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Berry Notes

Prepared by the University of Massachusetts Fruit Team

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UPCOMING MEETINGS

Strawberry fields are now in harvest. Continue to watch for tarnished plant bug on later varieties and two-spotted spider mite on all varieties. Spittlebug may also be found at this time of year (see article from Maine below). Rain during bloom may have set the stage for Botrytis problems in fruit in many locations. Try to remove rotting fruit from field to reduce spread from berry-to-berry. Also, strawberry sap beetle may become a problem if excess fruit remains in the field. **Raspberries/blackberries** are in bloom to green fruit. Tarnished plant bug and mites can also be a problem now in these crops. Cane borers damage may be found on primocanes soon. Cut out infested canes as they appear and remove from the field. Potato leafhopper may also appear soon. Look for stunted canes (shortened internodes) Be on the lookout for Orange Rust on black raspberries and blackberries. If rainy weather returns, bloom sprays for botrytis may be needed. Also keep an eye out for symptoms of fireblight in raspberries. Conditions have been very favorable for Fire Blight in apples this season and this may also be true for raspberries. **Blueberry** fruit is sizing up. Now is the time to monitor for cranberry fruitworm. Also, be aware of aphid infestations, which can lead to virus infections. **Grapes** are approaching bloom. Final rounds of shoot thinning are best done now before tendrils start to wrap around stuff. Thin for good air movement and sunlight penetration into the canopy. **Currants and Gooseberries** have an impressive fruit set this year. As harvest approaches be sure to cool fields with overhead irrigation during high heat periods or fruit drop may occur.

New Pest Alerts:

- Brown Marmorate Stink Bug: <http://ento.psu.edu/extension/factsheets/brown-marmorated-stink-bug>
- Spotted Wing Drosophila: <http://www.ipm.msu.edu/SWD/E-3140.pdf>

ENVIRONMENTAL DATA

The following growing-degree-day (GDD) and precipitation data was collected for an approximately one-week period, May 26 through June 1, 2011. Soil temperature and phenological indicators were observed on or about June 1, 2011. Total accumulated GDDs represent the heating units above a 50° F baseline temperature collected via our instruments for the 2011 calendar year. This information is intended for use as a guide for monitoring the developmental stages of pests in your location and planning management strategies accordingly.

Region/Location	2011 Growing Degree Days		Soil Temp (°F at 4" depth)	Precipitation (1-week gain)
	1-week gain	Total accumulation for 2011		
Cape Cod	151	385	65°	0.00"
Southeast	159	397	68°	1.10"
East	148	389	67°	0.00"
Metro West	166	429	68°	0.02"
Central	166	388	62°	0.01"
Pioneer Valley	157	427	74°	0.10"
Berkshires	142	340	68°	0.25"
Average	156	394	67°	0.21"

(Source: UMass Extension Landscape Message #13 June 3, 2011)

STRAWBERRY

Spittlebug in Strawberries

David Handley, Univ. of Maine Extension

We have been finding spittlebug masses in some strawberry beds this week. The frothy spittle masses are found on the leaf stems (petioles), just below the leaflets, usually showing up around bloom. Although spittlebugs don't pose a significant threat to the plants, the frothy spittle masses create an annoyance for pickers.

Spittlebugs overwinter as eggs and the nymphs emerge in late May. Start scouting for spittlebugs when the plants are at about 10% bloom. Randomly inspect five one-square foot areas per field every week. On hot, dry



days the spittle masses may be at the base of the plants, so spread the leaves and inspect the crowns, leaf bases, leaf stems, and flower stems looking for the frothy spittle masses. The small, yellow-orange nymphs will be under the spittle. If the average number of spittle masses is more than two per square foot, a treatment may be warranted. Spittlebugs tend to be a greater problem in weedy fields.

Pesticides currently registered for spittlebug control include Provado®, Thionex®, Danitol® and Brigade®. (Source: Strawberry IPM

News No. 3, June 3, 2011)

Leather Rot of Strawberry Fruit Found on LI

Meg McGrath, Cornell Univ.

Large, light brown rotting spots on immature and ripening strawberry fruit observed last week were determined to be leather rot. There was some white fungal growth on a few fruit. The pathogen grew extensively on fruit in a plastic bag. Fruit stems were sometimes brown at the fruit end. Characteristic appearance of this fruit rot is a rough, leathery texture to the affected tissue, which occurs at a late stage of development. Entire fruit can be affected. In contrast with other fruit rots, symptoms of leather rot on mature fruit can be a slight color change that is too subtle

for detection by inexperienced workers and many pick-your-own customers. Affected fruit have a very unpleasant taste. The pathogen can also affect blossoms and cause crown rot. Photographs will be posted at: <<http://www.longislandhort.cornell.edu/vegpath/photos/index.htm>>.

The pathogen causing this disease, *Phytophthora cactorum*, is similar to the closely-related and more familiar pathogen, *Phytophthora capsici*, in that it survives in soil and is favored by wet conditions. P.

cactorum survives in mummified diseased fruit between crops. Leather rot is reported as occurring most commonly in areas where water drainage into soil is poor and there was a period of time with standing water after rain. Fruit touching soil are more likely to be affected. Leather rot reportedly occurs sporadically but can be severe following excessive rainfall, with losses up to 50% reported by growers in OH.



pathogen in the soil and fruit. A planting site with good air movement and full sun will have minimal time periods that fruit are wet and thus in a favorable condition for infection. Leather rot can be effectively controlled with cultural practices alone unless conditions are very favorable. Some of the most effective fungicides for gray mold, a more common fruit rot disease on LI, (Elevate, Switch, Scala, and Topsin) are not effective for leather rot. Pristine is effective for both. Ridomil, Aliette, phosphorous acid

Since disease onset requires soil to be saturated with water to enable spores to germinate, a key component of management is minimizing the potential for soil to be saturated by selecting a planting site with good drainage, using raised beds, orienting rows to facilitate water drainage out of the field, and avoiding ruts between rows. Straw mulch can provide a barrier between the

fungicides, Abound and Cabrio and also effective for leather rot. (*Source: Long Island Fruit & Vegetable Update, No. 12, June 2, 2011*)

RASPBERRIES/BLACKBERRIES

Monitor for Orange Rust in Brambles

Annemiek Schilder, Michigan State Univ.

This is a good time to check blackberry and black raspberry plantings for orange rust. Red raspberries are immune. Characteristic symptoms are spindly shoots with clustered, misshapen, pale green to yellowish leaves, as well as bright orange, powdery blisters on the undersides of leaves. Before the blisters burst open, they look waxy or shiny, as if covered with lacquer. On black raspberries, the rusted leaves start to wither and drop in late spring to early summer. New leaves produced towards the tips of canes may appear normal, giving the impression that the plant has “grown out” of the disease. However, such canes will remain infected and will produce a mass of spindly shoots with no blossoms the following spring. The plant becomes systemically infected and remains so for the rest of its life. Orange rust does not usually kill plants, but it can significantly reduce vegetative growth and yield. The disease can be caused by either of two closely related fungi, *Arthuriomyces peckianus* or *Gymnoconia nitens*. The orange spores are spread by wind and can infect leaves of healthy plants with long periods of leaf wetness provided by rain or dew. Orange rust is favored by relatively low temperatures (50-70oF). The fungus overwinters in the crown and roots of infected plants, leading to the production of new infected canes every year.



Orange rust symptoms on the underside of a black raspberry leaf.

of planting. Upon inspection of plants each spring, any infected plants, which are economically worthless, should be dug up and destroyed promptly before rust pustules mature and spores are liberated. The location of those plants should be clearly marked, and any new suckers arising from root pieces left in the ground should be removed and sprayed with an approved systemic herbicide. It is also prudent to remove infected wild brambles in nearby wooded areas and fence rows. Management practices that improve air circulation, such as thinning out canes within the row, pruning out floricanes immediately after harvest, and effective weed control aid in disease control by reducing build-up of moisture in the planting. Some blackberry cultivars (e.g., Eldorado, Raven, and Ebony King) are reported to be resistant to orange rust, but no black raspberry cultivars are known to be resistant.

Fungicide options

The best fungicide options are Rally (myclobutanil), Pristine (pyraclostrobin + boscalid), and Cabrio (pyraclostrobin). While Abound (azoxystrobin) is labeled for use on brambles, it does not have orange rust (or any other rust for that matter) on the label. Rally may have a

Cultural control

While there were no chemical control options for this disease in the past, we now have several excellent

bit better curative activity than the others because of its greater systemicity, which would make it the material of choice during or after a rainy period with inoculum already being present. Each of the earlier-mentioned fungicides will also control various other cane, leaf, and fruit diseases. Since Pristine has two active ingredients, it has the broadest spectrum of activity. None of these fungicides will cure an already infected plant. However, they can prevent healthy plants from becoming infected. Since infected plants will continue to be sources of

inoculum over their lifetime, it is best to remove and destroy them altogether and replace them with healthy plant material from a reputable nursery. Apply fungicides upon first discovery of the blisters, preferably before they burst open and release spores. If the field has a history of the disease, sprays should be initiated before blisters appear. Since infections can also originate from wild brambles near the field, one should keep an eye on these as well if possible. (*Source: Michigan Fruit Crop Advisory Team Alert, Vol. 23, No. 8, May 27, 2008*)

Fireblight in Raspberries

Adapted from M. Heimann and S. Jeffers, Univ. of Wisconsin

A serious disease of apple and pear trees in New England, fire blight also affects many other members of the Rosaceae, including brambles. Raspberries are the most susceptible of the bramble fruits to infection by the fireblight bacterium (*Erwinia amylovora*) but other bramble can also be infected.

Symptoms

The most obvious symptom results from infection of the cane tips, which become blackened and curl over as they die and dry out. This ‘shepherd’s crook’ appearance is typical of fire blight symptoms on other host plants. As the disease progresses down infected canes, the leaf petioles and veins and surrounding tissue turn black. Discolored veins may be more apparent from the underside of leaves. Entire leaves may turn black, wither, and die. Typically, discoloration and dieback are limited to tender young growth at shoot tips.

The disease can affect fruit clusters as well. Infected fruit stems turn black and the young developing fruit becomes hard and dry.

Cause

Fire blight is caused by the bacterium *Erwinia amylovora*. Raspberry infections are caused by a different strain of the bacterium that what causes apple/pear infections and so infections can not travel from one to the other. Infections are most likely spread from plant to plant by insects, wind and splashing rain. Wet conditions in the canopy from rain, high humidity, overhead irrigation combined with warm temperatures favor disease development.

Disease Management

Cultural controls are very important in managing this disease. The following practices offer effective methods for limiting the spread of this disease in commercial raspberries:



Raspberry cane tip bent in ‘shepherd’s crook’ from fire blight. Photo from Wisconsin Cooperative Extension fact sheet A3499



Discoloration of leaf tissue along veins showing spread of bacteria in the plant. Photo from Wisconsin Cooperative Extension fact sheet A3499

1. Only plant with certified disease-free nursery material purchased from a reputable source
2. Use good sanitation practices in the field by removing and destroying all diseased and infested plant material as soon as it is found in the field and cleaning tools, especially pruning clippers, before using them in another field.
3. Manage insect pests to avoid transmission of diseases from one planting to another. Do this by regularly scouting the field to determine need rather than preventative spraying.
4. Do not overfertilize with nitrogen which stimulated excessive vegetative growth resulting in a dense and we interior canopy.
5. Plant and prune with an eye toward optimizing air circulation within the rows to help create good drying conditions as well as good spray penetration and coverage when sprays are applied.
6. Remove any wild brambles from surrounding areas which can be reservoirs of insect pests and pathogens than move into commercial plantings.

Cultivar Resistance

Fire blight infects red and black raspberries and blackberries. There are

not truly resistant cultivars available, but some are more susceptible than others. Boyne, K81-6, and Encore are identified as more susceptible to this disease.

Chemical Control

No chemical controls are specifically registered for fire blight in raspberry. A delayed dormant copper application

for other target diseases may help reduce inoculum, but may result in tissue damage in some copper-sensitive varieties. Following good cultural practices outlined above is recommended over relying on any spray applications. (*Source: Univ. of Wisconsin Fruit Factsheet Series.*)

BLUEBERRY

Blueberry insect pest activity picks up with the warmer weather

Rufus Isaacs and Keith Mason, Michigan State University

With fields past petal fall and small fruit sizing, fruitworm management should be the focus of grower's IPM programs for the next few weeks. Blueberry fields were scouted yesterday (June 6) in Van Buren and Ottawa counties, revealing fruitworm activity that indicates that growers with a history of these pests should be protecting berries from these insects.

Fruitworms

Cherry fruitworm moths were caught at all of the farms we scouted and the flight is peaking at the farms we checked in Ottawa County and past its peak in the Van Buren County sites we scout. We expect the flight for cherry fruitworm to continue to decline at southern Michigan farms in the next 7 to 14 days. Cranberry fruitworm flight has picked up at all the sites we visit, and moths were caught at all those sites. Cherry fruitworm eggs were first observed at the Grand Junction farm last week (May 31) and we observed eggs at all the farms we monitored this week.

~~Guthion~~, Imidan, Asana, Danitol, Sevin and Assail are all rated as being excellent insecticide options for control of fruitworms. Lannate can provide high activity, but has shorter residual control. There have also been recent registrations of the reduced-risk insecticides Delegate, Rimon and Avaunt that are registered for fruitworm and provide good levels of control. These also will control other pests: Delegate is labeled for control of fruitworms, leafrollers and for suppression of gall midge, maggot, and thrips; Rimon for fruitworms, spanworm, leafrollers and maggot; and Avaunt for fruitworms and spanworm, with activity also expected on plum curculio.

For any insecticide applied for fruitworm control, maintaining good coverage of the clusters is important to get residue to the parts of the berry where fruitworms are found such as in the calyx cup where eggs are laid. Because the larvae move over such a small distance before they enter the berries, it is important to use sufficient water and to consider spray additives (spreader-stickers) that will help spread the material across the berry surface. This is especially important for insecticides that need to be eaten by larvae for activity such as B.t. and Intrepid.

We have compared the level of fruitworm control at three one- to nine-acre fields in four commercial blueberry farms in southwest Michigan (two in Ottawa and two in Van Buren counties) over the past few years. At each farm, three fields with a history of fruitworm infestation were compared that received one of three programs comprised of insecticide applications at bloom, petal fall, and 7 to 10 days after petal fall. The three programs were (rates are all per acre)

1. Confirm at 16 oz, ~~Guthion~~ at 1.25 lb, ~~Guthion~~ at 1.25 lb,
2. Confirm at 16 oz, Asana at 9.6 oz, Asana at 9.6 oz or Mustang Max at 4 oz, and
3. Intrepid at 8 oz applied using the degree day model, Intrepid at 8 oz 10 to 14 days later, and Assail at 5.3 oz 7 to 10 days later.

All three programs were very effective at protecting fruit from fruitworm damage. Single berry damage (indicative of cherry fruitworm damage or the early stages of cranberry fruitworm feeding) was lowest in Program C, but this was not significantly different between programs: A) 1.1 percent damaged berries, B) 0.7 percent damaged berries, and C) 0.5 percent damaged berries.

Similar results were seen for multiple berry damage, which is a sign of advanced cranberry fruitworm feeding. No multiple berry damage was found in any fields treated with the IPM program and very low levels of multiple berry damage were seen in the other programs. The percentage of berries with cranberry fruitworm damage was well below 1 percent in all fields and there was no significant difference among treatments.

Aphids

We also have seen an increase in the number of blueberry aphids at the farms we scout. We observed single aphids and colonies with 5 to 10 individuals. Growers and scouts should continue checking fields for aphids, and with the high levels of rain this spring, there will be many vigorous young shoots for supporting aphid colonies. To scout for aphids, examine two young shoots near the crown on 10 bushes and record the number of shoots where aphids are found. Also record the number of shoots with parasitized aphids. Be sure to sample weekly from as wide an area in the field as possible to have a better

chance of detecting whether aphids are present. Although natural enemies, such as parasitic wasps, lady beetles, lacewings and hover fly larvae, can keep this pest in check, aphids can transmit blueberry shoestring virus, so growers may want to consider using an insecticide to control aphids if there are blueberry varieties that are susceptible to shoestring on the farm.

Leafrollers

A very low amount of feeding by leafrollers, much less than 1 percent of clusters with damage, was observed at the Grand Junction and West Olive farms. The number of these pests observed should diminish as growers apply insecticides to control fruitworms. Growers and scouts should continue to check fields for feeding damage by leafrollers during the next two weeks. To scout for these

pests, examine 10 shoots on 10 bushes on the field border and 10 shoots on 10 bushes in the field interior. Look for leaf or flower clusters that have feeding holes or webbing in the cluster. Leafrollers are generally not economically important in Michigan and they are normally very well controlled by insecticide applications targeting fruitworms.

Spotted wing Drosophila

As of June 6, no spotted wing Drosophila flies have been trapped. For more information about this new invasive pest, please check out MSU IPM's [spotted wing Drosophila page](#). (*Source: Michigan Fruit Extension News, June 7, 2011*)

Guthion may not be used in New England on Blueberries

Insect pest scouting information from west Michigan blueberry farms, June 6, 2011.

Van Buren County							
Farm	Date	CFW moths per trap	CBFW moths per trap	BBA % infested shoots	SWD adults per trap	BBM adults per trap	JB per 20 bushes
Covert	5-31	3	2	0	0		
	6-6	2	30	5%	0		
Grand Junction	5-31	14	1	5%	0		
	6-6	2	18	40%	0		
Ottawa County							
Farm	Date	CFW moths per trap	CBFW moths per trap	BBA % infested shoots	SWD adults per trap	BBM adults per trap	JB per 20 bushes
West Olive	5-31	4	0	15%	0		
	6-6	6	2	30%	0		

CFW = cherry fruitworm, CBFW = cranberry fruitworm, BBA = blueberry aphid, SWD = spotted wing Drosophila, BBM = blueberry maggot, JB = Japanese beetle

GRAPE

Canopy Management

Donn Johnson, University of Arkansas

This is the critical time period for canopy and crop load management practices to be done!

Shoot positioning of vines on high-wire trellis system should be underway in all areas of the region by now. This should begin when shoots are long enough to remain in place once they are positioned. For most varieties this occurs when they are around 20-24 inches in length. Shoot positioning is accomplished by “combing” the shoots, that is, separating them and positioning them perpendicular to the cordon and in a downward orientation. Delaying this operation can make it more costly to accomplish as the tendrils of adjacent shoots will begin to wrap around each other, making separating the shoots without breaking them more difficult.

Crop load adjustment should be done within two weeks past fruit set to get the most benefit from cluster thinning. Small-clustered cultivars such as Vignoles or Norton are

generally not cluster-thinned unless they are young and still undergoing canopy development. With moderate- to large-clustered cultivars it is recommended to follow the 2-1-None Rule: At fruit set, if the shoots are greater than 20 inches in length, **retain 2** clusters. If shoots are between 8 and 20 inches in length **retain 1** cluster. If they are less than 8 inches in length, retain **none**.

Leaf removal should begin shortly after fruit set and be done by the time the berries are pea-sized. It is accomplished by removing 6-8 leaves from the basal area of the shoot around the fruit clusters and should be done on the east (N-S rows) or north (E-W rows) sides of rows. Leave foliage of the south (E-W rows) or west (N-S rows) sides to protect the fruit from overexposure and sunburn. Leaf removal creates a favorable environment for developing high-quality fruit by allowing more

sunlight and air movement into the fruiting zone. At the same time it creates an unfavorable environment for diseases by decreasing humidity within the canopy and promoting more rapid drying of fruit after wetting events such as rains and dews. It can decrease disease pressure

from powdery mildew which is favored by shaded, humid conditions and from bunch rot diseases. It also facilitates better spray penetration and coverage of the fruiting zone and canopy interior. (*Source: Missouri/Arkansas Vineyard and Pest Mgt News, June 13, 2009*)

Potato Leafhopper

Alice Wise, Cornell University Extension

Potato Leafhopper: Time to review this occasional visitor. Potato leafhopper (PL) nymphs are pale yellow-green and walk sideways like a crab. The more slender lime green adults may also be present. This insect does not overwinter on Long Island, but rides warm air masses from the south May-June. The constant migration means all stages may be present at any one time in early summer and repeat invasions may occur. Thus PL infestations may be short-lived or may persist well into August.

PL injects a toxin when feeding, causing chlorosis (yellowing) and even browning of the leaf edge. Leaves are often cupped, especially on shoot terminals, which can also be stunted. It is notoriously difficult to scout for PL due to the extremely high mobility of this pest. Many managers visually estimate damage and do an informal “trellis shake” to help gauge the severity of infestation. In apples, a threshold of 1 nymph per leaf is used, out of 50 - 100 leaves counted per orchard block. Mature vines can tolerate some injury as damaged terminals are often hedged off. Moderate to severe injury on both terminals and laterals however may be detrimental to vine health, though overall vine health and the severity/length of the infestation are factors. The need for control of grape berry moth and Japanese beetle may help decide the timing and frequency of treatment. Intervention for baby vines or otherwise compromised vines (ex: drought stressed vines) might be sooner vs. mature, healthy vines. Options for treatment are below.

- **Assail** is a reduced risk neonicotinoid labeled for 2 app's, adjuvant recommended.
- **Avaunt**, reduced risk, labeled for leafhopper suppression only.
- **Baythroid**, restricted use, labeled for control of grape leafhopper. Broad spectrum activity means it is likely hard on beneficials.
- **Brigade, Brigadier** – both labeled for grape leafhopper, both restricted use, both have the pyrethroid bifenthrin, the latter also has the ai found in Provado.
- **Danitol** and **Lannate**, restricted-use and toxic to predator mites, although Danitol is also a miticide. No more than two applications of Danitol/season are recommended due to concerns about the development of resistant PL and ERM populations, although more are allowed on the label depending on rate. Lannate has a 7 day reentry interval.

- **Imidan** is labeled for grape leafhoppers. Field experience with Imidan indicates that it will knock back PL also, however the period of residual control is usually no more than a week. Imidan is no longer restricted use but it has a 14 day reentry.
- **Leverage**, restricted use, labeled for control of leafhoppers, broad spectrum activity suggests it is likely hard on beneficials.
- **Provado**, another neonicotinoid is now restricted use. **Pasada** is the name of a generic version of Provado. Research in grapes by entomologist Greg Loeb suggests that a half rate is as effective as a full rate.
- **Sevin** is linked anecdotally to flare ups of European red mites in vineyards. Advantage to Sevin is that it is also effective against beetles and berry moth.
- **Azadiractin** materials primarily act as insect growth regulators that function as contact materials and work through ingestion. In a trial at LIHREC in 2004, Aza-Direct did not work as well as Danitol or Assail with moderate PL pressure. The primary use is against nymphs, they disrupt the molting process. Thus, their best fit is early in the infestation cycle and not when the population is skewed toward adults. Both Aza-Direct and Neemix are OMRI approved.
- **Pyrethrin** based products – Many such as Pyganic are OMRI approved. Experience with these products in other commodities suggests that they are broad spectrum, will offer a quick knockdown but will have a short period of residual control, reportedly as little as 3 days. These are probably more effective when applied in the earlier stages of an infestation.
- Oils and soaps. Though labeled for leafhoppers, **JMS Stylet Oil** typically is not used specifically for PL control. It likely will knock back but not control moderate to heavy infestations (comment based on intuition, not field or research experience). Grower experience with soaps against PL has been disappointing. See labels for cautions on use in temps >85F and for compatibility issues.

References: Greg Loeb, Grape insect and mite pests – 2011 field season. This overview is located on our web page at <<http://ccesuffolk.org/viticulture>> in the current events section. (*Source: Long Island Fruit & Vegetable Update, No. 3, June 2 2011*)

GENERAL INFORMATION

Be Summer Safe: Protect Against Heat Caused Illness While Working Around the Farm

Dean Ross, Michigan State University Extension

The summer of 2011 has hardly begun, yet the increased warmth of mid-summer has arrived for much of Michigan [and New England]. Because farming is mainly an outdoor activity, those who participate in it run a greater risk of being impacted by heat related illness during the summer months.

Under normal circumstances, the body temperature is self-regulating. When the temperature rises, the body sheds heat, either through radiation, evaporation, convection or conduction. If one of those methods fails, the buildup of excess heat can begin a cascade of bodily reactions that range from heat rash to heat stroke and potentially lead to death. There are  a number of factors, which increase individual risk for a heat related illness. These include;

- Age (both the elderly and infants are more susceptible to heat illnesses)
- Health factors (those with circulatory or heart problems or are physically unfit or overweight)
- The consumption of alcohol and/or drugs (including prescription drugs)

- The acclimatization to working in the heat

To avoid heat-related injuries the following  guidelines should be implemented when working in the heat:

- Drink water periodically as you work—about every 15 minutes or so. Don't wait until you're thirsty!
- Avoid caffeinated and alcoholic drinks, as they cause the body to dehydrate faster.
- Wear lightweight, loose clothing and light colors that reflect sunlight.
- Save strenuous work for the cooler times of day, such as early morning or evening. Take periodic breaks in the shade—don't push yourself.
- Adjust gradually to working in the heat. No matter how young or how physically fit you are, you are still susceptible to heat illness.

Heat-related illnesses are usually avoidable by planning ahead and following through on a simple set of work guidelines. The alternative simply requires doing nothing. (*Source: Michigan Fruit Extension News, June 6, 2011*)

Five Steps to Food Safe Fruit and Vegetable Home Gardening

Project of the Universities of Rhode Island, Connecticut, Maine, New Hampshire and Vermont and funded by CSREES/USDA. Project 2003-5111001713

Food Safety and Your Garden Produce

Increasingly, food borne illness outbreaks are being traced to lettuce, tomatoes, cantaloupe and other raw fruits and vegetables. Most food borne illness is caused by the bacteria, viruses, molds and parasites (*or pathogens*) found on raw produce that is not carefully washed or prepared. Many of these can make you sick. ***These microorganisms are a natural part of the environment and can be a problem whether you choose to use organic or conventional gardening methods.***

It is also possible to get sick from contamination of produce with chemicals such as cleaning solutions, fertilizers, pesticides, and heavy metals (lead) and other chemicals that may be found in garden soil or well water.

FIVE STEPS TO FOOD SAFE GARDENING

Follow the five simple steps listed here and reduce the risk of someone suffering a foodborne illness after eating produce from your home garden.

STEP 1-PREPARE THE GARDEN FOR PLANTING

- Locate vegetable gardens away from manure piles, well caps, garbage cans, septic systems and areas where wildlife, farm animals, or the family pets roam.
- Use compost safely. Compost is the natural breakdown product of leaves, stems, manures and other organic materials—and also a source of pathogens. To be safe for gardening, your compost must reach a temperature of at least 130°F. Check the temperature with a compost thermometer. Do not use any animal waste, including pet waste, meat scraps or dairy product waste into your compost bin.

STEP 2- MAINTAIN THE GARDEN

Water source: Be familiar with the quality and safety of the water source(s) you use in your garden.

- If you get your water from a *municipal or public water system*, you can be sure that it is safe and potable (drinkable).
- Surface water (lakes, ponds, rivers and streams) can be polluted by human sewage or animal waste, fertilizers and

- pesticides from lawns and farm fields, or chemicals from industry.
- *Ground water* (which is the source for *well water*) is less likely to have microbial contaminants than surface water. If a well is your water source, you need to take a little more care to be sure that it is providing you with safe, clean water.
- Conduct a standard water test at least once a year to determine if your well water meets the standards of the Environmental Protection Agency (EPA).

Animals: Animal waste can be a source of bacteria, parasites and viruses.

- During the gardening season, keep cats, dogs and other pets out of the garden.
- Curtail nesting and hiding places for rats and mice by minimizing vegetation at the edges of your fruit and vegetable garden.
- Do not feed wild animals, even birds, near your garden. Fencing or noise deterrents may help discourages other wild animals.

STEP 3-HARVEST GARDEN PRODUCE

- Use clean, food-grade containers. **Food-grade** containers are made from materials designed *specifically* to safely hold food. Garbage bags, trash cans, and any containers that originally held chemicals such as household cleaners or pesticides are not food-grade.
- Use clean gloves (that have not been used to stir compost or pull weeds) or clean hands when picking produce.
- Brush, shake or rub off any excess garden soil or debris before bringing produce into the kitchen.

STEP 4-STORE GARDEN PRODUCE

- If you choose to wash fruits and vegetables before storing, be sure to dry them **thoroughly** with a clean paper towel. (NEVER wash berries until you are ready to eat them.)
- If you choose to store without washing, shake, rub or brush off any garden dirt with a paper towel or soft brush while still outside. Store unwashed produce in plastic bags or containers.
- Keep fruit and vegetable bins clean.
- When washing produce fresh from the warm outdoors, the rinse water should not be more than 10 degrees colder than the produce. If you are washing refrigerated produce, use cold water.
- Fruits and vegetables needing refrigeration can be stored at 40° F or less.
- Fruits and vegetables stored at room temperature (onions, potatoes, tomatoes) should be in a cool, dry, pest-free, well-ventilated area separate from household chemicals.

STEP 5-PREPARING AND SERVING FRESH GARDEN PRODUCE

More often than not, we eat fresh fruit and vegetables raw so we cannot rely on the heat of cooking to destroy pathogens that might be on our lettuce or tomatoes, it is important to prepare raw produce with food safety in mind.

- Always wash your hands first.
- Rinse fresh fruits and vegetables under cool, running, clean water even if you do not plan to eat the skin or rind.
- Never use soap, detergent, or bleach solution to wash fresh fruits or vegetables. These solutions can affect flavor and may not be safe to ingest.
- Avoid cross-contamination when preparing fruits and vegetables. *Cross-contamination* occurs when a clean work surface such as a cutting board or utensil (paring knife) or uncontaminated food is contaminated by dirty work surfaces, utensils, hands or food. Be sure to wash your hands (as well as the knife and cutting surface) before preparing any ready-to-eat foods such as salad, fresh fruit or a sandwich.
- If you have leftover produce that has been cut, sliced, or cooked, store it in clean, air-tight containers in the refrigerator at 40°F or less.

PRESERVING FRESH GARDEN PRODUCE

Canning, freezing or drying fruits and vegetables allows you to enjoy the fruits (or vegetables) of your labor all winter long. Choose and follow recipes and methods that are tested by a United States Department of Agriculture (USDA) endorsed source such as Cooperative Extension.

1. The National Center for Home Food Preservation offers tested recipes and procedures. <http://www.uga.edu/nchfp/index.html>
2. The USDA complete guide to Home Canning. <http://foodsafety.cas.psu.edu/canningguide.html>
3. Home Canning.com (Ball/Kerr). <http://www.homecanning.com/usa/>

UPCOMING MEETINGS:

- June 8, 2001** – *Mist Blower for Christmas Trees and Blueberries*, 5:30, Kenburn orchards 1394 Mohawk Trail Shelburne, MA 01370. Sponsored by Mass Christmas Tree Assoc. For more info contact Larry and Susan Flaccus at 413-625-6116.
- June 8, 2011** – *Canopy Management in Hybrids for Quality Wines*, Grape Twilight Meeting co-sponsored with the [Massachusetts Farm Winery and Growers Association](#), UMass Cold Spring Orchard 391 Sabin Street, Belchertown, MA 01007. Featuring Justine Vanden Heuvel and Anna Katherine Mansfield from Cornell University. For more information or to register contact Sonia Schloemann via email at sgs@umext.umass.edu.
- June 9, 2011** *Getting Ready to Sell at a Farmers Market* Auburn Safety Complex, Auburn 6:00 - 8:00 pm. To register on-line go to this link: http://cecf1.unh.edu/formbuilder/forms/form352_FrmMktRg.htm or contact Nada Haddad at 603-679-5616 or nada.haddad@unh.edu.
- June 14, 2011** - *UMass Fruit Team Twilight Meeting*, [Kosinski Farms](#), 336 Russelville Road, Westfield MA. Fruit Team twilight meetings start promptly at 5:30 PM. 1 (one) pesticide recertification credit will be offered. There will be a \$25 meeting admission charged at the door. This meeting will include information on highbush blueberry production as well as tree fruit production. For more information, check the [Fruit Team website](#) or call Jon Clements: 413-478-7219 or email at clements@umext.umass.edu.
- June 15, 2011** - *UMass Fruit Team Twilight Meeting*, [Red Apple Farm](#), 455 Highland Ave., Phillipston MA. Fruit Team twilight meetings start promptly at 5:30 PM. 1 (one) pesticide recertification credit will be offered. There will be a \$25 meeting admission charged at the door. For more information, check the [Fruit Team website](#) or call Jon Clements: 413-478-7219 or email at clements@umext.umass.edu.
- June 14, 2011** - *UMass Fruit Team Twilight Meeting*, Location TBA. Fruit Team twilight meetings start promptly at 5:30 PM. 1 (one) pesticide recertification credit will be offered. There will be a \$25 meeting admission charged at the door. For more information, check the [Fruit Team website](#) or call Jon Clements: 413-478-7219 or email at clements@umext.umass.edu.
- June 16, 2011** - *High Tunnel Workshop and Vegetable & Berry Twilight Meeting*. Ledgewood Farm, Moultonborough NH. 3-7PM. Hosted by Ed Person of Ledgewood Farm. For more information, contact Russ Norton at 603-447-3834 or russell.norton@unh.edu.
- June 18, 2011** – *Massachusetts Cultivated Blueberry Growers Association Summer Meeting*.
- June 22-26, 2011**. *10th International Rubus and Ribes Symposium, Zlatibor, Serbia*. For more information contact: Prof. Dr. Mihailo Nikolic, Faculty of Agriculture, University of Belgr, Belgrade, Serbia. Phone: (381)63 801 99 23. Or contact Brankica Tanovic, Pesticide & Environment Research Inst., Belgrade, Serbia. Phone: (381) 11-31-61-773.
- June 22, 2011** - *On-Farm Workshop: Strawberry Production*, Killdeer Farm, Norwich VT. For more info contact Vern Grubinger at vernon.grubinger@uvm.edu.
- June 29, 2011** - *Backpack and Airblast Sprayer Calibration Demonstration*. 5PM-7:30PM Plainfield NH. Learn all about backpack spraying equipment, and then learn how to calibrate both backpack and airblast sprayers. For info or to preregister, contact Seth Wilner at seth.wilner@unh.edu or 603-863-9200.
- June 30, 2011** - *Backpack and Airblast Sprayer Calibration Demonstration*. Location TBD. For info, contact George Hamilton at george.hamilton@unh.edu or 603-641-6060.
- July 12, 2011** - *Vegetable & Berry Twilight Meeting*. Moulton Farm, Meredith NH. For info, contact Kelly McAdam at kelly.mcadam@unh.edu or 603-527-5475.
- July 12, 2011** - *On-Farm Workshop: Raspberries and Blue Berry Production*: Rochester VT. For more info contact Vern Grubinger at vernon.grubinger@uvm.edu
- July 20, 2011** - *Vegetable & Berry Twilight Meeting*. Meadow- stone Farm, Bethlehem NH. For info, contact Heather Bryant at heather.bryant@unh.edu or 603-787-6944.
- August 1, 2011** - *On-Farm Workshop: Pest Management/IPM*, Littlewood Farm, Plainfield VT. For more info contact Vern Grubinger at vernon.grubinger@uvm.edu
- Aug 2, 2011** - *Vegetable & Berry Twilight Meeting*. Dimond Hill Farm, Concord NH. For info, contact Amy Ouellette at amy.ouellette@unh.edu or 603-796-2151.

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