UMass Extension
Vegetable Notes
For Vegetable Farmers in Massachusetts since 1975

Volume 28, Number 10 June 16, 2016

In this issue:

Crop conditions

Whew it's been windy out there this past week! The remay's been flying, farmers and crops alike have been getting sandblasted, and soils and plants are drying out quickly. High winds can also cause sharp leaves of summer squash and zucchini to scratch developing fruit, plant stems can be snapped or twisted, and sensitive crops like basil may be more prone to sunburn. Despite the harsh winds, it seems we've mostly bounced back from the erratic spring weather and consistent sun and periodic small rains have helped push things along. Now the markets are flush with spinach, salad greens and head lettuce; sturdy greens like bok choy and kale; early cabbage and broccoli are being harvested; and scallions and garlic scapes are being pulled in as well. This is an exciting time of the year, when all the planning and plotting turns into beautiful produce and you find your groove—planting, harvesting, washing, to market, and back again. We are feeling the excitement here too, with a record number of research trials going on at the experiment station in S. Deerfield. After scheming and planning all winter, we have studies on cabbage aphid control and insectary plantings, cabbage root maggot in direct-seeded crops, cover crop nitrogen contribution, and several cucurbit downy mildew experiments all underway. We are also anxious to see how the season turns out!

Summer field assistant Genvieve Higgins collecting data on root maggot damage on hakurei turnips.

Bacterial wilt causes sudden wilting of entire vines, usually without yellowing.

Pest alerts

Allium: Onion thrips adults and nymphs are still present at threshold levels in some MA fields. Repeat insecticide applications every 7-10 days, using shorter intervals in hot dry weather for most materials. Researchers at Cornell have developed a strategic plan for managing onion thrips in onions with insecticides, which calls for an initial treatment with Movento at the labeled rate, targeting nymphs. Include a penetrating adjuvant in all sprays for greatest efficacy. Make applications in early evening when thrips are emerging out of allium necks to feed using high pressure and 100gal water/A for best results.

Beet Spinach and Swiss Chard: Downy mildew was confirmed on high tunnel spinach in Orleans Co., VT grown from 'Kookaburra' seed resistant to several races of the pathogen. The spinach is now being tested to determine whether a new race of downy mildew may be present in the region.

Cucurbit: Evidence of **bacterial wilt** was seen on a cucumber plant in Franklin Co., MA. This disease is vectored by **striped cucumber beetles**. Scout for beetles on 25 plants twice per week from crop emergence to 3-leaf stage, then weekly. Count beetles per plant and note damage to leaves and stems. The economic threshold depends on the crop. To prevent bacterial wilt in highly susceptible crops such as cucumber, muskmelons, summer squash, and zucchini, treat when there is 1 beetle for every 2 plants. Less wilt-susceptible crops (butternut, watermelon, most pumpkins) will tolerate 1 or 2 beetles per plant without yield losses. Spray within 24 hours after the threshold is

reached.

Scab was reported on a farm in Hampshire Co., MA this week on "Market Pick' summer squash. Resistant varieties are available. The disease is favored by fog, heavy dew, light rains, and cool temperatures and spreads on moist air, insects, equipment, and humans.

The first **squash vine borer** adult was caught on Sunday in Hillsboro Co, NH at 500-600 GDD in a giant pumpkin field. Treatment threshold is 5 moths per week.

Solonaceous: Greenhouse tomato diseases **gray mold** and **fulvia leaf mold** have been reported in the region. Growers should be on the lookout for these diseases after the recent cloudy cold weather which allowed condensation to build up under plastic. Run fans, open vents and turn the heat on if necessary.

Table 2. Accumulated Growing Degree Days: 1/1/16 - 6/14/16

Location	GDD (base 50F)
Western, MA	
Ashfield	454.9
South Deerfield	539.9
Pittsfield	432.1
Central, MA	
Bolton	538.1
Northbridge	514.6
Phillipston	448.5
Eastern, MA	
Ipswich	446.8
Seekonk	612.9
Hollis, NH	524.4
Burlington, VT	556.6
Newport, RI	476.8

Table 1. European corn borer (ECB) pheromone trap counts for the week of 6/8/16 – 6/15/16

Location	ECB Weekly Total
Western, MA	
Amherst	2
Sheffield	3
South Deerfield	0
Whately	1
Central, MA	
Bolton	0
Leominster	1
Eastern, MA	
Barnstable	1
Haverhill	11
Ipswitch	20
Millis	11
Swansea	12
NH	
Litchfield	0
Hollis	3
Mason	0

Black leg of potato was diagnosed by the UMass diagnostic lab from a home gardener sample sent in from Middlesex Co., MA on Kennebec potato. Symptoms of this disease were also found on Reba and Norwis varieties in Washington, Bristol, and Newport Cos., RI. Seed was sourced from ME. Some growers have planted late this year, ordering seed from Idaho and Minnesota. Symptoms can look like poor emergence in a field where some crops have emerged 6-8" tall. Dug up seed pieces look like custard and smell terrible while germinating stems are rotted below ground. Symptoms can also be found later in the season on flowering plants near the base of plant with water soaked stems with a foul odor. Make sure to report varieties this disease is found on and where the seed came from. The disease is difficult to identify from rotting tubers, so be sure to submit whole plants for diagnosis to the UMass Diagnostic Lab (phone: 413-545-3208). High temperatures and rain are favorable for this disease. All crops should be routinely scouted. There are no fungicides to manage blackleg.

Potato virus Y (PVY) was confirmed on Green Mountain, Dark Red Norland, and Gold Rush potatoes planted in Hampshire and Franklin Cos., MA. This virus usually comes in on seedstock and is spread non-persistently (ie. very quickly) by aphids. The best ways to prevent spread of this virus is to protect crops from aphids using oil sprays (not systemic insecticides) or to plant a grassy border around the field--aphids moving into the field will clean their mouthparts off, removing the virus particles, as they pass through the grass.

Fulvia leaf mold on tomato. Photo by A. Radin.

Colorado potato beetle: The first generation of this pest is progressing. The treatment threshold for large larvae is 35 on 25 stalks scouted (~1.5 larvae per stalk), or 4 small larvae per stalk.

Sweet Corn: **European corn borer** caterpillars were found below threshold feeding in tassels in early sweet corn in Hampshire Co., MA this week. *Trichogramma* wasps were released and also seen in the same field. Control is working and populations remain low. The first flight for this pest peaked last week in Western MA, but is just reaching peak in Eastern parts of the state now (Table 1). Read more about scouting and trapping for clean corn in the article in this issue. Not all pests found in pheromone traps are pests! This week, *Leucania phragmitidicola* was captured in **fall armyworm** traps in Washington Co., RI. Fall armyworm traps are up at sites across MA, but no moths have been captured yet. Use the publication from UNH Extension: "Identifying Moths in Traps for Sweet Corn Pests" to learn

moth identification.

Multiple Crops: Potato leafhopper adults were found in beans and eggplant in Worcester and Franklin Cos., MA this week. Start looking for them in potato and treat at a threshold of 1 adult per stalk.

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

MANAGE SWEET CORN PESTS USING SCOUTING AND MONITORING

Heliothis pheromone trap set at sillk height for trapping CEW.

The earliest corn is now tasseling and even the first silk was seen emerging in a field in Whately, MA. As many successions are coming up across the state and the first European corn borers (ECB) are hatching, growers have begun their sweet corn sprays and *Trichogramma ostrinea* biocontrol releases. Other major sweet corn pests will be emerging and arriving soon (corn earworm (CEW), fall armyworm (FAW), sap beetle) and this year, we are monitoring for western bean cutworm (WBC) in the western part of the state where the pest may move in from New York. Also, common armyworm is an overwintering moth that has been reported as a minor pest in no-till sweet corn where they hide in residues.

Farmers, Extension educators and scouts in Massachusetts all contribute to a statewide pheromone trapping network for ECB, CEW, FAW and now WBC. We also receive and publish trap counts weekly from Extension educators in the neighboring states of NY, NH, and RI. We report this information regionally so that growers may be prepared to manage these pests preventively. Both pheromone trapping information and scouting are needed to successfully manage corn pests.

Traps contain many moths, mostly ECB here but we often see other non-pest species as well as bees and crane flies and all sort of interlopers.

Begin scouting for ECB and FAW larvae when tassels first emerge in the whorl (probably now!). For corn borers, look down into emerging tassels for tiny larvae or frass (white to brown material about the size of fine sand). For armyworms, look for ragged feeding holes and frass pellets the texture of coarse sawdust. If threshold is reached at this growth stage (Table 1), sprays should be made to target the tassles.

While FAW prefer whorl stage corn to older corn, Darcy Telenko of Cornell Extension recently wrote:

> "Two well-timed applications at tassel emergence have been found to be more effective than applications at the whorl stage on bare ground sweet corn even when ECB trap counts are high. Larvae feeding in the whorl are protected from insecticide applications and mortality will not be as high as at tassel emergence, when larvae feeding in the emerging tassel are exposed to the spray. Larvae will leave the tassel as it opens up and no longer provides a moist, protected feeding environment, and move down the plant looking for protected places to feed. Insecticide applications need to be timed to kill larvae before they bore into a new feeding location where again they will be protected from sprays. In fields with very uneven development, two applications may be necessary, one when approximately 25-50% of the tassels have emerged, and again after 75-100% of the tassels have emerged, if the field is still over threshold."

Refer to the UMass Sweetcorn Insect Management Field Scouting Guide for instructions and record sheets to scout corn now.

Table 1. IPM decision making guide for the major sweet corn pests					
	Moth life cycle		**Action Thresholds based on crop growth stage**		
	Emergence or Arrival	**Egg hatch**	**Whorl stage**	**Tassel emergence to first silk**	**Silk stage to 5 days before harvest**
European corn borer	Two generations/yr 374 GDD and 1400 GDD base 50°F	450 GDD and 1550 GDD base 50°F or 4-9 days	Usually no spray necessary	15% infestation combined with FAW	5% infestation OR trap captures of EII (IA) and Z1 (NY) traps combined exceed 12 moths per week, then spray weekly
Fall armyworm	Early-mid July – September. Arrival up the coast from the south.	2-10 days	Scout when moths are captured in pheromone traps and treat at 15% infestation	15% infestation combined with ECB	5% infestation
Corn earworm	Mid – late July – September. Arrival from south east and west.	2.5-6 days	Usually no spray necessary	Monitor trap catches to detect arrival and flight activity (see Table 2 for spray intervals)	Trap captures exceed 1.4 moths per week, then use Table 2 to determine recommended spray interval
Western bean cutworm	Not found in MA. Early July emergence in NY	5-7 days	Usually wait for tassel emergence.	1% infested with eggs or larvae	1% infested with eggs or larvae

ECB (left) CEW (center) and FAW (right). Photos by D. Ferro.

Table 2. Spray intervals for corn earworm		
Moths/Night	**Moths/Week**	**Spray Interval**
0 - 0.2	0 - 1.4	no spray
0.2 -0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 – 7	5 days
1 - 13	7 – 91	4 days

Once corn reaches the silk stage, action thresholds are based on trap captures rather than field scouting for CEW. Scouting is still used at this stage for making ECB and FAW spray decisions. Not all moths found in pheromone traps are pests! Make sure to learn moth ID before making spray decisions. Refer to Identifying Moths in Traps for Sweet Corn Pests to learn moth ID. Once a field has reached the silking stage, **s**cout the ear zone (roughly from two leaves above and one leaf below the ears) for ECB egg masses and ECB or FAW larvae. ECB and FAW Egg masses are found most frequently on the underside of leaves near the midrib, and consist of approximately 10-20 flattened eggs overlapping like fish scales. Eggs are white when first laid, turning cream colored after a couple of days, and show the black head capsules of the tiny larvae through the surface of the eggs when within 1 day of hatching (the "black head" stage). Egg masses can also sometimes be found on the flag leaves of the ears or on the husk itself. Look down into the tops of the silks for newly hatched larvae, and pull the ear away from the stalk slightly to look for larvae feeding between the stalk and the ear. If threshold is reached at this growing stage (Table 1), target the ears with sprays. Look for scouting reports and pheromone trapping data on corn pests in the Pest Alerts section of Vegetable Notes this season.

Other sweet corn trapping networks:

New York: http://sweetcorn.nysipm.cornell.edu/

Pennsylvania: http://www.pestwatch.psu.edu/sweetcorn/tool/index.html

-By Katie Campbell-Nelson, UMass Extension, 2016

USING NEEM AND AZADIRACHTIN FOR INSECT CONTROL

The neem tree, *Azadiracta indica*, is native to India. Extracts from the seeds of this tree have been used as medicine, a cosmetic, and as a pesticide for centuries. Today, there are several pesticides on the market based on neem. They are most commonly available as emulsifiable concentrates.

Types of Neem Products. Neem extract is often separated into two components, azadirachtin and clarified hydrophobic extract of neem oil. These components are used to make the three types of neem products described below. It is important to distinguish these three types of products from each other as they work in different ways.

1. Azadirachtin is the active ingredient in neem oil that is considered to have the greatest pesticidal activity. Products such as Azatrol, AZA-Direct, and Molt-X are based on azadirachtin. Many are OMRI-approved. Azadirachtin acts as an insecticide primarily by inhibition of molting; it is also a feeding deterrent. It must be ingested in order to have these effects. In addition, it discourages oviposition.

2. Products based on clarified hydrophobic extract of neem oil, which is neem oil from which much of the azadirachtin has been removed, include Trilogy and Green Light. This portion of the extract is similar to other plant-based horticultural oils and works in much the same way, by suffocating insects on contact. Many of these products are also OMRI-approved.

3. Clarified hydrophobic extract of neem oil may also be used to make insecticidal soap. Soaps made from neem oil list potassium salts of fatty acids as their active ingredient. Although neem soap has not been studied directly, it most likely works in the same was as other insecticidal soaps, which is by disruptiing insect cuticles. Bon-neem Insecticidal Soap is derived from neem oil, but at present neem soap is not OMRI-approved because it is considered synthetic.

Neem extracts contain numerous compounds in addition to azadirachtin. Some of these may also have insecticidal activity, but these chemicals have not been well studied.

Considerations For Azadirachtin Use. Azadirachtin is taken up by plant roots and translocated throughout the plant. It breaks down rapidly in sunlight, and on the plant surface it has a half-life of 1-2.5 days. It persists for much longer inside plant tissues, although its systemic activity is gradually diluted as plants grow. Azadirachtin products may therefore be effective longer when plants can take it up from the root zone. This is important considering that the minimum application interval for many products is 7 days. Note that azadirachtin is most effective at temperatures > 70°F and in soils with pH < 7. It is generally more effective against chewing rather than sucking insects; however, a few studies have demonstrated fair to good efficacy against aphids and leaf hoppers. Because it inhibits molting, it is most effective on insects in juvenile stages and has little effect on eggs or adults. Research has also shown that foliar applications appear to decrease spider mite populations. In all cases, it is best used preventatively, before insect populations build to critical levels. Some insect damage will be incurred since azadirachtin must be ingested to be effective.

Considerations for Neem Oil Use. Due to its mode of action, neem oil is generally more effective against soft-bodied insects such as aphids and mealy bugs. Neem oil has no systemic activity and works by direct contact alone. Thorough plant coverage is therefore essential. Neem oil is effective against insects at all life stages. Like azadirachtin, it also breaks down rapidly in sunlight and can be washed away by rain, making frequent applications necessary.

Phytotoxicity can be a problem with any horticultural oil. Avoid spraying when temperatures are above 85°F and/or humidity is > 90%. Agitate spray mixtures frequently to avoid separation. Oil is incompatible with some other pesticides, notably copper products. Do not apply sulfur within 30 days of oil application. Some plants may be more sensitive to neem oil than others. If the sensitivity of a particular plant species or variety is unknown, spray a few plants to test for

phytotoxicity before spraying the entire crop.

General Considerations. Neem is relatively non-toxic to humans, although some people may experience irritation of the skin and mucous membranes upon exposure. Handlers should wear long sleeved shirts and long pants, rubber gloves, and shoes with socks. All pesticides must be used in accordance with the label: the label is the law. Do not apply any pesticide in excess of label recommendations.

Neem products are relatively non-toxic to insects and arachnids that do not eat plants. It is also relatively non-toxic to bees at recommended field rates; however, if azadirachtin is repeatedly applied at high rates, bees may be exposed and may bring contaminated pollen back to larvae in the hive. Avoid applying any type of neem product to open flowers or at times when bees are actively foraging. Apply in late evening or early morning to minimize bee exposure.

Neem and Plant Pathogenic Fungi. Azadirachtin products are ineffective against plant pathogenic fungi and are not labeled for that use. Most neem oil products are labeled for the control of several plant diseases caused by fungi, but data from scientific trials indicates that they are relatively ineffective except in the case of certain powdery mildews. It is believed that horticultural oils prevent fungal spore germination and penetration of host tissue. Horticultural oils are fungistatic rather than fungicidal; that is, they temporarily slow or stop growth of a fungus rather than killing it. This effect is likely to be short-lived due to the low residual activity of these products.

-Written by Angie Madeiras, UMass Plant Disease Diagnostician

THRIPS ARE ACTIVE IN ONIONS

Onion thrips (*Thrips tabaci*) are being observed in onions across New England at or above threshold numbers. Hot and dry conditions favor rapid buildup of this pest. The host range of onion thrips is wide, including many vegetable families, field crops such as alfalfa, wheat, oat and tobacco, weeds including amaranth, goldenrod, ragweed and sunflower, and ornamentals such as roses, but onions are their preferred host and where they cause the most economic damage. Cabbage may be infested at any time in the season, but the most common thrips damage in brassicas in New England occurs later in the season on fall transplants. Succulent peas are sensitive to thrips feeding damage, and onion thrips can also cause damage in greenhouse tomato and cucumber.

During the day tiny yellow nymphs and slightly larger brown adults hang out at the growing tip. They're hard to see but wait and see if the tiny flecks move! Photo by S.B. Scheufele

Identification and life cycle. Onion thrips are tiny, slender insects that range in color from translucent to yellow to brown and are only 1/16" in length. They spend the winter as adults in crop remnants, alfalfa, wheat, greenhouses and weeds along the border of crop fields. Early spring reproduction can occur in field crops, especially wheat, before movement into onion. Adults insert eggs singly into plant tissue, adults and nymphs feed on leaves, and pupation occurs in the soil near the plant. Development time (base temperature of 52.7°F) is 140 GDD for egg, 180 GDD for larva (2 instars), and a total of 323 GDD for each generation. At summer temperatures, a generation can be completed in 2-3 weeks. Thrips have rasping mouth parts which they use to tear open plant cells to feed on plant juices.

Damage. In onions, damage is caused by adults and nymphs piercing cells and removing cell contents along leaf blades. Symptoms are irregular, blotchy whitening of the leaves (known as 'blast'), and if feeding is heavy, leaf curling or twisting and overall stunting of plant growth can occur. The result is reduced bulb size and lower overall yields, or if severe enough, plant death. Feeding that occurs during bulb formation and rapid bulb expansion has the most effect on yield. Scallions are particularly sensitive because the whole plant is marketed. In addition to direct injury, thrips damage can increase occurrence of purple blotch (*Alternaria porri*) and other bacterial diseases, as wounds caused by feeding allow for easy entry by pathogens. Thrips also vector the iris yellow spot virus which affects many allium crops.

Monitoring. Scout plants along field margins where infestations build early, as well as checking across the field. Scout weekly to determine if populations are increasing. Look closely between the leaf blades, especially in the center of the plant around the growing tip, to find the light yellow nymphs or darker adults. Though tiny, you can see the slender, yel-


Symptoms include white flecking flecking on leaves (right-photo by A. Shelton) and twisting or bending of leaves (left-S.B.Scheufele)

low nymphs moving about on the leaf when the leaves are parted. Count number per plant and note number of leaves per plant to determine if thresholds are reached. The number that constitutes an economic threshold varies with the stage of plant growth, efficacy of insecticide to be used, water availability, and health of the plants. A widely used threshold is 1-3 thrips per leaf or 30 per plant.

Cultural practices can reduce thrips numbers by delaying or inhibiting their establishment in the crop, or by reducing survival. These include:

- Incorporate or remove crop residue at the end of the season.
- Rotate into fields where no alliums or brassicas were grown for the past 2 years.
- Avoid planting onions or cabbage near alfalfa, wheat or clover; thrips may migrate to onions when these crops reach maturity or are cut and harvested.
- Avoid importing plants or sets from other farms or regions, or using last year's onions for sets.
- Maintain sanitation and scout regularly in the greenhouse to avoid thrips on transplants.
- Use straw mulch, which has been shown to slow population buildup.
- Alternate onion rows with carrot rows, which has been shown to reduce thrips in onion
- Use reflective plastic mulch.
- Provide adequate water for onion growth: onions need consistent, adequate moisture, and dry soil conditions worsen the effects of feeding damage.
- Heavy rain or overhead irrigation can lower populations (but may increase risk of foliar disease).
- Use selective insecticides to conserve minute pirate and insidious flower bugs, which are the most effective predators, as well as other natural enemies.

Chemical Control: Thrips move from the protected growing tip up the leaves during the evening, so that's the best time to spray. Use moderate to high pressure, 100 gal water/A, and appropriate nozzle spacing to achieve the best possible coverage. Wetting agents or spreader-stickers are strongly recommended so that insecticides don't quickly wash off the waxy foliage. If repeat applications are needed, use a 7 to 10 day spray interval. Use a shorter interval in hot weather. Rotate between insecticide groups after 2 applications to help prevent resistance. Note that products labeled for thrips control are not exactly the same for onions and Brassicas and dry bulb onions and fresh eating onions are often labeled differently. Please see the New England Management Guide for control options, there are many effective materials for conventional and organic growers alike. Always read the label carefully before applying any pesticide.

-UMass Extension Vegetable Program

AVOIDING BLOSSOM END ROT

Originally published in the 6/10/16 University of Delaware Cooperative Extension Weekly Crop Update, Vol 24, issue 12.
Written by Gordon Johnson, Extension Vegetable & Fruit Specialist; gcjohn@udel.edu

Variable June weather often creates conditions favorable for blossom end rot in susceptible crops, with tomatoes and peppers being the most affected. In most years, there is a transition point in June where temperatures move from the moderate side to an extended hot period with temperatures in the 90s. This is also when many tomatoes and peppers have reached full plant size with high water demand and have large numbers of flowers and developing fruit with heavy calcium demand.

Blossom end rot on tomato.

Blossom End Rot (BER) is a disorder where developing fruits do not have enough calcium for cell walls, cells do not form properly, and the fruit tissue at the blossom end collapses, turning dark in color. Calcium moves through cation exchange with water movement in the fruit, so the end of the fruit will be the last to accumulate calcium. Larger fruits and longer fruits are most susceptible. With fruits, the rapid cell division phase occurs early in the development of the fruit and if calcium accumulation in the fruit is inadequate during this period, BER may occur. While it may not be noticed until the fruit expands, the deficiency has already occurred and cells have already been negatively affected. We most commonly see signs of blossom end rot on fruits many days or weeks after the calcium deficiency has occurred.

Understanding blossom end rot also requires an understanding of how calcium moves from the soil into and through the plant. Calcium moves from the soil exchange sites into soil water and to plant roots by diffusion and mass flow. At plant roots, the calcium moves into the xylem (water conducting vessels), mostly from the area right behind root tips. In the xylem, calcium moves with the transpirational flow, the movement of water from roots, up the xylem, and out the leave through stomata. Calcium is taken up by the plant as a divalent cation, which means it has a charge of +2. It is attracted to negatively charged areas on the wall of the xylem, and for calcium to move, it must be exchanged off the xylem wall by other positively charged cations such as magnesium (Mg++), potassium (K+), ammonium (NH4+), or additional calcium cations (Ca++). This cation exchange of calcium in the xylem requires continuous movement of water into and up through the plant. It also requires a continuous supply of calcium from the soil.

In general, most soils have sufficient calcium to support proper plant growth. While proper liming will insure there is adequate calcium, it is not the lack of calcium in the soil that causes blossom end rot in most cases. It is the inadequate movement of calcium into plants that is the common culprit. Anything that impacts root activity or effectiveness will limit calcium uptake. This would include dry soils, saturated soils (low oxygen limits root function), compaction, root pathogens, or root insect damage. In hot weather on black plastic mulch, roots can also be affected by high bed temperatures. Low pH can also be a contributing factor. Calcium availability decreases as pH drops, and below a pH of 5.2 free aluminum is released, directly interfering with calcium uptake. Again, proper liming will insure that this does not occur. Applying additional calcium as a soil amendment, above what is needed by normal liming, will not reduce blossom end rot.

In the plant, there is a “competition” for calcium by various plant parts that require calcium such as newly forming leaves and newly forming fruits. Those areas that transpire the most will receive more calcium. In general, fruits have much lower transpiration than leaves. In hot weather, transpiration increases through the leaves and fruits receive lower amounts of calcium. High humidity will reduce calcium movement into the fruit even more. Tissue tests will often show adequate levels of calcium in leaf samples; however, fruits may not be receiving adequate calcium. In addition, in hot weather, there is an increased risk of interruptions in water uptake, evidenced by plant wilting, when transpirational demand exceeds water uptake. When plants wilt, calcium uptake will be severely restricted. Therefore, excess heat and interruptions in the supply of water (inadequate irrigation and/or rainfall) will have a large impact on the potential for blossom end rot to occur. Proper irrigation is therefore critical to manage blossom end rot.

As a positive cation, there is “competition” for uptake of calcium with other positive cations. Therefore, if potassium, ammonium, or magnesium levels are too high in relation to calcium, they can reduce calcium uptake. To manage this, do not over-fertilize with potassium or magnesium and replace ammonium or urea sources of nitrogen with nitrate sources.

Applying additional soluble calcium through irrigation, especially drip systems, can reduce blossom end rot to

some degree if applied prior to and through heat events and if irrigation is applied evenly in adequate amounts. Foliar applications are only partially effective when applied to very young developing fruit. Fruits do not absorb much calcium, especially once a waxy layer has developed, and calcium will not move from leaves into the fruit (there is little or no phloem transport). Foliar applications of 2-4 lb Calcium (Ca) per acre is recommended. Foliar calcium can be applied as calcium chloride at the rate of 5-10 lb per 100 gallons per acre, calcium nitrate at the rate of 10-15 lb per 100 gallons per acre, or chelated calcium at labeled rate.

In conclusion, the keys to controlling blossom end rot are making sure roots are actively growing and root systems are not compromised, soil pH is in the proper range, and irrigation is supplied in an even manner so that calcium uptake is not interrupted. Supplemental calcium fertilization will only marginally reduce blossom end rot if water is not managed properly.

Events

How to Conduct an On-Farm Trial

When: Tuesday, July 12th, 2016 from 3:00pm to 5:00pm
Where: UMass Crop and Animal Research and Education Center, 89 River Rd. Deerfield, MA

Ever want to apply for a SARE farmer or partnership grant? Looking to improve your farming practices through research? This workshop is for you! Farmers and Agricultural Service Providers welcome. We will provide hands-on training in setting up a replicated field plot, and include practice taking measurements and collecting data. Concepts learned can help you answer many questions through on-farm trials, but this workshop will focus on the UMass trial "**Nitrogen contribution from cover crops for vegetable crop uptake**" being conducted on multiple farms in Massachusetts this fall as a way to prepare cooperating farmers to conduct this trial.

Stay tuned for a follow-up workshop on data analysis and interpretation of results.

Free, but please RSVP: https://www.surveymonkey.com/r/OnFarmTrial

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

Supported in part by USDA/NE-SARE Professional Development MA State Program.

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*

June 28th, 4-6 pm
Wards Berry Farm, 614 South Main Street, Sharon, MA 02067
Farmer: Jim Ward

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.

Sponsors

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