UMass Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975

Volume 30, Number 7 May 24, 2018

In this issue:

Crop conditions

We seem to have skipped spring this year and fields are filling up fast! Transplants going out in the field this week and next include peppers, tomatoes, eggplant, cucurbits—and the pests that prefer these crops are out and they're hungry. Both the eggplant flea beetle and striped cucumber beetle were seen this week in Massachusetts (see Pest Alerts). Lisa McKeag is trying a novel approach to cucumber beetle management with a couple of farms. She is using a trap-out system developed by our new Tree Fruit Entomologist, Jamie Pinero. Jaime recently came to UMass from the University of Missouri where he was an Assistant Professor and State IPM Specialist. In Missouri, Jaime worked on developing affordable alternative insect pest management strategies, including the milk jug trap we're trying this year (see this article for details). Lisa collected a number of milk jugs, spray painted them yellow, and made cucumber-beetle sized holes in the sides. Commercial cucumber beetle lures and some soapy water will be placed inside and the jugs will be set out in cucurbit fields at plant height. She is experimenting with placing 5-10 traps per acre. Stay tuned for results of this new IPM adventure!

Lisa McKeag and Genevieve Higgins spray painting milk jugs to use for striped cucumber beetle traps. Photo: S. Scheufele

Row covers abound in many fields we've visited this week: on cucurbits, brassicas, alliums, and some of the first eggplant. Some have opted to go with ProtekNet for their brassicas because it does not trap as much heat as other row covers and can last several seasons if well maintained. Others opt to go with Typar which is cheaper than the heavier weight Agribon, but not as durable with the reasoning that it is the right width for the bed spacing they have. Whichever you choose, row covers can be a great way to protect crops from insect pests including flea beetles, cuke beetles and leafminer and root maggot flies.

Many varieties of greens from traditional lettuces to Asian greens such as tatsoi, mizuna, and pak choy are being harvested now. One farm we visited in the Hudson Valley, NY was harvesting quick-succession spring crops of brocollini, pea shoots, spinach, pak choy and radishes. Get some cash flow early folks!

Pest alerts

Allium:

Allium Leafminer: Last week this pest was observed in a crop of overwintered onions in a high tunnel, but we scouted in the Berkshires again this week and did not find any signs of the pest outdoors. Keep an eye out, especially in the Western part of the state, for the vertical, white oviposition marks or tunneling damage on leaves,.

Onion thrips were found at very low levels in Hampshire Co., MA, and were not found in other fields scouted in other parts of MA, so this pest is just becoming active. Scout weekly and treat when you reach 1 thrips/leaf, see New England Management Guide for recommendations. Controlling thrips can improve yield and, importantly, reduce damage from bacterial diseases, which can enter the bulb via wounds caused by thrips feeding. Interestingly, thrips (likely onion thrips) have been found infesting multiple crops in high tunnels with overwintered onion crop debris in northern NY, southern ME, and NH. Adults can overwinter in allium debris and in garlic cloves. When planting garlic in the fall keep in mind that you may be moving thrips around.

Location	GDD 50° F
Western MA	
South Deerfield	310
Deerfield	300
Amherst	305
Westfield	312
Central MA	
Leominster	324
Northbridge	294
Eastern MA	
Seekonk	297
Waltham	315
Ipswich	247
NH	
Hollis	269
Walpole	248
NY	
Hudson	341
Castleton	322

Brassicas:

Imported cabbageworm is active now in Washington Co.,RI. In MA, we have observed ICW adults and eggs but no caterpillars yet!

Flea beetles (*Phyllotreta cruciferae*) are still out in force across the state. One grower in Berkshire Co. was befuddled since she had put row cover over her crops the day she planted them, only to find flea beetle underneath when she uncovered them 3 weeks later! FB usually overwinter in field edges where they nestle down in the leaf litter or soil, but they must have found her field, which had been fallow for 3 years, a nice and protected enough spot, and emerged under the covers when temperatures were optimum. This generation will continue to be active through June.

Beets/Spinach/Swiss Chard:

Leafminer eggs and just-hatched larval tunneling damage were found across MA this week at fairly high levels of infestation. There are three to four generations per season; typically, mid-late May, late-June and mid-August are peak activity periods. If eggs are present in your crop, treat now to keep the population from growing in future generations. See article this issue for more information on scouting and management.

Cucurbits:

Striped cucumber beetle has been feeding in a high tunnel cucumber crop in Hampshire Co., MA, but has also been spotted in a flowering orchard in Worcester Co., MA. This insect emerges in the spring and feeds on pollen, leaves, and petals of alternate hosts such as apple trees, goldenrod, and aster to build reserves until cucurbits are planted in the fields, at which point they move to feed on the tissue of their preferred host! Be prepared folks, treat cucurbit crops or protect them with row cover or kaolin clay as they are seeded or transplanted.

Solanaceous:

Flea Beetle (*Epitrix cucumeris*) was found in Hampshire, and Middlesex Cos., MA this week feeding on eggplant transplants before going out in the field. Be prepared and protect your eggplant before putting it out in the field.

Powdery mildew is being found in high tunnel tomatoes (Hampshire and Berkshire Cos., MA) just beginning to set fruit. The plants now have a greater nutrient demand (particularly for potassium) and are stressed, making them more vulnerable to pathogens. In some cases, the pathogen arrived with the transplants from nurseries. Make sure to inspect plants you bring in and refuse to accept diseased plants! Since conditions are favorable for disease now, you may be seeing powdery mildew on multiple crops in your tunnels, these are all different species—*Golovinomyces cichoracearum* on lettuce, *Podosphaera xanthii* on cucurbits, *Oidium lycopersici* on tomato. See article this issue by Meg McGrath for management strategies.

Botrytis Neck Rot was diagnosed on tomatoes in a high tunnel in CT last week, and in a Hampshire Co., MA high tunnel this week. In both cases, tomatoes had been roughly pruned, and had poor airflow. Optimum temperatures for infection are between 65 and

Botrytis stem rot of tomato. Photo by K. Campbell-Nelson.

75°F, and infection can occur within 5 hours. High temperatures (above 82°F) suppress growth and spore production. Avoid pruning until treatments are made and sporulation is reduced.

Sweet Corn:

European corn borer: The first traps are being checked this week in NY, NH, and MA, and others are still getting setup as the first successions of corn are planted. Only one ECB moth was captured in Hollis, NH this week. Adult emergence typically occurs at (374 GDD), first eggs (450 GDD), and peak flight (631 GDD) base 50°F. We are about a week away from the beginning of adult flight in MA (Table 1), so farmers with emerged corn should put out traps this week to make sure they are ready to capture the first adults. If using the biological control *Trichogramma ostriniae,* be sure to order them now in order to release them when the adults begin laying eggs in about 2 weeks.

Multiple Crops:

Garden Springtail: Has been prolific in many parts of the state, in such large numbers that they cause a thundering noise on black plastic leading to concern among some growers. This insect is occasionally a pest of young seedlings, but they mostly prefer to feed on plant debris. The large populations of this insect in fields this year make sense due to the rapid increase in growing degree days this season. They have a rapid temperature-dependent reproduction rate, and adults are long-lived (up to 1 yr).

Garden springtail. Photo by K. Campbell-Nelson.

Seed Corn Maggot: maggots were found in an onion crop in Middlesex Co., but not in peas on this farm because the grower pre-sprouted their peas before planting. Elsewhere in Middlesex Co., seed corn maggot pupae were found in a field of peas where they had preferred sugar snap peas (no germination) over shelling peas and snow peas (some skips in the row but fairly good germination).

LEAFMINER ON SPINACH, CHARD, AND BEET

Spinach and beet leafminers are early-season pests that cause damage to early greens. These pests attack crops and weeds in the plant family Chenopodiaceae, which includes chard, beets, and spinach as well as lamb's quarters. The two fly species are very similar, however, spinach leafminer may also cause damage in Solanaceous crops such as peppers.

Crop damage is caused by the fly larva that burrows and feeds between the upper and lower epidermis of the leaf. Early damage is a slender, winding 'mine' or tunnel, but as the larva feeds and grows these expand and become blotches on the leaves. The fly overwinters as a pupa in the soil and emerges in late-April and May. The adult fly—a small, gray fly 5-7 mm long—lays eggs on the undersides of host leaves. The small (<1mm), oblong, white eggs, are laid in neat clusters on the underside of the leaves. They are easy to spot if you look under the leaves. If you find tunnels, pulling the epidermis off will reveal one or several pale, white maggots. When fully grown, maggots usually drop into the soil to pupate, though they may also pupate inside the leaf. The entire life cycle is 30-40 days and there are three to four generations per season. Typically mid- to late-May, late-June and mid-August are peak activity periods. After August, pupae enter overwintering phase and won't emerge until next spring.

Leafminer fly, eggs, and early tunneling damage.

If the plants are infested early and populations are high, the losses from this pest may be great. This may be especially true when eggs on transplants in the greenhouse go unnoticed until planting in the field, resulting in infestations in row-covered crops. Treat when eggs or first tiny tunnels are noticed—see current recommendations below. There are both conventional and organic products available and in both cases an adjuvant is recommended to improve efficacy. See New England Vegetable Management Guide for more details on products. Many

products are labeled for leafy greens including spinach and Swiss chard but not for beets so, as always, check the labels. Some systemics are registered that may be applied to transplants or to the soil including diamides (e.g. Coragen, Verimark) and neonicotinoids (e.g. Venom, Platinum), but be sure to observe the longer days to harvest restrictions. Most of the products labeled are for foliar applications. Among the organic products available, spinosad has demonstrated efficacy when applied before egg hatch. Spinosad also has some translaminar activity, particularly when combined with a penetrating adjuvant, and may be effective against larvae in leaf mines.

Because leafminer feeds mostly on one crop family and also on many weeds including chickweed, lamb's quarters and nightshades, weed control and crop rotation are the first line of defense. Row covers can also be used to exclude flies if placed over the crop before flies are active or immediately after planting, though be sure not to cover crops in fields where susceptible crops were grown previously and where adult flies may be emerging, as they will get trapped under the row cover.

-Updated for 2016 by UMass Vegetable Program, from an article by Eric Sideman, Maine Organic Farmers and Gardeners Association

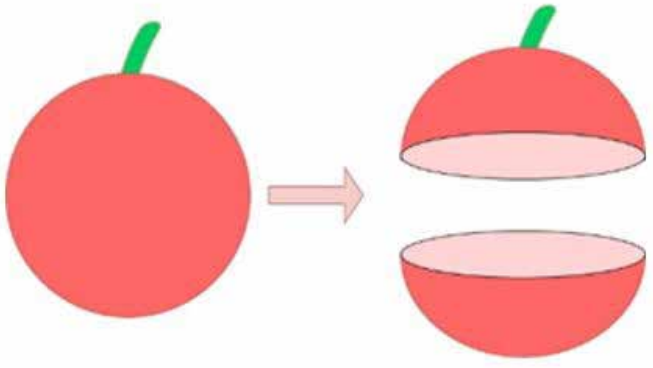
FSMA PREVENTIVE CONTROL RULE AND FARM OPERATIONS, EMERGING OPPORTUNITIES IN VALUE-ADDED AGRICULTURE

The increased demand for locally sourced food products has created opportunities for diversifying agricultural production in the state of Massachusetts. Local food system movements such as "50 by 60", a Food Solutions New England call for New England to produce 50% of its food by 2060 (1), have helped to lay the framework for expanding food production past the traditional boundaries of raw agricultural products, into the development of value added products. With 837 crop-producing farms spread across Massachusetts (2), developing value-added products such as cut produce, sauces, frozen produce, and vegetable mixes can serve as a way to distinguish yourself from other producers, while offering a new food product to your customers. Value-added products offer the potential to extend the shelf life of produce through various methods. However, extending the time between harvest and consumption can lead to a variety of potential food safety risks, as it increases the amount of time microorganisms have to grow on a product. The goal of this article, which is the first in our three-part series: FSMA and You: The Role of the Preventive Controls Rule on Farm Operations, is to look at the different risks associated with some of these value-added practices. While fresh local produce offers many nutritional and local economic impacts, we need to be mindful that the right precautionary preparation measures are taken.

Value- Added Fresh Produce

From 1996-2006, there were 72 foodborne illness outbreaks associated with fresh produce in the United States (3). Fresh produce has certain food safety issues associated with it, due to the lack of a "kill step", such as cooking, or other microbial growth management such as lowering pH, water activity, or salting. Without a kill step or other management strategies, organisms that could contaminate produce in the field or during handling have the potential to grow on produce, leading to illness if not managed properly. The increased handling of produce while making value-added products can also lead to increased risk of microbial contamination, such as *S. aureus* or norovirus, which can be spread through infected individuals. While whole, fresh produce is covered under the Produce Safety Rule (PSR), changing the physical, chemical or biological properties of produce can cause the produce to fall under the Preventive Controls for Human Food Rule—we'll cover the details of this rule in a later article. Some examples of these changes can be found below.

Figure 1: Surface Area of a Tomato



Cut Produce

Of the outbreaks reported from 1996-2006, 25% were due to fresh cut produce (3). This food safety risk is due to a few factors. When cutting the skin of a fruit or vegetable, you are breaking the protective barrier that is used to prevent contaminants from entering the produce. If there were bacteria present on the surface, the physical action of pushing a blade through

the produce will spread the bacterial contamination into the interior. When chopping produce, you also break some of the cells. When the cells break, the nutrients contained inside them leach out, providing a more accessible source of food for bacteria (4). Furthermore, cutting a fruit or vegetable increases its surface area. For example, the surface area of a whole tomato is the amount of area that comes into contact with air or any surface the tomato is resting on, represented by the dark red in Figure 1. When you cut a tomato in half, the surface area increases, as the two halves each have a new section, represented by the light red that is exposed to the outside environment. Every subsequent cut increases the surface area. This increase of surface area, coupled with the exposure of the more nutrient-dense interior gives bacteria access to growth space and nutrients, which leads to increased risk of bacterial growth. Surface area is of particular concern when product particle sizes increase substantially with product processes such as dicing, "ricing", shredding or spiralizing produce, as each piece has been cut a multitude of times, leading to a large total surface area. Careful consideration should be made to managing these risks, whether it's through sanitation or storage methods, to ensure the safety of the product.

Mixed Leafy Greens

Leafy green salad mixes are a growing industry, with a predicted 33% increase in US retail sales by 2021 (5). While making salad mixes is a relatively easy way of providing a new product to consumers, there are some risks that need to be considered. If there is microbial contamination on a batch of greens from one field, mixing it with other greens increases the spread of contamination. It's important that good agricultural practices are used to minimize the likelihood of pathogen growth in the field. Leafy greens that are grown in different fields and then mixed post-harvest, or are additionally cut in post-harvest processing for value added products such as bagged salads are considered processed as increased risk associated with cutting fresh produce is introduced. As with cut produce, managing these risks through sanitation and proper storage temperature will help keep these products safe.

Dried Produce

Drying produce can expand your business model into the field of shelf-stable snacks and ingredients. When drying produce, the goal it to remove as much water as possible, to prevent the growth of any bacteria or molds that would otherwise be able to grow at room temperature. However, it's important to remember that drying is not necessarily a heated kill step. While on-farm drying may involve using an oven, the temperature used is often too low to kill most bacteria. Instead, the goal of drying is to control the amount of water available to microorganisms, known as water activity. Generally speaking, bacteria, yeasts and molds can grow in foods with a water activity as low as 0.80 Aw, so proper drying and testing must be performed to ensure that the water activity of the final product is below that threshold. There are a few technical challenges to drying produce, the first being product size. It's important the produce is cut into small enough pieces, which allows each piece to be evenly dried. If the pieces are too large, case hardening may occur, which is when the exterior of the produce hardens due to over-drying, creating a barrier that prevents the interior of the produce from drying properly. Case hardening can also occur if the drying temperature is too high, which causes the exterior of the produce to dry much quicker than the interior. Unevenly dried produce creates a food safety issue, as the interior of the produce may not have dried enough to have a water activity under 0.80. Other techniques, such as providing air flow and ventilation, will also aid in the drying process.

Note: If whole, fresh produce is being dried without any prior or subsequent processing steps (such as peeling, cutting, or mixing), then it is covered under the Produce Rule. Examples of this include drying raisins or chili peppers. However, if there are any steps before or after the drying such as slicing apples before drying, or cutting dried herbs to add to a spice mix, then it may be covered under the Preventive Controls for Human Food Rule.

Frozen Produce

Freezing produce is a great way to extend the shelf life of your product that helps to maintain freshness and maintain nutrients. However, freezing produce does come with inherent risks. To begin with, it's important to remember that freezing is not a kill step. Freezing can be a way to prevent the growth of bacteria, but it is not a method for killing bacteria. The main risk associated with freezing produce is *Listeria monocytogenes*, a bacterium that grows at temperatures as low as 31°F. *L. monocytogenes* causes the disease listeriosis, which is lethal in about 20% of cases, making it a leading food safety concern. *L. monocytogenes* can be found in agricultural soil and water, and can enter a facility on produce or the boots of workers. Listeria can be killed using thermal treatment, so an effective cooking or blanching technique can be used to mitigate the risk. Care must be taken when handling produce after thermal treatment, as many cases of contamination occur from listeria growing within a facility. As a result, it is important to ensure facilities are sanitized regularly,

with a strong focus on floor drains and grates, which are high risk locations for listeria. *Listeria monocytogenes* is a very dangerous microorganism, but proper food safety management can significantly reduce this risk.

Conclusion

While there are a variety of risks and hazards associated with value-added processing, they don't prevent value-added products from being a viable commodity. All foods have risks associated with them; value-added products are no different. The important thing is to know how to identify and analyze these hazards, in order to minimize the risk of them occurring in a food product. The Food Safety Modernization Act, or FSMA, has outlined how to mitigate these risks and create a safe food product through its Produce Rule and Preventive Controls for Human Food Rule. While many farm operations are covered under the Produce Rule, some farm operations, such as the ones using the processes described above, may also fall under the Preventive Controls for Human Food Rule. If you're already performing some of these processes, keep an eye out for the second article of the three-part series FSMA and You: the Role of the Preventive Controls Rule on Farm Operations, entitled "The Preventive Controls Rule: What Type of Operation Am I?" which is due out next month.

Citations

1. http://www.foodsolutionsne.org/new-england-food-vision
2. http://www.referenceusa.com/UsBusiness/Search/Custom/d59a1ea8489c4fe885bad6b275c49a13
3. https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ucm064458.htm
4. http://www.foodsafetynews.com/2015/02/introduction-current-issues-in-produce-safety/#.WuMxA8kUmUl
5. http://academic.mintel.com/display/833173/

Useful Links:

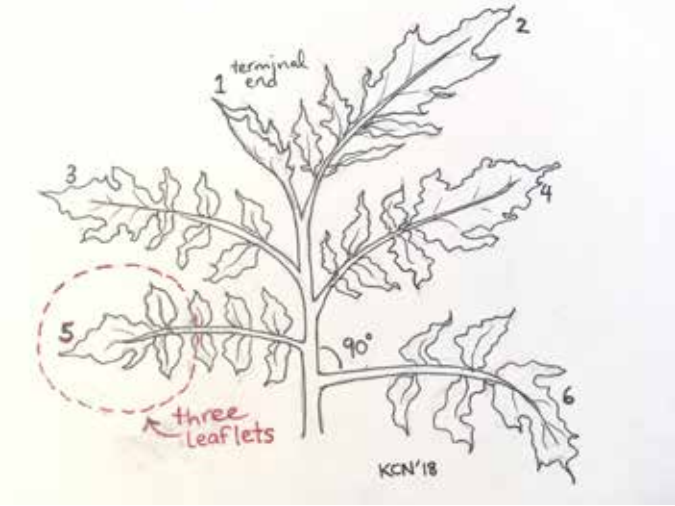
Guidance for Industry: Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables

Current Issues in Produce Safety: The Packinghouse

--by Christopher Von Achen and Amanda Kinchla, UMass Food Science Extension

FRUIT-SET IS THE TIME FOR A HIGH TUNNEL TOMATO TISSUE TEST

High Tunnel tomatoes have been trellised and are beginning to set fruit in their first clusters and nutrient demand for calcium and potassium is increased at this time.



Many are thinking of the importance of calcium (Ca) at this stage in order to avoid blossom end rot (BER) later in the season. However, BER is more an imbalance of calcium within tomato plants themselves rather than lack of Ca availability, and more often than not, is related to soil moisture fluctuation, heat stress, and sometimes, excessive nitrogen. Potassium (K) deficiency on the other hand, in concert with excessive heat, can be an even greater problem for quality fruit production, resulting in blotchy ripening, yellow shoulders, and grey wall. Indeterminate varieties in tunnels and greenhouses continuously carry heavy loads of fruit so potassium demand remains high from early summer onward. Now is the time to take a tomato tissue test and then to boost potassium through fertigation or top-dressing if needed. According to Steve Bogash at PennState, K should be 3% of the leaf tissue by dry weight. In trials Andy Radin conducted in RI, he found that K% varied greatly by variety and he could not find a correlation with yield or fruit quality, however, a minimum target of 3% K by dry matter is not a bad goal.

For conventional growers, soluble fertilizers with a K to N ratio of somewhere around 2:1 can help, according to research from Michigan. More N may be required for season-long production on indeterminate vines. For organic growers, you can top-dress sulfate of potash, as long as your irrigation moisture is able to reach it so it can dissolve, or, it can be dissolved in hot water for fertigation. For more information, read Steve Bogash's excellent article from Penn State: http://extension.psu.edu/plants/vegetable-fruit/fact-sheets/new-vegetable-grower-factsheets/refining-tomato-nutrition-better-nutrition-for-improved-packouts.

How to take a Tomato tissue sample: It's a very good idea to sample your tomato leaves a few times during the season to make sure that plants are taking up sufficient potassium, as well as other nutrients. At the very least, taking a sample at the on-set of fruit is a good time to ensure that nutrients are adjusted for a long and productive season. Here are the steps for taking an accurate tissue sample:

- When sampling leaves, take whole leaves (petioles + leaflets) from 24 plants. If plants are too small, or you wish to reduce damage to plants, take 3 leaflets from the tips of 30 leaves.
- Take the most expanded leaf below the first blooming flower cluster, which often is about 5 leaves down from the terminal. The 6th leaf is usually at a 90° angle to the stem (picture).
- Sample in the hour before or after noon (this is usually the peak uptake of nutrients for the day)
- Collect a representative sample of the planting from at least 15 plants of a single variety
- If there is spray residue on the leaves, briefly rinse them and pat dry
- When sending to a lab, pack in paper bags, not plastic, so the material does not begin to rot
- If you are trying to diagnose a nutrient deficiency on some of your plants, send samples of both "healthy looking" plants as well as afflicted ones

--written by Katie Campbell-Nelson, UMass Vegetable Program, and Andy Radin, URI Extension

MANAGING POWDERY MILDEW IN PROTECTED TOMATOES

--written by Meg McGrath, Cornell University

Fungicides are the primary management tool for managing powdery mildew, the most common disease in high tunnel and greenhouse tomatoes. Micronized sulfur (e.g. Microthiol Disperss) and mineral oil (JMS Stylet-oil) are the most effective products for organic production based on comments from growers. They are also good choices for conventionally-produced crops. Sulfur is recommended applied at its lowest label rate because plants grown in protected culture tend to be more sensitive to phytotoxicity than field-grown plants. Also, without rain or overhead irrigation, fungicide residue will remain longer on plant tissue. As stated on the labels for these fungicides, there needs to be a gap of 2 or 3 weeks between applications of these products because oil can move sulfur into the leaf resulting in damage. Applications of sulfur especially during the harvest period may leave visible residue on fruit. It can be easily wiped off. An option to minimize visible residue is to use sulfur for the first applications until fruit start to mature, switch to another product for an application or two, then start applying oil. Other organic-approved products that are not oils include MilStop and Cease (these 2 recommended used together), Double Nickel, M-Pede (apply at ¾ rate to avoid phytotoxicity), and Regalia. Conventional fungicides labeled for powdery mildew and permitted used in protected culture include Inspire Super (difenoconazole + cyprodinil), Switch (fludioxonil + cyprodinil), Revus Top (difenoconazole + mandipropamid), and Vivando (metrafenone).

Powdery mildew on tomato causes white spots on foliage and can cover leaves and plants quickly under the right conditions. Photo by S. Scheufele.

Cultural practices to add to the powdery mildew management program include using wide within row and between row spacing of plants and removing lower

leaves. These will help reduce humidity and also improve spray coverage. Also promote air movement to reduce humidity by opening sides or vents on warm days and using fans. These practices will help manage other foliar diseases including Botrytis gray mold and leaf mold.

Events

Twilight Meeting Summer Series

This series of Twilight meetings is an opportunity to learn from fellow farmers and find out what's new in Extension research. A light meal will be provided at each program. We will ask you to RSVP later, but for now, please save the date/s!

Fruit and Vegetable Twilight Meeting

Featuring: Carl Hills and Kimball Fruit Farm's **hydroponic tomato greenhouse**.
George Hamilton, UNH Extension, will demonstrate and discuss proper **boom sprayer calibration** for fruit and vegetable crops.

Sonia Schloemann, UMass Extension, will provide an update on managing **spotted wing drosophila**.

**1.5 Pesticide recertification credits have been approved for this meeting

When: Monday, June 25th, 2018 from 4:00 pm to 7:00 pm

Where: Kimball Fruit Farm, 184 Hollis St, Pepperell, MA 01463

Organic Weed Management

Featuring: Langwater's Kevin O'Dwyer and their flame weeder and leaf mulching techniques. Invited presenters include: Katie Ghantous (UMass Vegetable Weed Technician) with a vinegar weed injector, on-farm trial and information on weed ecology; Sonja Birthisel (UMaine PhD candidate studying Weed Management) with results of her research using occulation and solarization, and farmer Tyson Neukirch with his experiences using silage tarps in a reduced tillage system for weed management.

When: Tuesday, July 24th, 2018 from 4:00 pm to 7:00 pm

Where: Langwater Farm, 209 Washington St., North Easton, MA 02356

UMass Extension Vegetable Program Research Tour and Round Table

Featuring: Sue Scheufele's research on cucurbit downy mildew resistance, pollinator protection in butternut squash, effects of different mulches on broccoli pests, and natural predators of cabbage aphid. Also, Madelaine Bartlett's research on corn genetics and the importance of genetics in crop development and improvement, Omid Zandvakili's research on lettuce nutrition, Kelly Allen's research on Fusarium wilt of basil, presentations on pollinators & agriculture and solar & agriculture, and more! Research presentations will be followed by dinner and a round table discussion.

When: Tuesday, August 14th, 2018 from 4:00 PM to 7:00 PM (Rain date: August 16th)

Where: UMass Crop and Animal Research and Education Farm, 89-91 River Rd., South Deerfield, MA 01373

Reduced Tillage and Transplanters for Vegetable Farmers

Featuring: Farmer Jim Ward and his reduced till vegetable cropping systems which he has practiced for over 10 years with the help of an Unverferth Deep Zone Tiller, Davidian Farm's two-row Monosem vacuum precision planter mounted with Dawn Biologic roller crimpers (first ones in the state!), the UMass Research Farm's grain drill and roller crimper, and Brookdale Fruit Farm's new line of no-till transplanters from Checchi-Magli. There will also be demonstrations on Soil Health with Maggie Payne, Soil Scientist at NRCS.

When: Tuesday, August 28th, 2018 from 4:00 PM to 7:00 PM

Where: Ward's Berry Farm, 614 S Main St., Sharon, MA 02067

Respirator Train-the-Trainer Course for Farmers, Beekeepers, and Other Employees who Need to Use Respirators

UMass Extension is offering a series of Respirator Train-the-Trainer workshops in 2018. Farmers, beekeepers and other who need to wear respirators, required by pesticide labels, can benefit from the workshop. Participants will learn how the fit test a respirator and select, use, clean, maintain and replace respirators. All handlers must be trained under the EPA Worker Protection Standard (WPS) Respirator Requirement if they apply any pesticide that requires a respirator. Several organic approved (OMRI) pesticides and some miticides used by beekeepers require respirators.

The respirator train-the-trainer workshops are 2 hours long and will be held in Marlboro, Taunton, Hadley, and Marlborough. The registration fee is $30.00 per person. Participants will received a Certificate of Attendance, a check list for respirator training, and a fit test protocol. This is an hands on workshop. Bring your respirator or use one of ours.

There is one workshop left in this series. To register via the mail please click here for the registration form. To register online with a credit card (extra $5.00/person) see below.

When: Tuesday, June 19, 2018 from 1:15 PM to 3:45 PM

Where: Best Western Royal Plaza Hotel, 181 Boston Post Road West, Marlborough, MA 01752

REGISTER HERE: https://www.regonline.com/registration/Checkin.aspx?EventID=2267202

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

Where trade names or commercial products are used, no company or product endorsement is implied or intended. Always read the label before using any pesticide. The label is the legal document for product use. Disregard any information in this newsletter if it is in conflict with the label.

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