UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

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In this issue:

Training our summer scouts to identify early season brassica pests like flea beetle and cabbage root maggot.

Crop conditions

It's getting warmer and crops are loving it. After the weekend's brief heat wave, this week was more comfortable for plants and people alike. In most parts of MA, there have been a few strategic rain showers that have kept it from getting too dry, but some farms have had to pull out irrigation equipment. There's still lots of asparagus at the market and roadside stands, and strawberries are right around the corner. First succession plantings of brassicas and summer squash are sizing up and later successions are going in. Growers are also harvesting salad greens, radishes, spring high tunnel carrots, and scallions along with greenhouse crops like tomatoes, cucumbers, and strawberries. Farm crews are mostly formed.

The Vegetable Team is staffed up for the summer, and our seasonal hires have made their first scouting trips across the state! We've also begun collecting water samples for a food safety project we're working on with MDAR to help growers better understand their agricultural water quality. We're getting the fields prepared at our research farm and are excited to start collecting data on our various projects. Visit our Research Reports page to see trial results from previous years; we'll keep you posted on this year's results in Veg Notes!

UMass Extension is looking to expand the Production Agriculture team by hiring an Urban Agriculture Educator. We're excited to add this expertise to our program! See the News section for more details on the position.

As always, if you have questions on any crop production topic as the season heats up, you can always reach us through email (umassveg@umass.edu) or our Contact Us form.

Pest alerts

Alliums

Onion maggot is now at or past peak flight throughout the state, and we are hearing reports now of maggots tunneling into the bases of onions and causing poor stand. This is a fly pest that emerges in the spring and lays eggs at the base of plants in the allium family. The larvae subsequently feed on plant roots/bulbs, causing damage and making plants vulnerable to secondary infection. Once damage is visible, there is little to be done to control onion maggot. If you have struggled in the past with this pest on your farm, you can apply an insecticide as a transplant tray drench or in transplant water, or in-furrow before or during seeding or transplanting. Labelled materials are limited. Diazinon may be applied just before planting. There are no effective labeled OMRI-listed materials (Entrust, which is labeled for and effective against cabbage root maggot, is not labeled for soil applications in onions). The entomopathogenic nematode *Steinernema feltiae* also provides control – growers will often dip transplants into the nematode solution.

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.

Row cover will exclude the flies and prevent egg-laying in your crop, as long as the flies are not emerging from the soil beneath the cover.

Onion thrips are beginning to be reported around the region on onions, scallions, and leeks. Onion thrips feed on allium foliage, producing silvery damage; high populations can decrease yield and cause leaf deformation. Feeding damage allows for entry of bacterial pathogens which can lead to bacterial bulb rots later on. Scout onion fields weekly, gently pulling leaves apart from each other to check within the plant. An insecticide application is warranted if 1-3 thrips/leaf are found (organic growers should use the lower threshold). The most effective material for organic growers is spinosad (e.g. Entrust). Apply with insecticidal soap (e.g. M-Pede, at the 1.5% v:v rate) to increase efficacy. Entrust can only be used two times in a row before rotating to a different insecticide class. Neem oil (e.g. Trilogy) and azadirachtin (e.g. Azatin O) may be effective also if applied when populations are still low. Pyrethrin (e.g. Pyganic) can provide knockdown control. Many conventional materials are labeled—see the insect control section of the appropriate crop group in the New England Vegetable Management Guide for a full list. Use an adjuvant with all materials to help them adhere to waxy allium leaves, unless it says otherwise on the label.

Onion thrips and silvery feeding damage on onion.

An imported cabbageworm egg on the underside of a leaf.

Allium leafminer (ALM) flight is slowing down around the state. The spring flight lasts for 5-6 weeks, so can be expected to be finished around the end of May in eastern MA, 1st week of June in central MA/ Pioneer Valley, and mid-June in the Berkshires. This pest is relatively new and has only been confirmed in Hampshire and Berkshire Cos. but is likely present in other areas of the state, so let us know if you see signs of ALM in your alliums! Look for neat rows of small, white feeding/oviposition marks on the tips of allium leaves, and/or thin, white tunneling marks moving down the leaf. See the article in the September 9, 2021 issue of Veg Notes for insecticide recommendations.

Brassicas

Imported cabbageworm (ICW) eggs are beginning to be reported around the region. Eggs will hatch into caterpillars within a few weeks. ICW overwinters as pupae and adults first emerge in May. The familiar white butterfly adults lay oblong yellow eggs singly on the undersides of brassica plants, and larvae feed on plant leaves. In Massachusetts, they complete 3-4 generations per year. Once caterpillars start to be present, scout weekly and treat heading plants prior to head formation if 20% or more are infested. Use a 10-15% infestation threshold for leafy brassicas and heading brassicas after head formation. Labeled conventional products include spinosyns (e.g. Radiant), neonicotinoids (e.g. Brigade, Asana, Declare, Warrior, Mustang), pyrethroids (e.g. Assail), and diamides (e.g. Exirel, Verimark). Neonicotinoids are highly toxic to pollinators but are lower risk to use in brassicas because they are not a flowering crop. Diamide products are more expensive but are systemic, have long residuals, and will also protect against flea beetles, cabbage root maggot, and cabbage aphid. Bt products (e.g. Dipel, Xentari) are the most effective OMRI-listed materials. Use a spreader-sticker to help materials adhere to waxy brassica leaves.

Cabbage root maggot (CRM): The first flight of CRM is done throughout the state, and we are seeing damage from maggots now in brassica crops. Symptoms include stunting, wilting, leaf purpling/yellowing, and plant death. Maggots or pupae will be visible around the roots of the infested plant or within tunnels in root crops. Insecticides applied now will not be effective against large maggots or pupae, but may be effective against small maggots infesting plants that went into the ground more recently. See last week's listing in Pest Alerts for insecticide recommendations.

Flea beetles are now active around the region in brassicas. Plan to protect brassica plantings with insecticides or row cover from here on out this season. See the article in this issue for management recommendations.

Cabbage root maggot larvae.

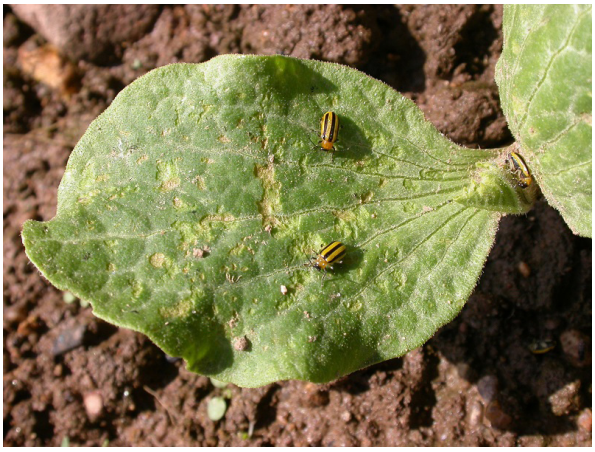
Chenopods

Leafminer eggs are present in beets, chard, and spinach now in eastern MA. Leafminer overwinter as pupae in the soil and emerge as adult flies in late-April and May, with peak activity happening in mid-late May. There are 2 other generations throughout the course of the summer, with peak activity occurring again in late June and mid-August. Row covers can also be used to exclude flies if placed over the crop before flies are active. Removing and destroying (squishing, feeding to chickens, not just dumping into a cull pile) affected leaves can help reduce the size of the subsequent leafminer generations. Insecticides can be applied when eggs or small tunnel first seen. For conventional growers, group 5 (e.g. Radiant) and group 28 (e.g. Coragen, Exirel) materials are labeled for use on spinach, chard, and beets, and have translaminar activity to target larvae that have already tunneled between leaf layers. Blackhawk is labeled for use on beets only. Brigade 2EC (spinach only) and permethrin (e.g. Pounce, Perm-Up, Loveland Permethrin – spinach and chard only) or pyrethrins (e.g. Pyganic, Pyrenone, Pyronyl) can be applied preventatively, before a crop becomes infested. Pyrethrins are highly light sensitive and would need to be reapplied frequently. For organic growers, Entrust plus a spreader-sticker to aid in leaf penetration is the best chemical control option.

Leafminer eggs on the underside of a leaf.

Cucurbits

Striped cucumber beetles (SCB) are out now, emerging from overwintering sites at field edges and feeding on unprotected cucurbit crops. SCB causes extensive feeding damage on all cucurbit crops and also vectors a bacterial pathogen, *Erwinia tracheiphila*, that causes the disease bacterial wilt. Cucumbers and cantaloupes are more susceptible to bacterial wilt than watermelon and winter squash. Crop rotation can help to reduce cucumber beetle pressure. Use row cover with hoops to exclude beetles; remove at flowering to allow pollination. Conventional insecticides for foliar control include carbamates, pyrethroids, and neonicotinoids. All are highly toxic to bees and should only be used before bloom. Some systemic products may also be applied through drip irrigation. The diamide products Exirel and Harvanta are also labeled for SCB – trials from the University of Delaware have found that they don't kill the beetles at the same rate as neonicotinoids but do stop SCB feeding. The most effective OMRI-listed material is pyrethrin (e.g. Pyganic). Treat when levels exceed 1 beetle/2 plants for crops highly susceptible to bacterial wilt, or 1-2 beetles/plant for less-susceptible plants. Small plants can also be protected using kaolin clay (e.g. Surround), which needs to be reapplied to protect new growth.



Striped cucumber beetle adults.

Solanaceous

Colorado potato beetle (CPB) adults were seen this week in Hampshire Co. and have been reported in other areas throughout the region. This pest primarily feeds on potato and eggplant, but will feed on tomato if their preferred crops are not available. CPB adults overwinter in the soil and on field edges near last year's potato and eggplant crops, and primarily walk to find new crops in the spring. These adults will mate and lay eggs, which will develop into adults. There will be another generation of eggs and larvae that develop in early July. CPB adults do not travel far from overwintering sites, so crop rotation is an essential tool in managing this pest. Most of the feeding damage from CPB is caused by larvae, so treatment is not required until larvae begin to develop. There are several cultural control practices outlined in the potato insect control section of the New England Vegetable Management Guide. Monitor crops for the start of larval development over the next few weeks; chemical treatment is most effective if sprays target the smallest larvae. CPB populations readily develop insecticide resistance, so prepare to use multiple chemical classes of insecticides if you plan to apply insecticides to both generations of larvae. See the June 4, 2020 issue of Veg Notes for chemical control recommendations.

A Colorado potato beetle adult laying eggs.

Solanaceous flea beetle was observed in eggplant in Hampshire Co. this week. This is a different species from the 2 flea beetle species that feed on brassica crops but both solanaceous and brassica flea beetles cause similar damage – tiny pinpoint holes in leaves that coalesce and expand as the leaves grow. Chemical controls include pyrethroids (e.g. Azana XL, Baythroid XL, Brigadier, Bifenture, Mustang Maxx, Warrior II), and Admire Pro (soil treatment only). Spinosad (e.g. Entrust) is the most effective material for organic growers but cannot be applied more than 2x consecutively; pyrethrin (e.g. Pyganic) will provide a quick knockdown of flea beetle for organic growers as well. Row cover or exclusion netting can also be used to exclude flea beetles early in production, before flowers develop.

Sweet Corn

European corn borer is beginning to be caught in pheromone traps in eastern MA. This caterpillar pest of sweet corn is monitored using pheromone traps that attract male moths. The presence of moths indicates that eggs and caterpillars will soon follow in corn plantings. Traps at most of our trapping locations have not been up for a full week, so we will begin publishing trap counts next week.

Flea beetle management

Flea beetles have emerged from their overwintering homes in the shrubby or wooded areas surrounding fields and are beginning to feed on the first spring brassica plantings. Controlling flea beetles can seem like a losing battle, but we have seen real success on farms that have taken an integrated approach to management. The most important steps to reducing the population size and damage caused by flea beetles seem to be breaking the cycle (rotating spring crops as far as possible from overwintering sites near last years' fall crop), and controlling early season outbreaks using something like a trap crop or a "push-pull" approach to prevent the problem from spiraling out of control within the season or from building up to unmanageable levels over the years.

Crucifer flea beetles (above), Striped flea beetle (below)

Life Cycle. There are two species of flea beetle that feed on brassica crops. The crucifer flea beetle (*Phyllotreta cruciferae*) is uniformly black and shiny, while the striped flea beetle (*Phyllotreta striolata*) has two yellow stripes on its back. Both are about 2 mm in length and hop away when disturbed. These flea beetles only feed on brassica crops; those found on corn or solanaceous crops are different species. Though they prefer the tender leaves of *Brassica rapa* and *B. juncea* crops such as arugula, tatsoi, mizuna, bak choi, and mustard, they will also feed on the more

waxy *Brassica oleracea* crops such as broccoli, cabbage, kale, and collard. Their feeding damage—small, round holes on leaves or leaf margins, which can coalesce or expand to form large holes as leaves mature—can kill seedlings outright, delay maturity, and reduce yield and marketability of older plants. The adults that are active now will mate and lay eggs in the soil, and larvae will hatch in 11-13 days. Larvae will feed on the root hairs of brassica crops but do not cause noticeable damage. After about 2 weeks, the larvae will pupate, and emerge after another week as the next generation of adults in mid-June. This cycle repeats itself and a second summer generation emerges in late July to feed on fall brassica crops before moving outside of the field to forested areas for the winter.

Management:

Break the cycle. Plant spring crops far from fields where fall brassicas were grown, and where flea beetles will overwinter. When overwintering beetles emerge, if they can't find a host plant they will not survive and reproduce and you will reduce the population of flea beetles on your farm. You can also starve the overwintering beetles by delaying planting until June. This may not easily fit your markets, but it does work. With no food or place to lay eggs, the overwintered adults leave the area, instead of reproducing and emerging in time for midsummer dining. It may take 2-3 years to bring populations down. Be careful to control brassica weeds at the same time. It is also important to separate your fall crop from the spring crop, since second generation flea beetles will emerge at the same time that fall brassica crops will be at their most vulnerable. These second generation adults are also the beetles that overwinter, so next spring, plan to use a field distant from previous late-season brassica fields.

Row covers. Floating row cover or insect netting provide the most effective protection from flea beetles, especially in spring and early summer. It is expensive in both materials and time, but it works. Insect netting, such as Proteknet, Biothrips, and Filbio, are available in a range of mesh sizes and can be used to protect against a variety of pests, including flea beetles. These trap in less heat and allow for greater air circulation than spunbonded row covers, though for early spring crops, the additional warming benefit of traditional row covers of various weights may be preferred. Whatever cover you choose, it is critical to seal the edges immediately after planting to make sure you exclude the beetles. Flea beetles can fit through small openings—not to mention the large holes and tears that often develop in row cover over time. Fortunately, hoops are not needed on brassica crops, but management is still time-consuming because the cover has to be removed for cultivation. Replace it as soon as possible to avoid letting beetles in.

Chemical control. Maturing plants should be scouted frequently. When plants are young, an average of 1 beetle per plant or 10% average leaf damage is a reasonable threshold for chemical intervention. Several synthetic pyrethroids (Group 3A), carbamates (Group 1A), neonicotinoids (Group 4A, either as foliar or soil drench), and diamides (Group 28) are labeled for flea beetle in brassicas. Avoid repeated use of one type of chemistry over multiple generations or using both soil and foliar applications of the same group. Systemic insecticides can provide longer-term control against damage, although beetles may still be seen when scouting. Diamide products (Exirel and Harvanta for foliar applications, Verimark for soil), are systemic and provide control against flea beetles as well as other brassica pests like caterpillars, cabbage aphid, and, if applied to the soil pre-plant, cabbage root maggot. Be aware that systemic insecticides may have longer days-to-harvest intervals.

For organic farmers, the choice of effective chemistries is limited to spinosad (Entrust), Surround WP (kaolin clay), and pyrethrin (Pyganic). In UMass trials, Entrust showed the greatest efficacy in suppressing flea beetles and reducing damage. Pyrethrin (Pyganic EC 5) showed poor to moderate efficacy in our trials but is reported by growers to cause a significant short-term knockdown. Abby Seaman, NYS IPM, found in 2013 that Entrust, as well as both Venerate and Grandevo, two OMRI-approved bioinsecticides, were all found to significantly reduce damage from flea beetle on cabbage but pest pressure was very low in that study. Growers often hesitate to use Surround because of difficulty mixing and spraying—some growers have found that using a masonry or sheet-rock drill to mix up the material in a 5-gallon bucket before adding to a backpack sprayer works to get the clay into suspension. If you want to apply Surround using a tractor-mounted sprayer you must have mechanical agitation or the material will not go into suspension and it will clog up your nozzles. It is probably worth figuring out how to do this if you struggle with getting your early season transplants to survive the onslaught of flea beetles, and it can also be useful in protecting cucurbit transplants from striped cucumber beetles, which vector bacterial wilt.

Control brassica weeds. Brassica weeds also harbor flea beetles (both adults and larvae) and reduce the efficacy of your crop rotation schemes that aim to break the pest cycle by changing crop families. Yellow rocket, wild mustard, and shep-

herd's purse are familiar weeds that are widespread in fields and roadsides. The list of weed hosts probably also includes garlic mustard (*Alliaria petiolata*), a serious invasive weed in the brassica family. It is a biennial with white blooms in spring (mid-May). It thrives in roadsides and field edges as well as shady woodlands, and has rapidly spread throughout Massachusetts.

Kale treated with Surround is protected from damage while untreated bok choi used as a trap crop could draw flea beetles, where they can be sprayed. Photo: S. Scheufele

Trap cropping. Take advantage of the flea beetles' preferences for particular brassicas by using the preferred species or varieties as a draw. Their numbers will build up in the more attractive plants, and can be killed there with an insecticide application, protecting the main crop and reducing spray area and time. A border or even a middle row planted to *Brassica rapa* or *B. juncea* crops such as komatsuna, tatsoi, mizuna, bok choi, or mustard has been shown to reduce numbers and feeding damage on less preferred *B. oleracea* crops such as broccoli, cabbage, or traditional kale (e.g. 'Winterbor' types). Red Russian kale (*B. napus*) and lacinato kale (*B. oleracea*) seem to be of intermediate attractiveness. To make it work, here are some tips:

- Make sure the trap crop is established before the main crop (the one you are trying to protect) or is at least as mature (e.g. transplanted same day). Direct-seeded crops can be used around transplants if seeded 7-14 days earlier.
- Use a fast-growing, vigorous cultivar for the trap crop.
- Use a border crop to prevent beetles from moving farther into the field. Traps at ends of rows help make a complete perimeter, which stops beetles coming from all directions. Interior trap crops also can act as a 'sink' within the field.
- Spray only the trap crop to kill the accumulated beetles, and to avoid having to spray the main crop. You also want to keep the trap crop healthy enough to do its work, and potentially be harvestable as well—you may need to fertilize, re-seed, or otherwise maintain this trap crop because if it gets too ragged, the beetles will not enjoy feeding on it and will move back into your main crop. Use a longer-residual product, if possible.
- Combine with a repellent on the main crop, e.g. coat the main crop with Surround WP and use a trap crop as part of a "push-pull" system.

—UMass Extension, Vegetable Program.

How to take a photo for plant diagnostics

--Written By Elizabeth Buck, Cornell Cooperative Extension Vegetable Program. Originally published in the May 13, 2020 issue of Cornell Veg Edge

With the current push to work remotely, using pictures to quickly address production questions has a lot of appeal and utility. I love the idea of using grower-captured photos to hasten the trouble-shooting process, especially since it isn't always possible to make prompt farm visits. But in practice it can be quite tough to work out a problem using photos because of poor image quality.

High quality diagnostic photos absolutely can allow us (and other ag professionals) to make pretty confident IDs and assessments of what is going wrong. I frequently send diagnostic images to our plant pathologists for a preliminary read on the situation, it works great. Examples of high quality diagnostic images are regularly published in our pest/disease/weed management articles.

What makes a high quality image?

A high quality image has 3 key components:

1. The image matches exactly what you are seeing. Same colors, same level of detail.
2. The image is well focused on the intended subject (is "sharp").
3. The image captures the correct part of the field, plant, bug, etc to make an ID.

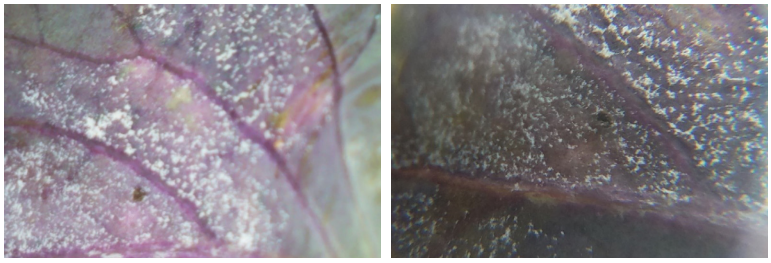
In practice, meeting these three criteria takes some time. I typically spend 3-5 minutes capturing a series of high quality images to use in VegEdge or to send off to our plant pathologists or entomologists. **Below you'll find tips on how to capture a good image, but first you should know some things.**

Things you should know:

Cameras sense a lot more light than our eyes can. Our eyes saturate with light and stop perceiving increased light well below the level of light that a camera (and plants) can perceive. This is why images taken in a sunny field tend to be over exposed and look washed out relative to what your eye perceives. The camera is showing you how much more light there is than you can physically realize. In a way, the camera is better than our eyes at showing us the relative amount of light a plant "sees".

So much of diagnostics relies on picking out slight color differences in plant tissue. Sunglasses alter how colors look. Something that stands out well with sunglasses on may not be as distinct with them off. I cannot pick out the slight yellow checkerboard of early stage cucurbit downy mildew when I scout with my sunglasses on because my shades filter out light in a way that changes the appearance of yellow objects. Cameras don't filter light and color the same way as your sunglasses do. It is difficult to get the photo to capture exactly what someone wearing sunglasses perceives – far easier to take shades off.

Making an ID usually takes at several photos. This number changes based on the problem. Insects can be done in as little as 1 or 2 high quality pictures. Weeds and feeding damage on crops usually require 2-3 good images. Plant diseases and mystery problems are almost always 3-5 photos. Remember that disease symptoms can vary from the upper and lower sides of leaves and images of both can be helpful.



Need a close up shot of some mold? *Take photo through a hand lens. Left: Zoomed in image vaguely shows downy mildew sporulation on a brassica seedling. Right: By taking the image through a hand lens, greater detail including the separation of individual mold colonies and the structural shape of the sporulation can be seen. Note image is clear near the central leaf vein and blurry on the edges due to the effect of the hand lens.*

Adjust the lighting setting. *Left: Overexposed image captured by just snapping a photo. Right: Same seedling, with white balance adjusted on phone so screen display matches what the eye sees; clearly shows the outline and wide range of discoloration (tan, bronze, yellow), which allows for a downy mildew diagnosis. The same diagnosis cannot be made from the image on the left.*

Correct focus point. *Left: Camera focused on leaves behind the scarring, leaving the lesion blurry and small. Too much extra foliage in the image. Right: Brought camera closer to subject, re-set the focus on the lesion, and stabilized the camera. These three actions yielded a sharper image that shows two different injury patterns – coppery sunken tissue in the center with no yellow margins and reddish-brown lesions with yellow margins moving in from the edge of the leaf.*

Different problems need different images:

- **For insects** you see, take a focused close-up of the pest. A couple images showing feeding damage, any frass, and where on the plant you're finding the damage can ID pests you don't see.
- **To ID caterpillars**, a top shot showing its head and a side shot of its pattern are really useful.
- **For broadleaf weeds**, take photos of the overall growth habit, a detail shot of some middle aged leaves, and one showing flowers or any other distinctive features like spines or rosettes.
- For **grasses**, a picture of the growth habit and a close-up, a focused image showing where the leaf meets the stem while you gently tug on the leaf blade will work well.

- **For diseases causing foliar symptoms**, include the overall plant, the portion of the plant showing symptoms but not yet fully destroyed, and a focused close up of the symptom. For example, with septoria of tomatoes I'd take pictures of a couple of staked plants showing that the problem is worst lower on the plant and that there is mud splashed up on the lower leaves. The next photo would be of a mid-aged leaf that is starting to yellow and is showing lesions. The last photo would be a close up of a mature lesion showing the surrounding tissue and a pale lesion with black specks in the center.
- For **diseases causing root symptoms, abiotic issues, or mysteries** take a picture of the field where the problem is occurring, a whole plant above-ground photo, pictures any above ground symptoms on the foliage, a shot of what the roots look like, and an image of the crown sliced open vertically. For example, if I'm diagnosing sad transplants, I'm taking a photo of the greenhouse area with bad flats, a picture of the condition of the flat showing the soil and tops of the healthy and affected plants, a close up a sad plant focused at the lower stem, and a shot of a sick seedling's roots.

Use the portrait mode, if you have it. *Left: Necrotic leaf is blurry while the background soil is in focus. Right: By using portrait mode, the downy mildew infected leaf becomes sharp and isolated from the background soil. The added sharpness reveals the darkening lines and veins in the chlorotic upper left part of the leaf, despite the right image being taken from a greater lens distance than the image on the left.*

Caterpillar ID. *Left: Blurry, curled up caterpillar, zoomed in on worm's side marking pattern. Center: Sharper view of same caterpillar taken by shifting camera angle, placing subject and camera lens in the shade of a ball cap to remove the shadow, and bringing the lens closer to avoid distortion caused by zooming. Right: Caterpillar glamour shot showing both top and side patterns, useful for ID.*

Steps for taking a high quality image:

- Clean off the lens of your camera before taking an image.
- Clean up the area around the subject. Push unwanted leaves out of the way, pull up weeds. This will help the camera isolate the subject from the background and improve the sharpness.
- Take off your sunglasses so you can match the image exactly to what you see.
- On bright days, hold your ball cap bill over the phone to shade the lens & reduce oversaturation.
- Stabilize the camera. Prop your elbow on your knee, ribs, the ground, stakes, etc.
- Center the focal point on the subject.
- Zooming in too far blurs an image. Better to adjust your distance from the subject first, then zoom so you maintain sharpness and level of detail.
- Adjust the lighting (white balance) of your image before taking the photo! This is the last thing you do before taking an image. Many phones have a little sun icon that you can slide higher or lower. Make the colors match what your eye sees.

Pro Tips:

- **Windy day?** Take leaves off plants, especially for shots of feeding damage and diseases. Place on any non-reflective surface like the ground, a truck seat, or even your pant leg.
- **Really tiny bug or something you saw with a hand lens?** Hold the scouting lens up to the camera lens. Move closer or further from the subject to take macro shots, don't zoom. The hand lens will distort the edges of the image, so make sure the subject is in the center.
- **Bugs moving around too much?** Catch them and toss them in the freezer over lunch. They'll be dead or very slow at

the end of lunch and they'll still have all their original coloring.

- **Having trouble focusing sharply on the subject instead of the background?** Try using portrait mode on your phone. Or, put your hand directly behind the subject to obscure the background and refocus your image. Once it refocuses, remove your hand and quickly take the picture. This requires one-handed picture taking so be sure to stabilize the camera.

How to disinfect stakes before reuse

--Written by Gordon Johnson, Extension Vegetable & Fruit Specialist, University of Delaware. Originally published in Univ. of DE Cooperative Extension's Weekly Crop Update, Volume 29, Issue 7, May 7, 2021

Many growers reuse stakes used in supporting crops such as tomatoes and peppers. Bacterial and fungal diseases have been shown to survive on wooden stakes and can be a source of new infections. Plant diseases survive on plant debris and soil on the surface of stakes and can also survive on the interior of stakes due to the porous nature of the wood. Therefore, where wooden stakes are reused, it is recommended that they be disinfected.

Stakes soaking in a disinfectant solution. Photo: UConn

Before disinfecting, all crop debris and soil should be removed from stakes by brushing or washing or a combination. Dirt and debris can protect pathogens and de-activate disinfectants.

Disinfecting Options

1. Soak stakes in a disinfectant solution for a minimum of 20 minutes (30 minutes preferred). Stakes should be completely submersed so solution surrounds each stake. Use weights to hold stakes under water. Options include:
   a. Chlorine bleach (5.25% sodium hypochlorite or higher) is commonly used as a disinfectant. Use bleach at a rate of 0.5% (=1 part bleach + 9 parts water). For more concentrated bleach products, reduce rates accordingly. Use in a well-ventilated area. Soak stakes for 30 minutes. Chlorine bleach is effective; however, it is short-lived after mixing in water, with a half-life of only 2 hours, and it is inactivated by organic matter so additional bleach will need to be added or new solutions made up frequently. It is crucial to maintain the pH of the bleach solution within the 6.0 to 6.5 range, as effectiveness decreases at lower and higher pH levels.
   b. Quarternary ammonium disinfectants like Green-Shield are more stable than bleach after diluting with water. Use at a rate of 0.5 fluid ounce of Green-Shield in 1 gallon water.

A steam pasteurizer that is used for soils can also be used to disinfect stakes. Photo: McGill University

   c. Hydrogen dioxide, hydrogen peroxide and peroxyacetic acid products such as OxiDate or SaniDate can also be used to disinfect stakes (some are organic certified). Check the labeled rate for the formulation you choose.
2. Apply heat to stakes to kill pathogens present. This can be done with a commercial kiln, seed dryer, or pasteurizer. Heat should reach a minimum of 140°F for at least 30 minutes. Pathogens are eliminated from wooden stakes with exposure to ≥ 220°F for ≥ 15 minutes.

News

UMass Extension Hiring Urban Agriculture Extension Educator - Apply Today!

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 in Eastern Massachusetts. 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 ag practitioners and organizations in Greater Boston and beyond. The application does not have an official closing date, but our goal is to **begin review of external candidates the week of June 13**.

Click here for more details about the position and to apply.

Homeowners & Landscapers: Be on the Alert for Hatching of Invasive Spotted Lanternfly Eggs

The Massachusetts Department of Agricultural Resources (MDAR) is asking the public to keep an eye out for the invasive pest known as spotted lanternfly (*Lycorma delicatula*) during the spring planting season due to the risk of egg masses being accidentally brought in on shipments of trees imported from other states. MDAR recently received reports that nursery stock from SLF-infested areas may have been sent to Massachusetts growers. Due to this, anyone who has recently purchased trees or shrubs or had them planted on their property, particularly maple or crabapple trees, is being asked to inspect the trunk and branches to ensure there are no SLF egg masses or any hitchhiking nymphs, and to report any finds to MDAR. Landscapers and plant nurseries are also being reminded to stay on the lookout for this pest.

Spotted lanternfly egg mass on birch (above) and young spotted lanternfly nymphs on tree-of-heaven (right). Photos: MDAR and R. Gardner, Bugwood.org

SLF egg masses are about an inch and a half long, and are flat and gray in color, making them difficult to detect, especially on tree bark. Because of this, any SLF may not be noticed until the nymphs hatch at the end of May or the start of June. The public is asked to look for small black insects marked with white dots. If grapes or tree-of-heaven are in the area, they will migrate to those plants.

Spotted lanternfly is a sap-feeding insect that has caused significant impacts to vineyards, orchards, and other agricultural commodities in states where it has become established. SLF not only harms grapevines, maples, hops, blueberries, and over 100 other host plants, but has been observed to impact outdoor recreation in other states where populations are high and adult lanternflies swarm in large numbers during mating season. If you see any signs of spotted lanternfly, please report it to MDAR at https://massnrc.org/pests/slf.

MDAR's Climate Smart Agriculture Program Grant Now Open

MDAR is now accepting applications from agricultural operations who wish to participate in the Department's Environmental & Energy grant programs. Grants are available to help agricultural operations make farm improvements that enhance their economic viability while working to prevent negative impacts to environmental resource, adapting to and mitigating climate change, improving energy efficiency, and adopting renewable energy technologies.

The Climate Smart Agriculture Program (CSAP) links MDAR's water, energy and climate grants together into one application. This includes the Agricultural Climate Resiliency & Efficiencies (ACRE) Program, the Agricultural Environmental Enhancement Program (AEEP), and the Agricultural Energy Grant Program (ENER). This combined program continues the goals of the three individual grants by implementing projects that help the agricultural sector adapt to climate change, mitigate climate change, reducing or preventing impacts to natural resources that may result from agricultural practices, and that improve energy efficiency and facilitate adoption of alternative clean energy technologies. The CSAP grant is broken into two sections:

- Section I: Environment - for environmental projects such as soil health, water use efficiency, or other projects working towards reducing or limiting greenhouse gas emissions.
- Section II: Energy - Ag-Energy projects to improve energy efficiency or to facilitate clean energy adoption.

Applicants can apply to either, or both sections. Participants selected for funding under either section are provided with reimbursement grants for 80% of total project costs up to $50,000.

Applications due: 4:00 pm on Friday, June 10, 2022

Click here to visit the CSAP website.

For more information contact:
Section I: Environment - Laura Maul at 617-626-1739, Laura.Maul@mass.gov
Section II: Energy - Gerry Palano at 617-626-1706, Gerald.Palano@mass.gov

Applications Open for MDAR's HIP Vendor Notice of Opportunity & SNAP Equipment Grant

2022 Healthy Incentives Program (HIP) Notice of Opportunity (NOO): MDAR is now accepting applications to strategically onboard new agricultural vendors and access points for the Healthy Incentives Program.

- Application period: April 21 to June 8, 2022.
- Both new HIP-eligible vendors and existing HIP vendors may apply.
- To apply and read more information, visit: www.mass.gov/hipnoo
- Questions? Email DTA.HIP@mass.gov

SNAP Equipment Grant, Spring/Summer Application Round 2022: Free mobile SNAP processing equipment from Novo Dia Group is available to direct-marketing farms and farmers' markets through DTA, in collaboration with MDAR and with financial support from the United States Department of Agriculture (USDA).

- Application period: April 20 to September 23, 2022, or earlier if funds run out.
- Eligibility is limited to SNAP-authorized farms and farmers' markets that do not currently have working equipment received through previous federal grants.
- Applications will be evaluated on a rolling basis.
- To apply and read more info: www.mass.gov/snapequipmentgrant
- Questions? Email David.Webber@mass.gov

Additional resources

- Looking for SNAP processing equipment but not eligible for the SNAP equipment grant? Learn about other options here.
- Farmers and farmers market managers can learn more about accepting SNAP benefits on MDAR's website.
- Information on the Healthy Incentives Program can be found on the HIP website.
- One on one assistance with the SNAP retailer application is available through MarketLink.

Events

Save the Date! Twilight Meeting at Elliot farm

When: Wednesday, June 15, 2022, 4-6pm

Where: Elliot Farm, 202 Main St., Lakeville, MA 01247

Join SEMAP and the UMass Extension Vegetable Program on June 15 for a twilight meeting at Elliot Farm. Come hear about pest management and crop fertility topics—more information coming soon!

Save the Date! Soil Health Demos at the UMass Research Farm

When: Tuesday, June 21, 2022, 1-4:30pm

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

Demonstrations will include:

- New York Soil Health Trailer demonstration
- No-till transplanting vegetables into a crimped cover crop
- Cover crop residue management
- Using tarps to terminate cover crops
- More details coming soon!

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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.