UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

Volume 28, Number 14 July 14, 2016

In this issue:

Crop conditions

Drought conditions continue across the region with MA particularly hard hit. The effects are far-reaching—from marketing, to animal pests, to Gypsy moth outbreaks. A combination of last fall's mast year for acorns – when oak trees are particularly productive and acorns abound – and the very mild winter have led to what many have observed to be a boom year for chipmunks and other small animals, and with more surviving adults breeding earlier, we will likely see them in even greater abundance this fall. Early season potatoes which were blooming several weeks ago have suffered from drought stress and are senescing early. Whole fields that either can't be irrigated or aren't worth the effort at this point have been left unmanaged to allow farmers to focus on money makers. Wholesale buyers that developed buying relationships outside of the region when early crops weren't available are hard to get back now that crops are coming in, and prices are still low. News of drought in the Northeast may have sent them looking elsewhere, and once buyers establish a source for the season it is hard to get them to switch to a local grower. On a lighter note: carrots are being dug; garlic is half to ¾ yellow and starting to get harvested (see article this issue on garlic harvest and curing); fresh onions, eggplant and peppers are coming in along with broccoli and cauliflower, and summer squash and cukes are full bore. On Monday, July 18th, a USDA Risk Management Agency Administrator will be holding a meeting at Carlson Orchards in Harvard, MA where farmers are encouraged to go voice their opinions on current federal crop insurance policies and learn about disaster declarations this year in peaches. Find out if anything can be done to support farmer's losses to drought this year! Join us next Tuesday at Alprilla Farm in Ipswich MA for an IPM field walk where we will learn to scout crops for pests, identify diseases with our diagnostician Angie Madieras, and learn about moisture management using a tensiometer. See more about both of these events at the end of Vegetable Notes.

Peppers ready for harvest this week, look out for pepper maggot and European corn borer though!

Pest alerts

Alliums: With recent increases in heat and humidity in many parts of the state, we may see greater incidence of onion leaf diseases. Check favorability for major onion leaf diseases – botrytis leaf blight, downy mildew, purple blotch – in your area through the NEWA Onion Disease forecast model. Choose the closest weather station to your farm, and the planting date for your onions to determine the favorability and threshold levels for these diseases based on the 5-day forecast.

Basil downy mildew was found in Washington Co., RI. on two non-resistant basil varieties. Infected leaves develop pale vein-bounded yellowing on the top of the leaf and distinctly furry, dark-gray sporulation on the underside of the leaf. Symptoms of downy mildew on basil can easily be mistaken for a nutritional deficiency. The fuzzy growth of spores on the underside of the leaf looks as if soil had been splashed onto the leaf under-surface. High humidity and extended leaf wetness favor disease development. Cornell Extension is accepting reports and samples of the disease, check out Basil Downy Mildew Monitoring Program to get involved.

Beans: Mexican bean beetles seem to be later to emerge this year, though Tom Dorsey at the New Jersey Department of Ag, who rears the biological control agent for MBB, Pediobius foveolatus, said that populations can increase rapidly once they start reproducing. Adult beetles were found this week in Worcester Co., MA and Washington Co., RI, though we haven't seen eggs yet. If planning to use Pediobius, scout field for eggs, flag these plants, and come back within a couple of days to see if they've hatched. When the first larvae emerge, order Pediobius. Mr. Dorsey says that orders are starting to come in, and there is limited availability, so you may want to contact them ahead of ordering to ensure that there is a supply: Tom Dorsey, 609-530-4192 or at the website: http://nj.gov/agriculture/divisions/pi/prog/beneficialinsect.html. You'll also get advice on how to use the wasps from this office. Pediobius is also available commercially from ARBICO Organics, 800 -827-2847 (AZ), http://www.arbico-organics.com

Table 1. Squash Vine Borer (SVB) weekly trap capture

Location	SVB
MA	
Westhampton	14*
Deerfield	0
Sharon	54
NH	
Litchfield	13
Hollis	4

*Two Weeks of Collection

Cucurbits: Last week we reported that cucurbit downy mildew (CDM) had been confirmed in Newport Co., RI, but we'd like to revise that—CDM was suspected, but could not be confirmed from the sample. The closest confirmed infections to date were reported in NJ and DE this past week, both on cucumber. The Cucurbit Downy Mildew Alert System currently (7/13) has all of New England at low risk for the disease, and our scouts have not found CDM anywhere in MA. Powdery mildew was observed on cucumbers in Franklin Co., MA and melons in Essex Co., MA this week. Plants that had early season signs of bacterial wilt (wilted, lifeless leaves with no yellowing) are now going down as they start setting fruit and whole vines have collapsed. The pathogen can spread from plant to plant so rogueing out wilted plants is worthwhile. Squash vine borer (SVB) numbers were down this week in NH from the previous weeks' record catches, but it's still early, and we should expect a 2nd generation and corresponding peak at the end of August. Though SVB usually bore into vines, a late flush of moths may mean that caterpillars will bore into the fruit of hard squash or pumpkin. Trap captures are low at one location in Deerfield MA where SVB has been well managed the last few years, but other fields trapping for the first time this year are reporting high numbers (Table 1) Treatment threshold: make the first insecticide application targeted at the base of the plant one week after 5 moths were caught for non-vining crops and 12 moths for vining crops. Only make treatments based on scouting or trap captures since pressure varies greatly from field to field, even in the same town.

Western bean cutworm eggs photo: M. Rice

Sweet Corn: Corn earworm catches are still low across the state, except for coastal southeastern MA where the pest is typically prolific, blowing in on storm fronts (Table 2). In NY, Western bean cutworm (WBC) numbers are starting to increase, with more sites reporting catches, and this pest is moving into MA, with 3 adults captured in Sheffield, on the Western border of the state. In other parts of the country where WBC is well-established, the recommendation has been to start scouting once 100 moths had been captured, however our colleagues in NY have found egg masses in fields even after single digit trap catches, so the recommendation is to start scouting whenever you start catching moths. Those growing transgenic Bt corn should be aware

Table 2. Sweetcorn pheromone trapping network captures for the week of: 7/6/16-7/13/16

Location	ECB	FAW	WBC	CEW	Spray Interval for CEW
Western, MA					
Sheffield	1	0	3	0	*No spray*
South Deerfield	0	0	0	0	*No spray*
Whately	0	0	0	0.5	*No spray*
Central, MA					
Bolton	1	1	-	0	*No spray*
Leominster	6	-	-	5	*5 days*
Eastern, MA					
Concord	0	0	-	0	*No spray*
Haverhill	0	0	-	0	*No spray*
Ipswich	4	0	-	2	*6 days*
Millis	35	-	-	1	*No spray*
Sharon	44	-	-	35	*4 days*
Seekonk	2	-	-	87	*4 days*
Swansea	4	0	-	10	*4 days*
Tyngsboro	0	0	-	0	*No spray*
NH					
Litchfield	0	0	0	0	*No spray*
Hollis	0	1	0	1	*No spray*
Cortland Co., NY	0	0	0	0	*No spray*

European corn borer (ECB), Fall armyworm (FAW), Western bean cutworm (WBC), Corn earwom (CEW)

that not all Bt hybrids will control WBC. While **European corn borer** (ECB) catches remain low, we are finding many look-alike carrot seed moths in traps. These are not a pest of corn and should not be counted among catches for ECB. See photos for carrot seed moth vs. ECB. Many pheromone traps are also being overwhelmed by this year's gypsy moth outbreak. An introduced fungal pathogen specific to gypsy moths, which relies on rainfall in May and June to proliferate, has failed to keep the moths in check due to the very dry weather. The second flight for ECB will begin soon once we reach 1400 GDD base 50°F (Table 3).

Spotted Wing Drosophila: The first SWD were found in traps in Hampshire County on 7/8 and since then UMass Extension Fruit team has been seeing low numbers of male and female flies in traps around the state. The implication is that anyone with susceptible ripening fruit and a history of spotted wing in their field should begin their spray program now. Sonia Schloemann, our small fruit specialist, also encourages folks to begin renovating strawberry fields that they are no longer harvesting from as soon as possible—larvae were reported in strawberry fruit this week. The dry weather in New England has helped keep this pest at bay, but now with some recent rains and more expected, it is likely that the population will begin to build up in available hosts.

Viruses: Tobacco mosaic virus (TMV) was confirmed on a greenhouse tomato plant in Franklin Co., MA. Leaves showed varying degrees of crinkling and mottling. Symptoms are dependent on several variables such as the age of the infected plant, environmental conditions and the strain of the virus, and can sometimes lead to poor yield or distorted fruits or fruits with non-uniform color. TMV is easily transmitted from plant to plant and sanitation, of field, workers, and tools, is key in managing its spread—it can even be spread by cigarettes so wash your hands after smoking!

* When not given here, refer to the New England Vegetable Management Guide for scouting thresholds and treatment options.

Table 3. Accumulated Growing Degree Days (F): 1/1/16 - 7/13/2016

Location	GDD (base 50F)
Western, MA	
Ashfield	948.1
South Deerfield	1085.2
Pittsfield	907.2
Central, MA	
Bolton	1093.6
Northbridge	1012.2
Phillipston	947.8
Eastern, MA	
Ipswich	936.1
Sharon	1134.7
Waltham	1118.1
Seekonk	1172.7
Hollis, NH	1043.5
Burlington, VT	1146.5
Newport, RI	1008.7

carrot seed moth

European corn borer

Tobacco mosaic virus on tomato leaf. Photo: S. Scheufele

GARLIC HARVEST, CURING AND STORAGE

Many farmers are beginning to harvest garlic, a big task that usually occurs around mid-late July. Timing the harvest can be tricky—heads should be left in the ground as long as possible to attain maximum bulb size (which doubles in the last stage of growth), but not so long that the cloves begin to separate, as overripe bulbs sell and store poorly. Harvest when leaves begin to turn yellow, but when about 60% are still green. Check bulbs by cutting through the head sideways to see how well developed the cloves are. Cloves should fill the wrappers - if they seem a little loose, the garlic has a little ways to grow. A little of the outermost wrapper may have started to discolor at this point. Harvest before the bulbs pop, which can happen relatively quickly, especially in a wet year. Remember that it is better to harvest too early than too late.

Use hand tools to loosen soil under the bulbs or a mechanical harvester to undercut the bed. Pulling bulbs out when they are tight in the ground can open wounds at the stem-bulb junction and allow for fungal infections. Fresh bulbs bruise easily and these wounds can also encourage infection. Don't knock off dirt by banging bulbs against boots, shovels, or buckets – shake or rub gently, and leave the rest to dry out during curing.

Curing is important for successful bulb storage and finding the ideal conditions for curing can be a challenge. Curing in the field runs the risk of sunscald, while curing in poorly ventilated barns can result in yield loss from disease. Avoid high temperatures (over 90°F) and bright sunlight. Rapid curing can be achieved by placing bulbs roots up on 1" wire mesh in a hoophouse covered with a shade cloth, and with the sides and ends open. A well-ventilated barn will also work, but be sure that bulbs are hung with adequate air circulation or on open racks up off the floor. Curing takes 10-14 days. Stems may be cut before or after curing. Curing is complete when the outer skins are dry and crispy, the neck is constricted, and the center of the cut stem is hard.

Storing Bulbs. After curing, garlic can be kept in good condition for 1 to 2 months at ambient temperatures of 68 to 86 °F under low relative humidity (< 75%). However, under these conditions, bulbs will eventually become soft, spongy and shriveled due to water loss. For long-term storage, garlic is best maintained at temperatures of 30 to 32°F with low RH (60 to 70%). Good airflow throughout storage containers is necessary to prevent any moisture accumulation. Under these conditions, well-cured garlic can be stored for 6-7 months. Storage at higher temperatures (60 °F) may be adequate for the short term, but it is important to select a place with low relative humidity and good air flow. As with onions, relative humidity needs to be lower than for most vegetables because high humidity causes root and mold growth; on the other hand, if it is too dry the bulbs will dry out.

Storing Seed. Garlic bulbs that are to be used as seed for fall planting of next years' crop should be stored at 50 °F and at relative humidity of 65-70%. Garlic cloves break dormancy most rapidly between 40 to 50 °F, hence prolonged storage at this temperature range should be avoided. Storage of planting stock at temperatures below 40°F results in rough bulbs, side-shoot sprouting (witch's-brooms) and early maturity, while storage above 65°F results in delayed sprouting and late maturity.

Garlic cloves used for seed should be of the highest quality, with no disease infections, as these can be spread to new fields and to next years' crop. Be on the lookout for garlic blight nematode which may have been distributed around New England on infested seed garlic. This nematode, which is also known as a bulb and stem nematode, causes bloated, twisted, swollen leaves, and distorted and cracked bulbs with dark rings. Infestation with this nematode can weaken plants, causing them to be susceptible to secondary infections. The UMass Plant Disease Diagnostic Lab can make a positive identification; call 413-545-3209 to submit a sample.

-R Hazzard. Resources: New England Vegetable Mgt Guide, Oregon State, ATTRA, Wishingstone Farm, Astarte Farm,

PEPPER MAGGOT FLY & EUROPEAN CORN BORER

Pepper maggot fly (*Zonosemata electa*) adults emerge in mid to late July and are active for several weeks, so this is the time to watch for their activity. One has already been captured on traps in Hampshire Co., MA last week. The fly is confined to solanaceous plants, including ground cherry, horse nettle, tomato, pepper and eggplant. Pepper is the preferred host and green bell peppers and cherry peppers are especially susceptible to pepper maggot fly damage.

The pepper maggot fly is found throughout eastern North America and in New England, the range of pepper maggot has been creeping northward and now extends into southern NH and throughout Massachusetts. Populations are spotty and rather unpredictable – that is, pest status is often a farm-by-farm or field-by-field phenomenon without any clear reason for high or low populations that occur in a particular place. The best way to detect activity is to look for stings on the fruit, and these are easiest to spot on cherry peppers.

Pepper maggot adult fly. Photo: J. Boucher

Pepper maggot flies are smaller than a house fly, bright yellow with three yellow stripes on the thorax, green eyes, and clear wings with a distinct banding pattern. Flies aggregate in forested field edges and enter the field during the day to lay their eggs. Females insert eggs directly into immature pepper fruit and leave a small dimple – an ovipositor sting or scar. Eggs hatch after about 10 days and the legless white maggots then feed and tunnel inside the fruit, especially in the placenta, causing soft spots on the wall of fruit and brown mines within.

Pepper maggot damage Photo: B. Grube

Maggots reach about ½ inch in length over a period of about two weeks, and do not have a distinct head capsule. When they are ready to pupate, they exit at the blossom end, leaving tiny round exit holes, usually in the end of August or in early September. These holes allow for the entry of soft rot bacteria into the fruit. Sometimes the oval brown pupae can be found inside the fruit. Often damage is detected only because of premature ripening or decay of the fruit.

Pepper maggot monitoring: Maggots prefer to lay eggs in the small (1-3 cm in diameter) round fruit of cherry peppers. When these are planted in the border rows they work very well as indicator plants. The egg-laying stings appear as depressions or scars and are easy to find on these small, round fruit. By timing insecticide applications with the first occurrence of the stings on the indicator plants' fruit, damage to the main crop can be avoided with a minimum of spraying. If cherry peppers are not part of your crop mix, look for stings on bell peppers.

If this pest is a concern for your farm, consider using perimeter trap cropping which is very effective. Two or three rows of hot cherry peppers can be planted around the perimeter of the pepper crop, encircling it like castle walls. These peppers are more attractive to the maggot flies than the sweet bells, so the flies will build up in the perimeter, allowing for a perimeter spray that will reduce pest populations and protect the main crop. Perimeter trap crop systems can be as effective as whole field sprays while dramatically reducing pesticide costs and protecting beneficial insects within the main crop.

Pepper maggot threshold: If stings are observed on fruit, make two insecticide applications, 10-14 days apart, with a material labeled for pepper maggot. Pepper maggot fly activity can be very localized, and varies by farm, by region, and by year. Many farms never have a problem with this pest. Some may have it and not realize it, because it is possible to confuse maggot damage with damage caused by European corn borer. Check nearby fruit carefully for proper identification if fly has been captured. If a given farm has a history of pepper maggot activity, then it is recommended that an insecticide be applied on that farm. Farms that have never had a problem with this pest generally do not need to be concerned; however, the range of this pest seems to be expanding.

When the activity of European corn borer and pepper maggot fly overlap, use of Orthene at 8-10 day intervals for control of ECB will also provide control of pepper maggots. However other, selective insecticides for ECB will not control pepper maggot. Insecticides labeled for pepper maggot fly include Dimethoate, Malathion, Mustang (zeta-cypermethrin), and GF-120 Naturalyte (spinosad). GF-120 Naturalyte is allowed for organic production. When using Naturalyte, a large spray droplet size of 4-6 mm is recommended to optimize the duration of this bait's attractiveness to the flies. See Vegetable Management Guide for more details on using these products.

European Corn Borer (ECB) is a resident pest that has 2 generations per year in southern and central New England and 1 generation in northern New England. Pepper is one of over 200 crop and weed host plants of this pest. The severity of ECB in peppers varies in MA and around New England. Some farms – typically in areas where farming is less dense and ECB populations have not built up – do not see much damage from this pest. In the Connecticut Valley and in Southeastern MA, an unsprayed pepper field is likely to have anywhere from 10 to 100% of the fruit infested. In some cases, it seems that sweet corn – which ECB prefer over peppers – helps to draw ECB away; in other cases, presence of sweet corn near peppers provides no benefit at all. Use flight counts and historical experience to help you decide which applies to you. Getting good ECB control is especially critical when you want to sell ripe, colored peppers.

European corn borer larvae inside pepper

Larvae overwinter in stalks of corn and other host plants and pupate in the spring. Adult moths emerge in late May or early June and mate in weedy or grassy areas. The moths are about 3/4" long, light brown in color with lighter bands on the wings. Three to 7 days after emergence (depending on temperature), females begin to lay flat, white egg masses on the underside of leaves. Eggs hatch in about 5 to 7 days (100 degree days, with a base temperature of 50°F).

ECB larvae are light colored, with a pattern of small dark spots on each segment. The head capsule is flattened and black or dark brown. Newly hatched larvae are 1/8" long and full-grown larvae are 3/4" to 1" long.

In southern and central New England, ECB generally does not become a pest in peppers until the appearance of the

second generation in late July or early August (1400 GDD base 50°F). Apply insecticides when second generation moths become active. Check state sweet corn IPM reports for flight activity, or use pheromone traps for monitoring adult flight activity. Currently a second generation of ECB has not emerged except for in Southeastern MA. Make first application 1 week after moth count equals or exceeds 7 moths per week and fruit are present on the plants. Discontinue sprays 1 week after moth counts drop below 21 moths per week. The spray interval depends on the residual period of the insecticide used as well as weather conditions and pest pressure. Use shorter spray intervals during peak flights and while pheromone trap catches exceed 150 moths per trap weekly. Choose selective/microbial products such as *Bacillus thuringiensis aizawai* or *kurstaki* strains whenever possible to preserve beneficials and reduce the chance of aphid outbreaks. Pyrethroids may cause aphid outbreaks by eliminating their natural enemies.

Using Trichogramma wasps for biological control of ECB in pepper. Sweet corn is not the only crop where ECB can be controlled with the parasitic wasp, *Trichogramma ostriniae*. Most of what you have read about using Trichogramma in corn applies to peppers, with a few important differences. Peppers are susceptible to the second generation of ECB, because that is when the plants are fruiting. ECB will invade fruits that are > ½ inch across. Trichogramma attacks only the egg stage, so timing is critical. We recommend that you begin releases the week that flight begins and continue weekly releases for a total of 4 weeks. Release 90,000 to 120,000 wasps per acre and spread the cards out throughout your pepper block. Higher rates are needed in peppers compared to sweet corn because the tolerance for damage is virtually zero and ECB larvae attack the fruit directly. Four releases are needed because the egg laying period for the second generation is longer than for the first generation of ECB. Fortunately, peppers are also a higher value crop and worth the extra cost. After four releases, Trichogramma will have reproduced in the field and biocontrol should continue.

Wasps can be ordered from IPM Laboratories, at www.ipmlabs.com or by phone, 315-497-2063. Wasps can also be used in combination with insecticide; if so, choose a selective material (see above) that will not kill wasps.

-R. Hazzard, University of Massachusetts with source material from J. Boucher, University of Connecticut Extension

PREVENTING DEER DAMAGE

Massachusetts is home to a robust deer population whose feeding in vegetable and fruit crops can cause economic losses. While there are some crops that deer might not prefer, they tend to like many of the same foods that we do. Cabbage and other cole crops, lettuce, beans, as well as developing melon and pumpkin fruits are all particularly susceptible to deer feeding now. Though deer will taste many different plants, and will eat almost any plant if they're hungry enough, there are a few crops that are considered unattractive to deer, such as strong-smelling plants like onions, garlic and fennel, nightshades like tomatoes and eggplants, and prickly plants like cucumbers and globe artichoke. As is also true for humans, rhubarb leaves are toxic to deer (though that doesn't necessarily mean they won't eat them if they're hungry!). If there are wood-edged areas of your farm that are particularly at risk for deer invasion, consider planting some of the crops listed above in these fields. If you can't keep them out with unappealing crops, there are several other options available for managing deer damage on your farm. Factors such as the amount of crop land that you're trying to protect and the time and resources available will determine which options you choose.

Row cover or netting can keep deer out of vulnerable crops. Floating row covers over hoops work well, but can be a lot to manage and may add unnecessary heat at this point in the season. Wider mesh netting can be used either as fence, or as row cover, and can be applied over a crop with just a few t-shaped stakes (see photo).

Electric fencing is the most cost-effective measure to prevent deer damage. For small fields of a few acres or less, portable fences of electric wire, woven rope, or tape will provide relief from deer. Solar or battery-powered chargers make it possible to set up a fence even in remote locations. Woven ropes and tapes enhance protection by being very visible to deer, even at night, while providing an elec-

Outlook Farm in Easthamptom, MA says "Look out deer!" with this netting over their lettuce.

tric shock on contact. They are also more visible to people. As few as two strands of electric wire can be used to protect crops; three strands are better. In a two-wire fence, the first wire should be at a height of 10-12 inches and the second at 30-36 inches. A three-wire fence can have strands at 12, 24, and 40 inches. Double fences - that is, two fences in parallel, spaced about 3-5 feet apart - can be very effective if deer are jumping over a single fence. The outer fence can be a single strand at approximately 36 inches.

Deer are well-insulated over most of their body with fur, dampening the shock of an electric fence. Baiting the fence, with store-bought lures or a piece of aluminum foil smeared with peanut butter, will entice the deer to contact the fence with its more sensitive nose and tongue, and help to educate a deer to respect the fence. Space the bait about 30 feet apart around the perimeter and keep the fence baited for at least a few weeks after the fence is installed. Be sure to regularly check the strands to ensure that they have adequate charge – about 2.5 kilovolts for a baited fence. Portable voltage readers can be purchased for as little as about $10. Make sure fence lines are well maintained as weeds or grass touching the wires will reduce the charge. Electric fence supplies can be found easily on the internet, at farm supply centers or through fencing specialty companies.

Permanent fencing is the most effective long-term solution to deer damage. In this case it is the fence itself, not an electric shock, that provides the deterrent. A non-electric fence should be at least 8 feet high and either have a lower bottom wire than a movable electric fence – about 6 inches off the ground - or be of mesh construction.

Fence maintenance is critical in both applications. If a tree falls on the fence or a hole is cut in the fence, it should be repaired immediately. Once deer have gotten inside and discovered the crop, it will be harder to keep them out, even with an electric fence. No gaps should exist in the fence; access must be provided through gates that are closed at all times. Fences should have a clear outer perimeter, at least 5 or 6 feet on the outside of the fence, so deer have to cross an opening before encountering the barrier. This also enhances visibility of the fence to the deer. Deer will blunder into a fence placed tight to a wooded edge and can actually damage or take down sections of a fence simply because they do not see it very well, especially with smooth wire designs. Having a clear border will increase the effectiveness of the fence and aid in maintenance. Permanent tall wire fences while more expensive may be a worthwhile investment on the home farm, or where you will always be planting vulnerable crops. Moveable electric fences make sense in fields that are rented, far from the home farm, or are planted to different crops each year.

Scare devices can be effective when deer populations and pressure are fairly low. There are devices that make noises, squirt water, give off bright light, or are made to look like predators. Some are motion sensitive. Placing these tools at field edges where deer are entering can help to scare them off, and can be used in addition to fencing. Deer get accustomed to these devices pretty quickly, though, so they must be moved frequently.

Repellents reduce deer damage by making the target crop taste or smell unpalatable to deer. All repellents are billed to reduce, not eliminate, deer damage and don't provide reliable protection when deer densities are high. To achieve this reduction, they must be consistently applied and reapplied as directed. Once a feeding pattern has been established, repellents are usually less effective. Repellents fall into three categories: taste, odor, and combination taste and odor. Different formulations allow the user to change the repellent and keep the deer on guard by providing a change in the range of odors and tastes.

For protecting vegetable and fruit crops, make sure that a product is approved for use on edible crops. Certain taste-based repellents can be used on edible plants such as vegetable crops, fruits, berries, nuts and herbs, but they must be washed off prior to eating. The following repellents are among those approved for use on edible plants: Hinder (ammonium soaps of higher fatty acids; for apple, pear, carrots), Millers' Hot Sauce (capsaicin), Deer Stopper (putrescent egg solids, rosemary and mint oils), Deer Off (putrescent egg solids, capsaicin, garlic oil). Some growers report that foliar applications of fish emulsion, which is sold and applied as a nutrient supplement, have an additional benefit of repelling deer. There are also numerous home-made products that may work as repellents.

Repellents should be applied before damage is likely to occur, when precipitation is not expected for 24 hours, and temperatures will remain between 40° to 80°F for that period. Hand-spray applications may be cost effective on small acreages, while machine sprays will reduce costs for larger areas. If the materials are compatible, spray costs may be reduced by adding repellents to pesticide sprays.

Maintaining optimal densities of deer populations through habitat management and hunting can help to keep deer pressure

in vegetable crops low. The Massachusetts Division of Fisheries and Wildlife sets management goals and regulates hunting during three designated seasons. For more information on white-tailed deer and this control strategy, see the official Massachusetts website on Deer Management at http://www.mass.gov/eea/agencies/dfg/dfw/fish-wildlife-plants/mammals/deer-management.html

-by L. McKeag and R. Hazzard with thanks to the following sources: : John E. McDonald, Jr., formerly US Fish & Wildlife; Craig Hollingsworth, University of Massachusetts; Richard Ashley and Norman L. Gauthier; University of Connecticut; Maryland Dept of Agriculture (http://www.dnr.state.md.us/wildlife/ddmtrepell.asp); Massachusetts Division of Fisheries and Wildlife; http://www.electric-deer-fence.com; growers who build deer fences.

Events

Crop Insurance/Risk Management Education Program

When: Monday, July 18, 2016 from 4pm to 6pm

Where: Carlson Orchards, 115 Oak Hill Road, Harvard, Massachusetts

USDA-Risk Management Agency (RMA) Administrator, Brandon Willis will be conducting a Town Hall - style meeting. Among the items Administrator Willis will be discussing include:

1. Losses to Peaches in 2016
2. Recommendations to Improve Existing Federal Crop Insurance Policies/Products
3. Recommendations to Establish New Federal Crop Insurance Policies/Products
4. Likelihood of Adding Additional Insured Crops

Massachusetts farmers seldom have the opportunity to receive visits from USDA Administrators. This is an excellent opportunity to express your views to the RMA Administrator on Federal Crop Insurance Policies/Products in a face to face setting.

IPM Field Walks

In this series, learn to identify and scout for vegetable pests and select integrated pest management strategies that work for you, whether you are an experienced farmer, or just starting out, organically certified or not! We will use pheromone traps to monitor pests, use a microscope to identify plant pathogens, and learn to scout in multiple vegetable crops with UMass Extension Vegetable Program staff Katie Campbell-Nelson, and Plant Diagnostician Angie Madeiras. Scouting will be followed by a discussion of effective control strategies with growers in attendance. Bring a hand lens if you have one.
Supported in part by funding provided by USDA-NIFA Extension Implementation Program, Award No. 2014-70006-22579

** *All field walks have been approved for 2 pesticide credits in the vegetable category*

July 19th, 4-6pm
Alprilla Farm, 94 John Wise Avenue, Essex, MA 01929
Farmer: Noah Kellerman

August 2nd, 4-6pm
Red Fire Farm, 184 Meadow Rd, Montague, MA 01351
Farmer: Ryan Voiland

Questions? Contact: Katie Campbell-Nelson, kcampbel@umass.edu, 413-545-1051.

Cocktail Cover Crops: Trials and Techniques

When: Monday, July 25th, 2016 from 1:00pm to 5:00pm

Where: Many Hands Organic Farm, 411 Sheldon Rd Barre, MA

Multi-species cover crop cocktails can create synergistic ecological benefits for your farm or garden - enhancing biodiversity, efficiently capturing and recycling nutrients, and sequestering carbon in the soil. This workshop will explore

how to select, mix, and establish various cover crop mixtures. We will also discuss assessment and quantifying how your cover crop practices are impacting soil health. **Instructors:** Ray Archuleta, NRCS Conservation Agronomist Greensboro, NC; Brandon Smith, NRCS Northeast Region Team Leader for Soil Health Division; Masoud Hashemi Associate Professor UMass Stockbridge School of Agriculture; Julie Rawson NOFA/Mass executive director.

Cost: NOFA/Mass Member - $38 (walk-in $43) Non-member - $50 (walk-in $55)

Pre-registration is recommended. For more information contact Dan Bensonoff, Education Events Organizer, at dan@nofamass.org or 860-716-5122.

Twilight Meeting: Equipment for Mechanical Cultivation & Product Washing and Packing

When: Wednesday, August 10, 2016 from 4pm to 6pm

Where: Tangerini's Spring Street Farm, 139 Spring St, Millis, MA 02054

Tangerini's Farm is a 65-acre farm located in Millis, Ma. Produce is marketed through a 500 member CSA, an on-site farm stand, farmers' markets, food coops and wholesale buyers. Over the last two years, with support from an MDAR Food Safety Improvement Program grant, they have developed a washing and packing area to prepare all their produce. They will demonstrate the use of many pieces of equipment including wash tanks, barrel washer, bunch washer, onion topper and a conveyer system. They will discuss the flow of produce in the packing area as well as how it is stored. They will also show off some new investments and innovations in their cultivation equipment.

Lisa McKeag, from the UMass Vegetable Program, will also provide an update on the roll-out of the Food Safety Modernization Act (FSMA) in Massachusetts.

Contact Lisa McKeag at lmckeag@umext.umass.edu or 413-577-3976 for more information.

Sponsors

Vegetable Notes. Katie Campbell-Nelson, Lisa McKeag, Susan Scheufele, co-editors.

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