UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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In this issue:

Vegetable IPM field walk at Flats Mentor Farm in Lancaster, MA

Crop conditions

As summer pickers and weeders return to school, harvest season is still in full swing. More demand is being placed on farmers, H2A temporary agricultural workers, and year round staff to get the job done. With the labor shortage, beans are going by the way side. Sweet Corn is continuously being harvested yet not quite meeting demand across the state. Despite making targeted fungicide applications, Northern Corn Leaf Blight is reportedly spreading. The drier weather last week with less than an inch of rain in most places helped to ripen tomatoes and peppers. Some used the dry weather as an opportunity to get onions out of the field and into storage. Sweet potatoes are sizing up. As major storage crops are being harvested, farmers are noticing the effect of planting date on final harvests. One farmer reported a weak winter squash harvest planted in May during a dry spell but an excellent pumpkin crop planted in June. Greenhouse seeding for Fall and Winter CSA's are underway with crops such as turnip, radish, broccoli rabe, cilantro, spinach and lettuce mix.

Pest alerts

Late blight has been reported in several new farms and gardens across MA over the past week. There are still no reports of the disease on potato in MA but the disease has been confirmed on potato in Northern VT and ME as well as NY and PA. Environmental conditions remain extremely conducive to disease development and spread so be sure to scout tomato and potato fields carefully and often, and report outbreaks to your local extension service so the disease can be tracked. Submit suspicious plant tissue to the UMass Plant Disease Diagnostic Lab. Researchers at UMass will use these samples to study the genetic diversity of the pathogen population. **Forecast and Recommendations:** If you don't have late blight on your farm yet, work out your tomato harvest schedules so that you can continue regular fungicide applications, and continue spraying potatoes as long as vines are green; vine kill as soon as tubers are the desired size. The recommendations in Table 1 are based on weather data collected at NEWA weather stations, assuming the cultivar is susceptible, and that chlorothalonil is the fungicide sprayed. Some fungicides (eg, copper) may need shorter intervals, while others (systemic, oomycete-specific products) can remain effective for longer periods. For the best recommendations based on conditions at your farm sign up for the late blight Decision Support System (DSS) which incorporates these variables. Track disease progress at USA BLIGHT.

Cucurbit Downy Mildew New reports were confirmed on cucumber in Middlesex County, MA in Newport County, RI and in western NY on cucumber and cantaloupe. So far the disease has been confirmed on cucumber, butternut, and other winter squash in New England. The CDM IPM-PIPE is forecasting a moderate to high risk of spread in MA and most of New England. Scout cucurbit crops often and maintain a spray program alternating protectant fungicides with those that have specific activity against Downy Mildew (see NE Veg Guide for details).

Garlic seed can suffer from a variety of seed-borne diseases including white rot, Botrytis, Fusarium, or stem and bulb nematodes. There are no certifiers of disease free seed in the Northeast (please let us know if you find one) but some precautionary measures can still be made. If saving your own seed be sure to cure them properly and inspect the seed carefully, submitting any abnormal samples for diagnosis (UMass Disease Diagnostic Lab: 413-545-3208). An article printed in a July, 2013 issue of Vegetable Notes covers important Garlic Curing and Storage considerations. If purchasing new seed, ask if the seed has been diagnosed and shown

Table 1. GDD and BLITECAST output for Late Blight Management				
DATE: 8/29/2013	GDD Base 50F	Accumulated LB Severity Values - 7 days	Accumulated Rainfall - 7 days (in)	Recommended Spray Interval (days)
Pittsfield	1713.5	6	0.74	5
Ashfield	1861.2	0	0.37	6
Belchertown	2200.3	3	0.32	5
Harvard	2171.0	2	0.06	5
Dracut	2194.0	3	0.00	5
Boston	2238.7	1	0.08	5
East Bridgewater	2207.0	9	0.11	5
Seekonk	2312.6	7	2.16	5
Barnstable	2109.1	8	0.36	5

to be free of white rot, botrytis or nematodes and not extensively contaminated with Fusarium to avoid spreading a problem into new fields and future seeds.

Cabbage Looper, Imported Cabbage Worm, Diamondback moths and in some cases Cross-striped cabbage worm are causing marketable damage in some parts of the state, particularly on leafing green brassicas. The threshold for application of an insecticide in leafy greens is 15% of the crop infected with one worm or more. Look carefully, as often the pelleted frass is found before a cabbage worm. For treatment options, see the New England Vegetable Management Guide.

Fall armyworm (FAW) damage is being reported from several locations around the state. FAW prefernetially feeds on grasses such as corn but has a broad host range including many vegetable crops. See the sweet corn report below for scouting and control recommendations.

Spider mites have been reported to cause problems in Massachusetts tomatoes this year. Other vegetable hosts include eggplant, potato, vine crops such as melons, cucumbers, among others. Two-spotted spider mites (TSSM) are one of the most important pests of eggplant. They have up to 20 generations per year and are favored by excess nitrogen and dry and dusty conditions. Outbreaks are often caused by the use of broad-spectrum insecticides which interfere with the numerous natural enemies that help to manage mite populations. As with most pests, catching the problem early will mean easier control. A 10X hand lens is key for identifying the mite species, but injury and webbing can be seen with the naked eye.

Spotted Wing Drosophila numbers continue to increase. We are consistently catching them in all locations across the state where we have traps. Trap captures average over 100 each of males and females (up from approximately 70 males and 60 females per trap on average last week) with some locations with very low numbers and others with over 600 total SWD. This is consistent with reports from other states in the Northeast and upper Midwest. Some conventional growers are reporting good success with a rotation of Delegate and Assail + sugar on a 7 day schedule. Some organic growers are reporting adequate control with a combination of mass trapping, alternating Entrust and Neem or Oxidate, and some exclusion netting for small scale production. Either approach must also incorporate frequent harvest, good canopy management (pruning for good air circulation), and prompt refrigeration of harvested fruit in order to be successful. Consumer education is also helpful especially in PYO settings where customers can help by removing overripe or damaged fruit from the field for a credit toward their purchase.

Food Storage Survey. The UMass Extension Vegetable Program is conducting research on farm produce storage practices and facilities in New England in collaboration with UMass Building Sciences. We are conducting a survey to achieve two goals: to determine what storage facilities and methods are currently prevalent, what problems exist and how these may be mitigated and improved; and to offer an energy audit of each respondent's storage and offer a report based on their responses to measure energy efficiency and cost of operation. This information will serve as a baseline that will allow us to develop technologies and techniques to ensure optimum crop storage conditions while achieving energy efficiency and low-cost operation. The survey is available online here and should take about twenty minutes to complete. Any information you are able to provide is greatly appreciated. We look forward to working with you as our efforts and research continues and thanks for your time in participating in this survey and best of luck in the coming months. - *Ben Weil and Luke Doody, UMass Building Energy*

Sweet corn report

European corn borer trap captures are low this week with most locations reporting counts ranging from 0 to 8. Sunderland, MA and Litchfield, NH were the outliers reporting counts of 15 and 17 total ECB moths, respectively. Corn earworm counts are also lower than last week, and unusually low for the week before Labor Day. Half of our reporting sites are receiving no-spray recommendations, with most others at 5-6 days. The recommended interval in Hadley, MA is 4 days with a CEW trap count of 10.

Fall armyworm (FAW) damage is being reported from several locations around the state. Trap counts aren't necessar-

Table 2. MA Corn Trap Counts 8/23/13 - 8/29/13				
Location	**Total ECB reported**	**CEW Nightly Average**	**CEW Weekly Total**	**Spray interval on silk**
CT Valley				
South Deerfield	1	0.6	4	*5 days*
Sunderland	15	0.0	0	*no spray*
Hatfield	4	0.7	5	*5 days*
Hadley-1	3	1.4	10	*4 days*
Hadley-2	7	0.0	0	*no spray*
Feeding Hills	0	0.0	0	no spray
Central & Eastern MA				
Spencer	1	0.0	0	*no spray*
Tyngsborough	4	0.6	4	*5 days*
Lancaster	0	0.1	1	*no spray*
Concord	4	0.3	2	*6 days*
Millis	n/a	0.7	5	*5 days*
Northbridge	8	0.0	0	*no spray*
Rehoboth	0	0.7	5	*5 days*
NH				
Litchfield	17	0.3	2	*6 days*
Hollis	0	0.0	0	*no spray*
Mason	5	0.1	1	*no spray*

ily high, but FAW is in fields. Damage is being found in small, pre-tassel corn. Feeding damage from FAW caterpillars occurs first in whorl stage corn, deep within the whorl, on leaves and in the newly forming green tassel. Watch whorl stage corn for ragged feeding damage and masses of sawdust-like excrement. FAW larvae eat into the side of corn ears, leaving behind frass and a large hole. They also feed in the tip, making a mess of the kernels. The most effective way to prevent ear damage is to apply controls during whorl and pre-tassel stage. If flights are very high, silk sprays may be needed. Monitor FAW moth flights with a bucket trap (eg Universal Moth Trap or Multipher traps) with a lure (Scentry lure, PSU type) clipped under the lid and a vapor strip placed inside the trap. Hang the trap on a stake at plant height in whorl stage corn. Count moths at least weekly. Replace lure every two weeks. Replace vapor strip every 4-6 weeks. Scout whorl and pre-tassel corn by checking 100 plants in groups of 10 or 20 in a V or X pattern across the field. Avoid checking only field edges, and start at random, not only where you can see damage. A plant is infested if at least one caterpillar is found. If feeding damage is old and no larva is found, the caterpillar may have left the plant to pupate in the soil. If 15% or more of plants are infested with FAW, a control is needed. In emerging tassels, combine counts for ECB and FAW. For example, if 10% of plants have FAW and 12% have ECB, use the combined infestation to determine treatment. Moths (males) have mottled brown forewings with a slanting white bar across the wing, and plain light tan hindwings. They measure about three quarters of an inch long. Female moths lay clusters of eggs on the leaves of a variety of host plants, preferring whorl stage corn to older corn. Eggs hatch in 2-10 days, depending upon temperature. Caterpillars are smooth (unlike CEW) and dark green or brown with lengthwise stripes and dark spots. Full-grown larvae reach 1 1/2 inches. The head capsule is dark with a distinctive light colored marking in the form of an upside down Y.

A grower in Western MA reports that Northern Corn Leaf Blight, found several weeks ago in a block of now-harvested corn is spreading into younger plantings. Ripe corn is showing some yield loss, and a pre-tassel planting is showing signs of disease as well. Contact the UMass diagnostic lab (413.545.3209) for assistance if you suspect NCLB in your fields. Fungicides may be applied, starting when lesions are first observed but should not be used once sweet corn is at harvest. Fungicides registered for sweet corn include chlorothalonil (Bravo), mancozeb (Dithane), propiconazole (Tilt), and azoxystrobin plus propiconazole (Quilt).

- L. McKeag, University of Massachusetts Vegetable Extension

PUMPKIN AND WINTER SQUASH HARVEST AND STORAGE

Winter squash and pumpkin fruit that remain in the field face a daunting list of diseases, insects and weather events that could threaten fruit quality. Early harvest and careful storage is often preferable to leaving fruit in the field. This is especially true if you know that your pumpkins or squash are in fields that are infected with Phytophthora blight (Phytophthora capsici) as symptoms can develop on fruit even if they are asymptomatic at harvest.

Since the pumpkin market lasts from Labor Day to Halloween, pumpkins may need to be held for several weeks before they can be marketed. When is it best to bring then in, and when to leave them in the field? If the vines are in good condition, the foliage can protect the fruit from sunscald. If foliage is going down from powdery mildew or downy mildew, this

may help with ripening and make harvesting easier, but also increases the risk of sunscald or injury to pumpkin handles. There can be extra work involved in bringing fruit in early, especially for growers who normally have pick-your-own harvest. However, we recommend that growers harvest as soon as crops are mature and store under proper conditions, if it is feasible. If you need to hold fruit in the field for pick-your-own or any other reason, using a protectant fungicide (e.g. chlorothalonil) can protect against black rot and some of the other fruit rots. Scout for insects feeding on the fruit and handles, which may include squash bug nymphs or adults, striped cucumber beetle, and squash vine borer and control them if damage is evident. See the New England Vegetable Management Guide for treatment recommendations.

What about pumpkin stems, i.e. handles? In some cases, it's the handle that sells the pumpkin. Pumpkins may not be marketable if the handle is broken off or dried up. Ideally, if the timing is right, pumpkins would be cut from the vine one to two weeks prior to marketing. However, if they are harvested now they may sit much longer before being sold. The discussion of how early to cut handles is an old one with many different opinions. One view is that it is advisable to cut the handles from the vine to save them from advancing powdery mildew and reduce shrinkage. Whether or not handles shrink and shrivel after cutting is affected by plant stress, genetics (variety), moisture and temperature conditions, and disease. There are many diseases that can affect handles, including Powdery mildew, Plectosporium, Fusarium, Black Rot, and Alternaria. Again, proper curing and storage conditions are key.

Ideally, pumpkins should be harvested when fully mature, with a deep orange color and hardened rind. Similarly winter squash should be harvested when mature, as indicated by corking of the stem, loss of rind surface sheen or gloss, groundspot yellowing, and die-back of the tendril nearest to the fruit. As long as pumpkins have started to turn color, they will ripen off the vine if held under the proper conditions. While not ideal, this may be preferable to leaving them in the field if conditions are not favorable. If necessary, pumpkins can be ripened in a well-ventilated barn or greenhouse. The best temperatures for ripening are 80-85 degrees Fahrenheit with a relative humidity of 80-85%. Night temperatures should not drop below the sixties. These are the same conditions as those used for curing. A period of curing is often recommended for squash or pumpkin showing non-hardened skin or surface damage. However, research on this subject has produced variable results, and shows that curing squash is not consistently beneficial when the squash shows no damage or is well matured in the field. The curing period is typically about 10 days. During this process the fruit skin hardens, wounds heal, and immature fruit ripens – all of which prolong the storage life.

Take care to avoid subjecting squash or pumpkin to chilling injury. Chilling hours accumulate when squash or pumpkin is exposed to temperatures below 50°F in the field or in storage. Injury increases as temperature decreases and/or length of chilling time increases.

Storage life depends on the condition of the crop when it comes in and your ability to provide careful handling and a proper storage environment. All fruit placed in storage should be free of disease, decay, insects, and unhealed wounds. When harvesting squash and pumpkins, it is important to handle the fruit with care to avoid bruising or cutting the skin. Despite their tough appearance, squash and pumpkin fruit are easily damaged. The rind is the fruit's only source of protection. Once that rind is bruised or punctured, decay organisms will invade and quickly break it down. Place fruit gently in containers and move bins on pallets. Use gloves to protect both the fruit and the workers. Removal of the stem from squash (butternut, Hubbard, etc.) will also decrease the amount of fruit spoilage because the stems frequently puncture adjacent fruit, facilitating infection. These fruits need a period of curing to heal the stem scar, which can be done in windrows in the field if weather is favorable.

Growers often plan to store winter squash until January, February or March. Select fruit that are free from disease and haven't been subject to much chilling (below 50°F). Chilling injury is of particular concern with squash intended for storage because it increases the likelihood of breakdown. If squash has been exposed to chilling injury it should be marketed first and not selected for long-term storage. Remove squash from the field if temperatures are likely to drop below fifty degrees for any length of time. Be sure that storage areas have the capacity to maintain temperatures above 50 F throughout the storage space.

Pumpkins and winter squash should be stored in a cool, dry, well-ventilated storage area. Ideal temperatures are between 55° and 60° F with relative humidity of 50 - 70%. High relative humidity provides a favorable environment for fungal and bacterial decay organisms. Lower humidity can cause dehydration and weight loss. Higher temperatures increase respiration and can cause weight loss. Temperatures lower than 50° F cause chilling injury. In a greenhouse, temperature can be managed with ventilation on sunny days; heaters will be needed for storage into November and beyond. Fruit tempera-

ture should be kept as close to the temperature of the air as possible to avoid condensation, which can lead to rot. Under ideal conditions, disease-free pumpkins should have a storage life of 8-12 weeks and butternut squash up to three or four months. Even if it is difficult to provide the ideal conditions, storage in a shady, dry location, with fruit off the ground or the floor, is preferable to leaving fruit out in the field.

As you plan for storage and marketing, keep in mind that the market for pumpkins seems to get earlier every year. Fall decorative displays include pumpkins, and those displays begin showing up as Labor Day approaches. One of the best solutions to early-maturing pumpkins may be finding an early market.

--R. Hazzard, compiled from multiple sources.

IDENTIFYING POTATO TUBER DISEASES

Scab caused by Streptomyces scabies
Photo by RW Samson

Early blight caused by Alternaria solani
Photo by S. Jensen

Dry Rot caused by Fusarium spp.
Photo by C. Averre

Black Scurf caused by Rhizoctonia solani
Photo by MSU

Potato harvests are well underway on many MA farms and tubers are making their way to fresh markets or storage facilities. There are many diseases that affect potato tubers so as you begin to sort through your potato harvest take a moment to check for disease symptoms. Proper identification will help you decide which tubers will store well or should be sold as tablestock, and will give you a better idea of which soil-borne diseases are present in your fields and improve future rotations.

Common Scab (*Streptomyces* spp.) produces tan to dark brown, circular or irregular lesions which are rough in texture. Scab may be superficial (russet scab), slightly raised (erumpent scab), or sunken (pitted scab). The type of lesion is dependent on potato cultivar, tuber maturity at infection, organic matter content of soil, strain of the pathogen, and the environment. Scab infections can reduce marketability of potato crop but will not spread in storage.

Early Blight (*Alternaria solani*) usually affects potato foliage but tuber infections can also occur. Tuber lesions are dark, sunken, and circular often bordered by purple to gray raised tissue. The underlying flesh is dry, leathery, and brown. Lesions can increase in size during storage and tubers become shriveled.

Fusarium Dry Rot (*Fusarium* spp.) causes internal light to dark brown or black dry rot of the potato tuber. The rot may develop at an injury site such as a bruise or cut. The pathogen penetrates the tuber, often rotting out the center. Extensive rotting causes the tissue to shrink and collapse, usually leaving a dark sunken area on the outside of the tuber and internal cavities. Disinfect containers before storing and keep temperatures below 50°F.

Black Dot (*Colletotrichum coccodes*) On potato foliage symptoms are nearly indistinguishable from early blight and on tubers it produces tiny black sclerotia (fungus resting structures). Symptoms on tubers can be easily mistaken for silver scurf.

Silver Scurf (*Helminthosporium solani*) affects only tuber periderm. Lesions are initiated at the stolon end as small pale brown spots which may be difficult to detect at harvest but will continue to develop in storage. In storage, lesions may darken and the skin may slough off and many small circular lesions may coalesce to form large affected areas. Tubers may also become dried out and wrinkled due to excessive moisture loss in storage. Avoid late harvest, prevent condensation and maintain high relative humidity and low temperature during storage.

Black Scurf and **Rhizoctonia Canker** (*Rhizoctonia solani*) Black scurf is purely cosmetic and does not reduce yield or spread in storage. Irregular, black, hard masses on the tuber surface are sclerotia of the fungus. Presence of these sclerotia may be minimized by harvesting tubers soon after vine-kill and skin set. However, *R. solani* can also attack underground sprouts and stolons, reducing tuber production and yield and

Canker caused by Rhizoctonia solani
Photo by Clemson U.

deforming tubers. The fungus causes cankers on tubers which can be small and superficial but may be large, sunken and necrotic. These diseases are most common in cool, moist soils.

Pink Rot (*Phytophthora erythroseptica*) and **Pythium Leak** (*Pythium* spp.) Pink rot infections start at the stolon end and result in rotten and discolored periderm with a clear delineation between healthy and diseased tissue. When exposed to air, tuber flesh turns pink and then brown-black. *Pythium* spp. that cause leak infections invade tubers through harvest wounds and continue to develop in transit and storage. Infections result in internal watery, gray or brown rot with well-defined red-brown lines delineating healthy and diseased tissue. Avoid harvesting during warm, wet weather, cure for proper wound healing and keep temperature low to reduce disease spread in storage.

Late Blight caused by Phytophthora infestans

Late Blight (*Phytophthora infestans*) affects potato foliage and tubers. Early foliar symptoms are brown to black, water soaked lesions on leaves and stems which produce visible white sporulation at the lesion margins under humid conditions. Whole plants and fields may collapse rapidly. Tuber infection is initiated by sporangia from foliage being washed down into the soil and usually begins in wounds, eyes, or lenticels. Lesions are copper brown, red or purplish and white sporulation may occur on tuber surfaces in storage or cull piles. Infected tubers are susceptible to infection by soft rot bacteria which can turn entire bins of potatoes in storage into a smelly, rotten mass.

Black Heart is physiological disorder caused by lack of oxygen during storage which causes the tissue to die from the inside out and turn black. The condition is not reversible but if you notice it quickly and correct your storage conditions you can prevent the whole crop from being affected.

-S. Scheufele, UMass Extension Vegetable Program

FOOD SAFETY RESEARCH UPDATE: TOMATO HARVEST

Produce safety continues to be a growing concern within the food industry. There are many steps being taken on farms to improve food safety practices. In an effort to improve sanitation, growers are increasingly using plastic materials to handle and pack fresh produce, replacing traditional wood crates and paperboard cartons. Further, some workers have begun wearing gloves in an effort to reduce contamination of hand harvested produce. Dr. Lynne McLandsborough from UMass Food Science Department recently completed a research project investigating survival, transfer, and inactivation of *Salmonella* on plastic materials used in tomato harvest. This research project examined some practical cleaning & sanitization practices that will effectively manage food safety risks in tomato production.

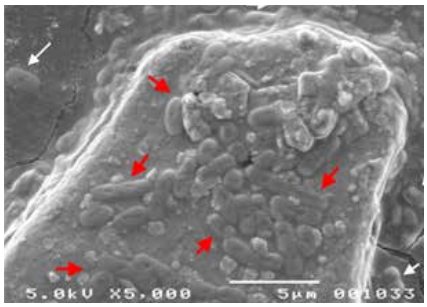

Figure 1: Salmonella + 5% soil after 14 days at 53% relative humidity at 20°C

Salmonella spp. survival on plastic bin material.
Experiment. Treatments in this study included varying inoculation levels and comparing soiled vs. non-soiled buckets. Survival of *Salmonella* spp. was evaluated over 28 days.
Results. Other research has shown that survival of *Salmonella* spp. on plastic bins is greatly enhanced by the presence of soil suggesting that routinely cleaning harvest buckets is imperative to decreasing food safety risks. The survival of *Salmonella* spp. dried onto harvest bin materials was investigated in this study. Bacterial cells survived up to 28 days and were observed to associate with soil particles (Figure 1). Presence of soil adhering to buckets significantly increased bacterial survival.

The influence of glove material for transfer of Salmonella from gloves to tomatoes.
Experiment. *Salmonella* spp. inoculum was applied to different glove material types (vinyl, latex, nitrile and low density polyethylene). Studies were conducted to measure the levels of *Salmonella* spp. transferred onto tomatoes by different glove materials.
Results. Bacterial transfer from gloves to tomatoes occurred regardless of the glove material tested but the level of

transfer to tomatoes varied according to glove material type and tomato type (ripe grape tomatoes or semi-green ripening tomatoes). In general, vinyl and nitrile showed less transfer of *Salmonella* spp. to tomatoes than latex or low density polyethylene gloves, indicating stronger adhesion of *Salmonella* spp. to these materials. The data indicate that using gloves consisting of nitrile or vinyl may reduce *Salmonella* transfer to tomatoes. Other researchers have also demonstrated that nitrile gloves result in less transfer of bacteria than do cotton cloth gloves. However, since all glove materials could transfer bacteria to tomatoes, it is important that good hand and glove hygiene practices are followed to minimize contamination.

The influences of bucket wear for bacterial transfer and clean-ability.
Experiment. Traditional plastic harvest buckets (old and new) were sourced and characterized for physical surface differences. "Old" buckets were fabricated by simulating field abrasions and the following factors were compared: new vs. "old" buckets, soiled vs. non-soiled surfaces, and bleach concentration (50ppm, 100ppm and 200ppm).
Results. Abraded bins showed the same or less bacterial transfer than new bins. This is likely due to a reduction in contact area between the inoculated surface and the fruit. Cleaning and sanitation of bin materials using 50 ppm bleach was less effective when soil was present on bucket materials but at higher bleach levels (100 or 200 ppm) this was not observed. No statistical difference in sanitation sensitivity was observed when materials were abraded to simulate worn conditions. These results indicate that cleaning should be done prior to sanitization to ensure adequate disinfection of buckets.

Good Agricultural Practices should always be followed when handling produce.

Wash and sanitize your buckets prior to use to remove dirt and debris and reduce contamination risks. Containers should be rinsed with water, scrubbed with detergent, rinsed again to remove loosened soil and detergent, and then sanitized (following the manufacturer's directions).

Click here to find OMRI Listed Sanitizers and Cleaners for Organic growers

Click here to find Basic Elements for Equipment Cleaning and Sanitizing in Food Processing and Handling Operations

More Cleaning and Sanitizing Resources for Farms: On-farm Food Safety: Cleaning and Sanitizing Guide, Post Harvest Chlorination, On-Farm Cleaning: Cleaning and Sanitizing with Food Safety in Mind

Be sure that your harvest team uses nitrile or vinyl gloves properly during harvest. Train your staff about proper glove hygiene practices, i.e. wash your hands prior to using gloves, and discard disposable gloves when they become soiled or damaged.

This project was funded by the Center for Produce Safety (Award SA7662). Julie Goddard and Wes Autio from the Stockbridge School of Agriculture are co-investigators on the project.

-Compiled by Amanda Kinchla from research conducted by Dr. Lynne McLandsborough, UMass Food Science Department

NEW NUTRIENT MANAGEMENT REGULATIONS

Vegetable Growers in the Commonwealth of Massachusetts are advised to stay up to date with changing nutrient management requirements in the state. Last year, the Massachusetts Legislature passed Chapter 262 of the Acts of 2012, An Act Relative to the Regulation of Plant Nutrients. This new law directs the Massachusetts Department of Agriculture (MDAR) to "promulgate regulations that specify when plant nutrients may be applied and locations in which plant nutrients shall not be applied." MDAR is currently developing the regulations which are scheduled to take effect on January 1, 2014. The full text of the new Act can be found here: Chapter 262 of the Acts of 2012.

It should be noted that the UMass Vegetable Program information is not regulatory, but is intended to provide practitioners and others involved in the management of soil fertility and the regulation of plant nutrients with sound, up-to-date technical information. Best Management Practices and resources for developing and implementing nutrient management plans on vegetable farms can be found in the following locations:

1) Vegetable Production Best Management Practices (BMPs) for Environmental and Water Resources are those farm operations which promote efficient use of resources, safety for consumers and farm workers, and economic viability of

farms. In addition, BMPs are designed to minimize potential negative effects of vegetable production upon the environment and water resources. Practices that form the basis of a nutrient management plan can be found in the Complete Checklist chapter of the Vegetable BMPs within the Nutrient Management section that begins on page 18 in the Checklist. The Manure Management section beginning on page 33 in the Checklist provides complementary information. Click here for the "BMP Complete Checklist".

2) New England Vegetable Management Guide. This publication has a recently revised soil and nutrient section (http://nevegetable.org/cultural-practices) that includes the following segments that are useful in the development and implementation of a nutrient management plan for vegetable production. These segments include: Fundamentals of Soil Fertility, Plant Nutrients, Guidelines for Organic Fertilization, and Soil Health. This publication provides more depth than the BMPs, referenced above, and includes tables that are useful for calculating specific crop needs as well as the nutrient value of various amendments. The Crops section of the Guide, http://nevegetable.org/crops, includes a nutrient management section for each crop. These crop specific nutrient management sections include tables that give recommended application rates for N, P and K for given soil test results (very low, low, optimum, above optimum). The tables also provide recommendations on how to use split applications (e.g. how much to broadcast preplant, and how much for one or two sidedress applications). These tables are an essential tool in the formulation of a nutrient plan for each crop. The online version of the Guide has been updated as of July 2013, and will be the content of the printed 2014-2015 New England Vegetable Management Guide.

3) Massachusetts Commonwealth Quality (CQ). The intention of Commonwealth Quality, a brand designed by the Massachusetts Department of Agricultural Resources, is to help consumers easily find farm fresh fruits and vegetables that are safe, sustainable, and produced in an environmentally friendly way by local farms in Massachusetts. The CQ program checklist includes a section on nutrient management useful in the formulation of a nutrient management plan. To qualify for CQ, growers must meet a minimum percentage of the practice points in the CQ guidelines established by UMass Extension. The summary score sheet lists 6 fundamental nutrient management practices in Section 3 for the checklist found here: http://ag.umass.edu/agriculture-resources/commonwealth-quality

-Updated by Katie Campbell-Nelson, UMass Vegetable Extensions and Mary Owen, UMass Extension Turf Specialist & Turf Program Coordinator

UPCOMING EVENTS

Twilight Meeting at Tangerini's Farm

When: Wednesday, September 18, 4pm to 7pm
Where: Tangerini's Spring Street Farm, 139 Spring Street, Millis, Massachusetts 02054

Join us at Tangerini's Farm for a vegetable twilight meeting, hosted by Laura and Charlie Tangerini. Theirs is a 67-acre working family farm that was established in 1995 on land that has been in agriculture since the early 1800's. They run a year-round CSA and in 2010, they built a custom-designed, half-underground storage facility for winter vegetables that has three bays with separate temperature and humidity controls. We will talk about their production and storage practices , as well as the work they have been doing with UMass Extension to implement IPM strategies on their farm. We will also have as a guest Heather Vitella, who runs Cover Crop Marketing and with whom Laura put together an e-book for CSA first-timers called The CSA Survivial Guide, to discuss strategic marketing for farmers.

Vegetable Notes. Ruth Hazzard, Katie Campbell Nelson, Lisa McKeag, Susan Scheufele, co-editors. Vegetable Notes is published weekly from May to September and at intervals during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted.