sense for weed control. Depending on which product you use, it can last a few to several seasons, though stony soils probably shorten the life of any of these fabrics due to constant abrasion.

I do have a question about how use of plastic mulch on beds plus fabric between beds affects soil qualities. I now commonly see sections of fields that are literally paved over with plastic film and plastic fabric. Plants exist to create the foundation of the soil's ecosystem every bit as much as soil serves to anchor plants in place and supply water and nutrients. Plant diversity in fields encourages microbial diversity in the soil, and maintains carbon production through photosynthesis performed by that diverse assemblage of plants in a field. Right? Wouldn't it be better if living plants (A.K.A. Living Mulch) occupied the space between beds? Probably, yes, but that creates ANOTHER management problem. I have seen several growers' attempts at this, with so-so to poor results. Here are some condensed results of studies of such systems.

Weed growth between black plastic mulched beds - serious trouble here

In New Hampshire, Dr. Becky Sideman and students grew broccoli on black plastic mulch with and without an Italian (annual) ryegrass/white Dutch clover mix (see trial report here). They were primarily looking for effects of the living mulch on broccoli's ability to find nutrients. At high fertilizer (organic) rates, yields were similar between the plots with and without living mulch. However, where fertilizer rates were lower, they found lower broccoli yields in plots with living mulch vs. those without . They determined that at least part of this was attributable to competition for nitrogen (yup, good ol' nitrogen.) Other factors were probably involved as well.

A really interesting study conducted at Michigan State involved both bell peppers and summer squash grown on plastic mulch with seven between-bed treatments: cultivated bare ground, winter rye residue dead mulch, mowed weeds, living winter rye (spring seeded), living annual ryegrass (spring seeded), and winter rye/white Dutch clover mix. They measured many responses to these treatments, including: weed suppression, labor requirements, crop performance, possible competition issues, soil nitrogen, and soil health in terms of microbial biomass and activity. The study was conducted two years in a row.

Annual ryegrass was the only living mulch that managed to suppress weeds, somewhat (reduced by half) but in only one of the two years. The winter rye dead mulch treatment did significantly reduce weed biomass in both years (70% to 80%). Mowing labor in both living mulch and weed treatments was significantly less than wheel-hoe cultivating between beds, though they did not include the time it took to hand weed the plastic edges (which is really a critical issue!!). As for effect on yield, summer squash was unaffected by any of the treatments in both years, and the same was true for peppers in ONE of the years. But yield losses were very significant in one of the years, in comparison to the clean-cultivated middles. It's possible that this was the effect of low soil moisture- available water to the crops was less in all treatments other than the cultivated control. (This included the dead rye mulch, but they noted that there were lots of living weeds in that treatment along the edge of the plastic.) Apparently the plants in the middles transpire water out of the soil like so many drinking straws. They suggest that delaying planting of living mulches could reduce the competition for water, but I would counter that annual weed competition could be much greater with delayed planting, and it would be harder to establish a good solid mat of the desired living mulch plants. They did find that living mulch reduced leaching of nitrate, which would be expected. In their measures of soil health (microbial biomass and presence of enzymes that are indicators of microbial activity), they surprisingly found no difference between the cultivated bare ground and all of the mulch treatments (dead rye mulch, mowed weeds, mowed cover crop plants.) In their words, their "expectations were challenged." They were flummoxed. And kind of disappointed. But they honestly reported their results. This happens. Overall, although the study provided many lessons, no big new set of practices came out of it that will be adopted by masses of vegetable farmers.

A study in Delaware looked at living mulch as weed control between plastic-covered watermelon beds. In this case, they looked at different species of spring-planted grasses in combination with broad-leaf herbicides for weed control, and grass herbicide to eventually terminate grass growth (at 5 weeks). Overall, they found that spring-seeded grass cover crops did not eliminate the need for additional weed control. I was disappointed that they did not use mowing as a treatment- this would have kept the rye (which begins to stunt in the summer anyway) under control, while also clipping the tops of lambsquarters and pigweed. As for weed control by rye, there was some… but there's no doubt weeds would have gone out of control without herbicide, or by simply mowing. They did find that rye had a negative impact on average melon

weight, which again, hints at competition for water.

A very useful part of the Delaware study was their trial of spring-planted cereal cover crops- annual rye, cereal (winter) rye, spring barley, spring oats, and sorghum sudangrass after 6 and 8 weeks of growth. Spring oats won in terms of biomass produced, and weed control in all of the cover crops was better than no cover crop at all… but there were still pigweeds and lambsquarters. Seeding densities of these grasses were NOT varied, so there may be more to look at here. And again, mowing was not employed.

Judson Reid, of Cornell, has done a lot of interesting work in this area. See the report from his SARE project here. He and colleagues did on-farm trials in which cooperating farmers grew spring-planted barley (alone), spring-planted rye (alone), and each of those mixed with white Dutch clover, in between plastic mulch-covered beds of peppers and onions. These were compared to clean cultivation. One farm used herbicides on the between-bed spaces while the others mowed regularly. While they looked at many parameters, a key finding is that rye/white Dutch clover mix was best at suppressing weeds. They did consistently find yield loss in living mulches in comparison to clean cultivation indicating, once again, that competition for water and possibly nutrients are real issues. You can look at a powerpoint presentation online (fantastic pictures) here.

Cover crop in walkways
Photo: J. Reid

Closer to home, John Eidson at SODCO in North Kingstown has been experimenting the last few years with planting vegetables into established sod that contains microclover, a type of white clover that does not grow as aggressively as white Dutch clover. As a sod mix, they have had huge success with it. John has been tilling strips and leaving sod pathways. He's had some pretty good success, though such a system does not use black plastic mulch, so weeds end up being an issue within the tilled strip beds. Also, there's no doubt that the vegetables and sod strips compete for water. Soil warming is slower, too. But there is great potential for such a system. One is that tilling existing sod (which should be about 16 months old) provides a great green manure nutrient release. Such a system could work by shifting vegetable beds over, annually.

John Eidson (R), out standing in his field of tomatoes planted into Black Beauty sod

IDENTIFYING CATERPILLARS IN SWEET CORN

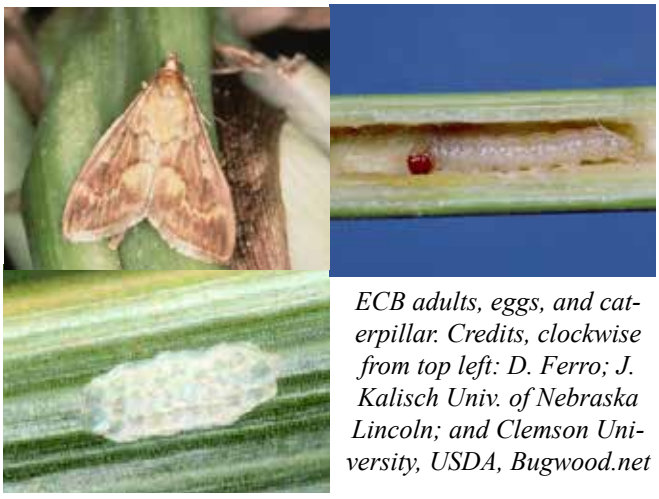
We are nearing the point in the season when all of the major caterpillar pests of corn are present in corn fields—European corn borer (ECB), corn earworm (CEW), and fall armyworm (FAW). The second ECB flight is happening now, and we are still seeing feeding damage from ECB larvae in the field. Historically, trapping for CEW has begun July 15 but for the past few years, including this year, moths have been captured a few weeks before then. This trend suggests that CEW is overwintering in some locations in New England instead of blowing up on storms from the South. FAW has just begun being caught in pheromone traps and over the next few weeks, we expect to see larvae in the field and trap counts increasing slowly. In the hot weather, eggs can hatch quickly, so arrival of these pests means that damage may soon follow.

If you are noticing unacceptable amounts of caterpillar damage in your sweet corn now, take the time to identify which corn pests are present. The most effective management strategy involves attracting and trapping moths using pheromones and using trap counts for each moth to inform spraying and/or scouting schedules. Earlier in the season, when ECB is the only caterpillar pest out and about, ECB trap captures tell us when the moth flight is beginning and therefore when to scout for caterpillars in the emerging tassels and early silks. Scouting results tell growers' if they are under or over a predetermined spray threshold. Once CEW arrives, the CEW trap captures determine the spray schedule: more moths caught per week mean fewer days between sprays. For more information on managing all 3 corn caterpillar pests, see the following articles in past *Vegetable Notes* issues:

Corn Earworm Management

Manage Sweet Corn Pests Through Scouting & Pheromone Trapping

European corn borer is the first corn caterpillar pest to show up in sweet corn, as they overwinter in the Northeast. ECB moths begin emerging in May (at 375 GDD base 50°F), mate, and lay eggs, which will hatch in 4-9 days, depending on the temperature. The newly hatched larvae will move to the closest protected feeding spot—whorl, tassel, ear—and will feed for 5-7 days before boring into the corn stem or ear. First generation larvae will pupate and emerge as adults at 1400 GDD (usually mid- to late-July) to mate and lay eggs. The second generation will overwinter as pupae, protected inside corn stems in the field. Historically, there were 2 strains of ECB common in the Northeast, the New York strain and the Iowa strain. ECB-NY usually arrives in New England before ECB-IA, and in greater numbers. In an attempt to understand why we've been seeing lots of feeding damage despite low trap counts over the past few years, NY and NH have deployed hybrid ECB lures as well, but the captures from these traps have not been high enough to explain the feeding damage discrepancy.



ECB adults, eggs, and caterpillar. Credits, clockwise from top left: D. Ferro; J. Kalisch Univ. of Nebraska Lincoln; and Clemson University, USDA, Bugwood.net

Adults are ¾ inch long moths, white to tan, with 2 dark, serrated lines running across the lower part of the forewings.

Eggs are laid in clusters on undersides of leaves—they are flat and overlap each other like fish scales. Eggs are white when freshly laid, becoming cream-colored then orange-tan as they mature. Before hatching, the black head capsules of the enclosed larvae are visible.

Caterpillars vary in color from light-gray to pink but always have small, dark spots on each body segment. They have brown head capsules, and light red-brown stripes running the length of their bodies. Mature larvae are ¾ to 1 inch long.

Where might you see ECB? Before there is silk, caterpillars bore into the tassel or stalk. The weakened stalk will often flop over and you will see flagging tops in the field. Once there is silk in the field, ECB will enter the ears through the silk channel, or bore directly into the side of the ear. You may often see them in ripening corn boring into the side of the ear next to the corn stalk.

Corn earworm historically did not overwinter in New England and was instead blown in on storms coming from the south or from western New York, where they overwinter, arriving in mid-July. In recent years, CEW is showing up earlier in the season, implying that there are pockets of overwintering populations of CEW in our region. Eggs are laid in silks

and hatch in 2.5 to 6 days. Newly hatched larvae enter the ear through the silk channel and feed for 3-4 weeks before pupating. Although each female lays several eggs on each ear, you will only find one caterpillar per ear, as the small caterpillars are cannibalistic. Moths are blown in throughout the growing season, so infestations are sometimes linked to storms. Additionally, a 2nd generation of moths can emerge to mate and lay eggs.

CEW adult, eggs, and caterpillars, showing variation in color. Photos, top to bottom: E. Burkness, UMN, Bugwood.org; B. Huchison, Univ. of Minnesota; R. Clark II.

FAW adult, eggs, and caterpillar. Photo,s top to bottom:C. Barrentine, BugGuide.net; F. Peairs, Colorado State Univ., Bugwood.org; J. Castner, Univ. of Florida

Adults are yellow-brown moths, with a dark spot in the middle of each wing and a dark band across the bottom of each wing. Live or newly dead moths have light green eyes.

Eggs are tiny, white, and round. In the silk, they look like dew drops and are very hard to see.

Caterpillars vary in color, similarly to ECB, from green to pink to brown to nearly black. Alternating light and dark stripes run the length of their bodies, and they have sparse hairs covering their bodies. Each body segment has a group of 3 small dots on the side. The head capsules are always plain golden brown (compared to the head capsules of FAW, which have a Y pattern—see below).

Where would you be seeing CEW now? CEW are in ear tips—look for messy frass and/or chewed up silks.

Fall armyworm does not overwinter in the Northeast but is blown northward on storm fronts, usually starting in mid-July. CEW is also blown in on storms, though they don't always move together. Females prefer laying their eggs in whorl-stage corn. Eggs are laid on leaves and hatch in ~5 days. The larvae feed in the whorl and newly forming tassel, creating large, ragged holes in the leaves and dropping big clumps of frass. Larvae feed for 15-20 days.

CEW (left) and FAW (right) head capsules. FAW head has an upside down y-shape. Photo: A. Eaton

Adults are ¾-inch long, mottled dark gray moths, with some light spots on their wings and an obvious white area at the extreme tips of their wings.

Eggs are laid in masses on leaves and are surrounded by fuzzy hairs from the female moth.

Caterpillars are light-tan to dark black, with some longitudinal striping along their bodies. Their bodies are smooth, unlike the hairy CEW caterpillars. When viewed head on, FAW head capsules are divided by an inverted "Y", compared to the solid CEW head capsule.

Where would you be seeing FAW now? Check whorl-stage corn for large, ragged holes in the foliage, and big clumps of frass in the whorl. Often, the FAW caterpillar will be within the developing tassel. FAW will also bore into the sides of ears, similarly to ECB, and can also infest ear tips.

References:

Fall Armyworm, Corn Earworm, and European Corn Borer Factsheets, New York State IPM Program

Using IPM in the Field: Sweet Corn Insect Management Field Scouting Guide, UMass Extension

--Written by Genevieve Higgins, UMass Extension

Managing powdery mildew in protected tomatoes

Powdery mildew has emerged as the most common disease of high tunnel tomatoes over the last decade or so. High tunnels provide protection from rain, which allows leaves to remain dry; we therefore usually see lower levels of foliar diseases like Septoria leaf spot and early blight in high tunnels than in the field, as these diseases require leaves to be wet to infect. Powdery mildew, on the other hand, does not require leaf wetness to infect, and so is able to thrive in the high tunnel environment. We are seeing widespread and severe powdery mildew infections at this time of the year, across the region, in tunnels where the disease is not being managed. Severe infections will lead to reduced yields and defoliation, which in turn can lead to sunscald of fruit.

Tomato powdery mildew
Photo:G. Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood

Powdery mildews are host-specific pathogens, meaning that the powdery mildew fungus that causes disease on tomato (*Oidium neolycopersici*) is different from the fungus that causes powdery mildew on cucurbits or lettuce or various ornamental crops. The various powdery mildews cause similar symptoms on their host crops though – white, powdery sporulation on both the tops and undersides of leaves, in round spots that begin small but expand and converge and can eventually cover an entire leaf. Spores are dispersed by wind and spores take about one week to infect, grow, and produce new sporulation.

Cultural controls

Cultural controls can help reduce powdery mildew severity but will likely not prevent the disease. Although *O. neolycopersici* does not require high humidity to infect, the pathogen thrives in humid environments (up to 95% relative humidity). **Removing lower leaves and increasing plant spacing** will improve air circulation and can improve spray coverage. Those practices, in combination with **providing adequate ventilation**, will reduce humidity in tunnels. (These two resources, one from the UVM Agricultural Engineering Program and the other from UConn, provide good background information and specifics about how to achieve adequate ventilation and air circulation.)

Oidium neolycopersici is an obligate parasite, meaning that it requires a living host to survive, so it is not able to overwinter in crop residue in the soil and crop rotation is not a useful tactic in managing tomato powdery mildew. The pathogen likely overwinters in year-round tomato operations and on solanaceous weed hosts. **Control solanaceous weeds** in and around the high tunnel that may be acting as weed hosts for the pathogen.

Chemical Control

Fungicides are the primary management tool for managing powdery mildew. Fungicides are not curative in plants, so they must be applied preventatively, before or just after symptoms begin developing.

Micronized sulfur (e.g. Microthiol Disperss) and mineral oil (e.g. JMS Stylet-Oil) are the most effective products for organic production, and are also good choices for conventionally produced crops. Apply sulfur at its lowest labeled rate because plants grown in protected culture tend to be more sensitive to phytotoxicity than field-grown plants. Also, without rain or overhead irrigation, fungicide residue will remain longer on plant tissue. As stated on the labels for these fungicides, if you are using both sulfur and oil to manage powdery mildew, there needs to be a gap of 2 or 3 weeks between applications of these products because oil can move sulfur into the leaf resulting in damage. Applications of sulfur especially during the harvest period may leave visible residue on fruit, which can be easily wiped off. An option to minimize visible residue is to use sulfur for the first applications until fruit start to mature, switch to another product for an application or two, then start applying oil.

Other OMRI-listed products that are not oils include:

- MilStop (potassium bicarbonate) and Cease (a Bacillus subtilis strain) - these two are recommended to be used together

- Double Nickel (*Bacillus amyloliquefaciens*)
- M-Pede (potassium salts of fatty acids – an insecticidal soap) - apply at ¾ rate to avoid phytotoxicity
- Regalia (extract of giant knotweed, *Reynoutria sachalinensis*)

Conventional fungicides labeled for powdery mildew and permitted for use in protected culture include those listed below. Unless otherwise noted, you must rotate FRAC groups after making a maximum of 2 consecutive applications of any of these products.

- Switch (FRAC Groups 9 & 12)
- Emblem (Group 12)
- Luna Tranquility (Groups 7 & 9) – disease suppression only
- Fontelis (Group 7)
- K-Phite (Group 33) – no limit on consecutive applications
- Revus Top (Groups 3 & 40)
- Trionic (Group 3) – max 4 total applications per crop
- Vivando (Group U8) – max 2 consecutive applications before rotating FRAC groups, max 3 max applications per year

--Written by G. Higgins, UMass Vegetable Program, with excerpts from Meg McGrath, Long Island Horticultural Research & Extension Center

News

UMass Extension Diagnostic Lab Now Accepting Hemp Samples from Licensed Growers

The UMass Extension Diagnostic Lab is now accepting hemp samples for analysis and evaluation of insect and disease problems. In addition, a special program in 2021 offers only licensed hemp growers the opportunity to have nematode analysis conducted for free, including a site visit!

For both disease diagnostic services and nematode analysis, samples will be accepted only from licensed hemp growers in Massachusetts. Submission of a copy of the grower's license is required.

For information on collecting, packaging, and shipping hemp samples to the lab, as well as the free nematode analysis program, see the lab's Hemp Diseases and Nematode Assays page or call Dr. Angela Madeiras at 413-545-3209.

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

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

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

Report Crop Losses on Crops Insured under Federal Crop Insurance or Covered under the Noninsured Crop Disaster Assistance Program (NAP) through the USDA - Farm Service Agency

Just an important reminder that you should report crop losses to either your agent or your FSA Office as soon as losses become apparent. Check with your agent or your FSA Office for exact loss reporting requirements and deadlines. This is especially critical if you are abandoning the crop or destroying the crop since a loss adjuster will likely have to make a field inspection! Failure to report losses on a timely basis could delay your claim or have your claim denied!

Commercial Grape Growers' Survey

The UMass Extension Fruit Program is conducting a survey of commercial grape growers to gather information on how to better serve this audience. If you are a commercial grape grower in New England or New York, please fill in the survey below. Your response will be used to prioritize future Extension and research efforts. It should take be-

tween 5-15 min. The deadline is Friday August 6, 2021.

Completing this survey will automatically enter you into a raffle to win a $150 gift certificate & a free subscription to the Grape Notes Newsletter.

Survey link: https://umassamherst.co1.qualtrics.com/jfe/form/SV_dhz2MMPQdvXYC9g

MDAR Seeks Responses for the Specialty Crop Block Grant Program – Round II

The purpose of the Specialty Crop Block Grant Program (SCBGP) is to enhance the competitiveness of specialty crops. Specialty crops are defined as "fruits, vegetables, tree nuts, dried fruits, horticulture, and nursery crops (including floriculture)." Additional specialty crop categories and details here. For details and how to apply, click here.

Applications are due by Tuesday, August 10, 2021 at 5:00pm.

Tree Fruit & Small Fruit Growers: Weeds Needs Survey

Since 2016, the UMass Extension Fruit Program has been operating without an official weeds specialist. The Fruit Team has created this brief survey to assess current weed management challenges in commercial orchard, vineyard and small fruit cropping systems. The results of this survey will be shared but all personal information will be kept confidential.

Survey link: https://forms.gle/4Ty8RS5n1ETXiTEn9

Events

UMass Twilight Meeting - Cover Crop Strategies for Vegetable Farms

When: Wednesday, August 11, 2021 - 4:00pm to 6:00pm

Where: Appleton Farms, 219 County Rd., Ipswich, MA 01938

Registration: Click here to register for this event.

Join UMass Extension for this in-person twilight meeting all about making the best use of cover crops for weed control, soil health and fertility, and attracting beneficial insects.

- **Appleton's farm manager, Andrew Lawson**, will discuss the farm's current cover cropping practices and demonstrate their high-speed, shallow tillage disc cultivator.
- **UMaine Extension Sustainable Agriculture Professional, Jason Lilley**, will talk about planning cover crops into vegetable rotations, species selection considerations, interseeding into late-season crops, and more.
- **UMass Vegetable Team Educator, Hannah Whitehead** will discuss cover crops and beneficial insects.

Rain or shine--in case of rain, we will meet inside the barn. Masks are required for unvaccinated people inside Appleton buildings only.

Questions? Contact Lisa McKeag at (413) 545-1051 or lmckeag@umass.edu

Successful Value Added Food Product Development: Managing Food Quality and Safety

Are you an entrepreneur developing new and exciting products? Do you have questions about ensuring the safety of your product? If so, this is the program for you! This course is a program designed specifically to address product development and food safety issues faced by small processors. Throughout the course, we will introduce the food science basics, important considerations when developing a new food product, share key elements required for product labeling, and provide an overview of key regulatory requirements for small and emerging food businesses, such as entrepreneurs and local food processors.

Upcoming Sessions and Registration link:

- Successful Food Product Development for New Food Businesses: Managing Food Quality & Safety- WVU: Mondays, 5:30-7:30pm, July 12 to August 16

- Successful Food Product Development for New Food Businesses: Managing Food Quality & Safety- FCCDC: Tuesday, August 10 and Thursday, August 12, 9am-4pm
- Successful Food Product Development for New Food Businesses: Managing Food Quality & Safety- NFU and UoA: Tuesday, August 31, Wednesday, September 1, and Thursday, September 2, 10am-2pm

UNH North Country Lunch and Learn

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

This event is free, but registration is required.

- **August 4, 12-1pm:** Brussels Sprouts: Growing and Storage

Registration: Click here to register for these workshops.

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

Massachusetts Tomato Contest to be held on August 24

The 36th Massachusetts Tomato Contest will be held in the KITCHEN at the Boston Public Market on Tuesday, August 24. Tomatoes will be judged by a panel of experts on flavor, firmness/slicing quality, exterior color and shape. Always a lively and fun event, the day is designed to increase awareness of locally grown produce.

Farmers who want to submit entries can bring tomatoes to the market between 8:45 am and 10:45 am on August 24th or drop their entries off with a registration form to one of the regional drop off locations on Monday, August 23rd. Drop off locations include sites in Great Barrington, South Deerfield, Worcester, Dighton and West Newbury. These tomatoes will be brought in to Boston on Tuesday.

For complete details, including drop off locations, contest criteria, and a registration form, **click here.** Be sure to include this **registration form** with your entries.

The 36th Tomato Contest is sponsored by the Massachusetts Department of Agricultural Resources, New England Vegetable and Berry Growers Association and Mass Farmers Markets in cooperation with the Boston Public Market.

THANK YOU TO OUR 2021 SPONSORS!

Become a sponsor!

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