



UMASS
EXTENSION



Vegetable Notes

For Vegetable Farmers in Massachusetts

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CROP CONDITIONS

Weather conditions continue to encourage strong growth, though many fields are in need of irrigation and little rain is forecast for the coming week. Sweet corn harvest started in eastern and southeastern MA this week, quite possibly setting records for earliness on many farms. It is important to keep sweet corn watered especially in early silking to ensure good pollination and tip fill. In tomatoes, moisture stress can result in blossom end rot, decreased fruit size, and fewer flowers developing per truss. Under dry conditions calcium uptake by plants is reduced leading to calcium deficiency in many crops. Blossom end rot and internal tipburn in cabbage and lettuce are common disorders associated with calcium deficiency. Most vegetable crops will require at least 1 inch of water per week. Dry conditions also bring lower disease pressure. There were no new late blight reports in the Northeast this past week. Late blight forecasting data from around the state indicate that most inland locations did not accumulate severity values in the past 7 days (thus a 10-14 day fungicide schedule would be recommended). Coastal areas of southeastern MA chalked up 4 (7-day schedule). Cucurbit diseases so far have been mainly bacterial wilt from cucumber beetle feeding, and angular or bacterial leaf spot. For downy mildew of cucurbits, the national tracking system indicates low risk in New England.

WORKER SANITATION AND HYGIENE

Food safety involves a variety of issues including worker hygiene, water quality, wildlife/livestock, manure and compost, general farm sanitation, and traceback. We will address each of these issues over the summer to help provide some insight on what potential food safety requirements might look like. Please direct any questions to Rich Bonanno at rbonanno@umext.umass.edu. The following article addresses Worker Sanitation and Hygiene.

Growers must ensure that employees in the field or packinghouse take the necessary precautions to avoid microbial contamination of the produce. Growers should make sure that all state and Federal Occupational Safety and Health Administration (OSHA) and Federal Worker Protection Standards (WPS) requirements are reviewed with supervisors to assure that the proper number of toilet facilities and potable water are available in the field. A toilet must be within ¼ mile or 5 minute walking time. Even if field sanitation units are not required, a toilet facility must be available for all workers at a reasonable distance!

Worker sanitation and hygiene is one of the main potential sources of produce contamination. This must be stressed to workers on a regular basis through training and observation. This can be accomplished through formal presentations, videos, one-on-one instruction or demonstrations. Periodic refresher or additional sessions may be needed as new employees are hired. The training should include, at minimum, method of handwashing, method of scrubbing fingernails and proper use of toilet facilities.

The use of gloves or hand sanitizers does not take the place of handwashing! If gloves are used, hands should be washed prior to wearing gloves. Signs should be posted in the appropriate language for employees instructing them to wash their hands before starting work, after use of the toilet, after breaks or anytime they leave their work station and return. The

hand washing stations must be placed outside the toilets so workers can be observed using them. This is true even if in a packing facility. All handwashing facilities must include potable water for handwashing, soap and single-use paper towels. The water used for handwashing stations is not for drinking. It is advisable to place signs on the water tank indicating it is just for handwashing. The water used for handwashing must be collected in a receptacle and disposed in a sanitary location.

Portable toilets must be supplied and maintained on a regular maintenance schedule. Documentation is required for this activity. Plan ahead in case of a spill. Know how you will handle an immediate spill and have the service company number on an emergency telephone list.

The field toilets should not be located in the field that is being harvested or near product already harvested or packed. Workers must be encouraged to use field toilets and to use them properly. Used toilet paper tissue cannot be placed in a box or other receptacle in the facility. It must be put in the holding tank of the toilet. Used toilet tissue that is disposed of on the floor or in a box will cause an unsanitary condition. Signs should be placed outside and inside the toilet facility to encourage proper use.

Potable water is critical for workers in the field especially during periods of high temperature. It is important for employees to drink small quantities of water throughout the day and start work well hydrated. They should be encouraged to drink at least one quart of water an hour during hot periods or when sweating more than normal. The drinking water source should be tested once a year to ensure potability.

Smoking or eating in production areas (field or packing areas) must be discouraged since they are possible contamination sources. In the field, eating and smoking should be confined to roadways or edges of fields. In the packinghouse, it should be in designated areas away from the receiving/loading or packing lines i.e. an area marked off with tape or partitions. Outside picnic tables placed under a cover will work in many cases.

- article by Wesley Kline, PhD, Agricultural Agent Rutgers Cooperative Extension; intro by A. Rich Bonanno, UMass Extension

CUCURBIT UPDATE: SQUASH VINE BORER AND SQUASH BUGS



Squash Vine Borer Adult (Melittia satyriniformis). Photo by Alan Eaton.

Squash bugs have been colonizing cucurbit crops, and squash vine borer (SVB) moths have been showing up in traps in New Hampshire. Cucumber beetles may be declining, and tend to congregate in flowers once bloom occurs. Care should be taken during bloom to avoid insecticides which are toxic to pollinators.

Squash vine borer moths (*Melittia satyriniformis*) are day-flying moths with a 1.0 to 1.5 inch wingspan and bright orange markings. In flight, they look like wasps. There is one generation each year and adults emerge in late June/early July. They lay eggs at the base of squash plants, and upon hatching, larvae bore into stems (where they are protected from insecticides). Thick-stemmed squashes are preferred. Unless you use traps or scout fields for evidence of eggs or larvae, the first sign of squash vine borer infestation can be wilting vines in July and August.

By that time, it is too late to do anything.

Growers should scout their pumpkin and squash fields weekly for squash vine borer from late June through early August. Examine the base of vines for evidence of larval feeding (sawdust-like frass near entrance holes) and then split open the stem to confirm the presence of larvae, which suggests more eggs are being laid. Two insecticide sprays, ideally applied to the base of the plants and timed five to seven days apart, will control newly hatching larvae before they are able to bore into the stem. Alternatively, you can monitor with a Scentry Heliothis pheromone trap from early June through early August. Make 2 to 4 weekly applications if more than 5 moths per week are captured. Timing is very



Squash Vine Borer Larvae (Melittia satyriniformis). Photo by Jude Boucher.

important. Treat base of stems thoroughly to target hatching larvae. Some selective materials, such as spinosad (Entrust) or spinetoram (Radiant), provide excellent control of hatching SVB larvae.

Squash bugs (*Anasis tristis*) are serious pests of pumpkins and squash throughout North America. Damage and survival are low on watermelon, very low on cucumber and muskmelon, and highest on squash and pumpkin. Both adults and nymphs feed by inserting their beak and sucking juices from plant tissue. Toxic saliva injected during feeding causes foliage to wilt, turn black and die; the severity of this damage is directly related to density of squash bugs on each plant. Later in the season, squash bugs may feed on the fruit, causing them to collapse or become unmarketable.



Squash Bug (Anasa tristis) adult and nymphs

Adults are 0.5 to 0.75 of an inch long, flattened and grayish-brown. Wingless nymphs are similar in appearance to adults, and are whitish when small, with a brown head, and grayish white when larger with black legs. Eggs are laid in clusters usually on the underside of leaves and are orange when first laid, but turn bronze-colored before they hatch. There is one generation per year in the Northeast.

Squash bugs are reduced by clean cultivation and crop rotation and delayed by row covers. If possible, rotate cucurbit crops between fields as far apart as possible. Keep headlands mowed and free of trash to reduce overwintering sites. Squash or pumpkin, especially certain winter squash (Hubbard or marrow), have been used effectively as perimeter trap crops to protect the less attractive melons and cucumbers from incoming adult bugs. Plant the perimeter 1 or 2 weeks before the main crop, and treating the trap crop just prior to main crop emergence or prior to transplanting, and 5 to 10 days later. Black plastic, straw mulch, and reduced tillage systems encourage higher populations, probably by providing good hiding places.

Squash bugs are unusually difficult to control with insecticides. Scout undersides of leaves for squash bug adults and eggs and treat if the copper-colored egg masses exceed one per plant. Time squash bug sprays to kill young nymphs just after hatch, because this stage is the easiest to control. Treat late in the day when the flowers are closed to reduce risk to bees. For adult bug control, insecticides applied to the base of the plant are most effective, possibly because bugs tend to cluster there. Sprays for cucumber beetle may reduce squash bugs. See <http://www.nevegetable.org/index.php/crops/pumpkin-squash-and-gourds?start=3> for labeled products. Squash bugs are virtually impossible to control later in the season when nymphs are large and the canopy is dense.

- Source material from *New England Vegetable Management Guide; Handbook of Vegetable Pests, A Capinera; ATTRA*. Adapted by Andy Cavanagh & R Hazzard, UMass Extension.

TEFF: IMPROVE YOUR SOIL AFTER EARLY VEGETABLES

As crops are harvested in July, some fields will need to rest without being overrun by weeds. Sudangrass and buckwheat are the two obvious cover crop choices for this purpose. However, teff is a third option that can be a nice fit in certain situations. Teff (*Eragrostis tef*) is the staple grain of Ethiopia, so it may seem like a peculiar cover crop choice for the Northeast. However, teff seed is readily available and effective growing practices have been worked out for New York conditions, especially through the work of Cornell Extension agents Tom Kilcer, Pete Barney and Mike Hunter. These recommendations should be adaptable to central New England.

Why would you choose teff over buckwheat or sudangrass? There are two situations where it would be preferred. First, teff tolerates dry conditions better than the two alternatives, as one might expect from an Ethiopian crop. Vegetable growers who rely on the benefits of light soils may find that their fields get too dry for late summer cover crops. Teff thrives in these conditions. Second, teff requires less management after planting than sudangrass or buckwheat. It does not need to be terminated like buckwheat and does not need heavy mowing and crown breakdown like sudangrass. One mowing will take care of weeds, and teff generally does not produce seeds. Additionally, sudangrass is difficult to incorporate if the stems become woody, and the crown can take some time to break down. Teff is a fine-bladed grass with a small crown, so it is easy to break up, even if left to grow. The root system is fibrous and shallow, but massive.

The challenge with growing teff is mainly in seedbed preparation and sowing. Teff seed is extremely tiny. The seedbed

should be quite firm so that the seeds stay near the surface (~1/4 inch) and are in good soil contact. The seeder needs to be able to open a crack at the discharge but not at the seams. Spending some time on the planter with tape is worthwhile as is fixing worn parts of the seed rate mechanism. A Brillion-type grass seeder works well. Broadcast seeding also works, but the seeds don't fly very far. Use a light vehicle for planting because the passes will need to be close together. Coated seed is available if the challenges of dealing with the tiny seed are too much, but at a higher cost.

Some growers may even get some revenue from their teff. A hay cutting off of a teff cover crop can receive a premium price as horse hay. This practice helps cover the cost of using teff, even though it reduces the amount of organic matter and active carbon returned to the soil. The decision depends on your management goal.

Teff seed is available from King's Agriseeds in Pennsylvania and from Hankins Seed in Oregon. It costs about \$3 to \$4 per pound with a seeding rate of 5 – 8 lb/ac. Coated seed is available from Seedway for \$4 per pound, with a seeding rate of 8-12 lb/ac.

Detailed information on using teff is available from Cornell. Agronomy Fact Sheet #24 describes raising teff for forage. It is available online through the Cornell Spear program, <http://nmsp.cals.cornell.edu/publications/factsheets/factsheet24.pdf>.

A fact sheet on Teff as a cover crop is available through the Cornell vegetable cover crop site, www.covercrop.net.

- adapted from Thomas Björkman, Horticultural Sciences, Cornell University, Geneva, NY

MASSACHUSETTS FARM TO SCHOOL PROJECT OFFERS FARMER ID INSERT

In the hopes of increasing local product traceability as it ships to schools around the state, the Massachusetts Farm to School Project has recently made available ID Inserts for farmers that can be placed inside boxes of produce before they are sent off the farm. The inserts are 3x5", are in full color, and are two sided, with the front showing photographs of local fruits and vegetables and the text "Local Food is Good Food". The back side thanks the customer for purchasing locally-grown produce, explains some of the key benefits of buying locally-grown, and has a space for your farm's stamp or sticker following the words "This produce is brought to you with pride by :". These ID cards are available free of charge while supplies last. Contact the Massachusetts Farm to School Project at mafarmtoschool@gmail.com or by calling (413) 253-3844 to order. These inserts are only applicable to farms selling to school customers.

- Emily French

WATCH FOR POTATO LEAFHOPPER IN POTATO, EGGPLANT, BEANS

Potato leafhoppers are building up in beans, potatoes and eggplant. Adults are about 1/4 inch long, light yellow-green, and fly up from foliage when it is disturbed or shaken. Nymphs are found on the underside of leaves, and are light green, wedge-shaped and very fast-moving. Damage can be severe on early-season varieties of potato and red potatoes, as well as in green beans. Beans are more susceptible when they are young than at later stages. Eggplant is also susceptible. Field crops such as alfalfa, clover, soybean, sunflower and tobacco are also hosts.

Adults and nymphs feed by inserting a needle-like beak into the plant and sucking out sap. They also inject a toxin into the plant, which causes yellowing, browning, and curling of leaves. In potato, leaf margins turn brown and brittle first, followed by death of entire leaves, a condition known as 'hopperburn'. In beans the leaf turns mottled brown as if infected with a disease before dying completely. Both adults and nymphs cause damage. Yield loss can be significant, with smaller potato tubers, and fewer bean pods that are smaller in size. In eggplant leaf margins and tips turn yellow and curl up. Feeding can reduce yield before damage is visible. Damage is often confused with Verticillium wilt, where leaves turn yellow and droop down. Damage is worse under drought conditions.

It is important to protect plants when leafhoppers first arrive, before nymphs build up. In potato, the threshold is based on insects per leaf: Nymphs can be monitored by visually inspecting lower leaf surfaces on lower leaves. Treat if more than 15 nymphs are found per 50 leaves. University of Connecticut has established a threshold of 1.5 leafhopper per leaf in eggplant. In potato and eggplant, some materials registered for Colorado potato beetle adults will also control leafhopper, including neonicotinoid foliar sprays such as Provado. These and several other carbamate, synthetic pyrethroid and

organophosphate products are also registered for leafhopper in potato, eggplant and snap beans. Refer to the New England Vegetable Management Guide for registered products. An updated list can be found at www.nevegetable.org (search under crops).

On organic farms, pyrethrin (PyGanic EC5.0) has been shown to be the most effective product for reducing leafhopper numbers and damage. Good coverage is important. The residual period is short. Spraying late in the day or in the evening may provide better control than spraying early in the morning. Don't wait for numbers to build up. Row cover can be used to delay PLH infestation in snap beans until flowering, when plants are less susceptible to damage.

ASPARAGUS BEETLE IN JULY



*Common Asparagus Beetle
Damage*

There are two beetle pests of asparagus, the common asparagus beetle and the spotted asparagus beetle. Distinguishing between the two species is important because while both beetles can damage the emerging spears, the common asparagus beetle larvae and adults can also devour the ferns. Significant defoliation can weaken the plant and reduce the plant's ability to provide sufficient nutrients for the following season. Serious defoliation can also make asparagus more susceptible to invasion by *Fusarium*, a fungal pathogen. The feeding of spotted asparagus beetle larvae on berries does not affect the health of asparagus plants over the long run.

Common asparagus beetle (*Crioceris asparagi*) is blue-black, shiny, smooth and about 6 to 9 mm (1/4 inch) long, with three large yellow, squarish spots with red margins along each wing cover. Eggs are black, laid standing on end in rows along the spears, and hatch in 3-8 days. Larvae are wrinkled, plump, hump-backed, and dull gray

with black head and legs. They grow up to 1/3 inch. These larvae feed in spears and in ferns. Eggs and larval damage makes spears unmarketable. Larval feeding damage in the ferns can cause severe defoliation and weaken the stand. When full grown, larvae drop to the soil and pupate underground. New adults emerge in July, feed in ferns, and are looking for overwintering sites by September.



Common Asparagus Beetle (Crioceris asparagi)

Spotted asparagus beetle (*Crioceris duodecimpunctata*) is reddish orange or tan, with six black spots on each wing cover (hence its other name, 12-spotted asparagus beetle). Eggs are greenish and glued singly on their sides to leaves. Eggs are laid on fronds, not on spears. Larvae are similar to those described above, but are orange colored, and they feed almost entirely inside the berries so they affect seed production but do not hurt the plants.



Spotted Asparagus Beetle (Crioceris duodecimpunctata)

Cultural controls. In the fall, remove all of the crop residue and other refuse nearby that may provide shelter for adults to over winter by disking lightly (avoid crown damage) or burning crop stalks and fronds. Maintaining a clean environment in the fall will force beetles to seek shelter outside the field or burrow in the soil, where many predators reside.

Biocontrol. The most important natural enemy of Common asparagus beetle is a tiny parasitic wasp (*Tetrastichus asparagi*) that attacks the egg stage. Wasps kill eggs by feeding on them (sucking them dry) and laying their own eggs inside the beetle eggs. The immature wasps grow inside the beetle larvae, killing them when they pupate. Studies have found >50% of eggs killed by feeding and half of the surviving larvae parasitized. Providing a nearby nectar source such as umbelliferous flowers may enhance wasp populations.

Monitoring and chemical control. Treat ferns if 50 to 75% are infested. If possible spot spray along edges of planting where overwintering adults colonize the field and/or band insecticide over the row to help spare natural enemies. Use selective insecticides on ferns. Disk old ferns lightly in the fall and clean areas around planting of debris to reduce over-

wintering populations. Eliminating female plants, and thus berries, can reduce or eliminate SAB populations.

--R Hazzard. *References: Handbook of Vegetable Pests by John Capinera; 2008-2009 New England Vegetable Management Guide; Eric Sideman, MOFGA; Brian Caldwell, Cornell University, Suzanne Wold-Burkness and Jeffrey Hahn, UMI Department of Entomology.*

HERITAGE WHEAT FIELD TOUR JULY 7 AND THE UMASS HERITAGE WHEAT PROJECT

Northeast Organic Wheat (NOW) is an extension and research program for on-farm crop improvement in organic systems and local market partnerships, funded by Northeast SARE. The Northeast, and in particular the Connecticut Valley, was once a major wheat-growing area. Today there is burgeoning interest among farmers, bakers and consumers to restore local wheat production on diversified farms. Northeast organic wheat growers need varieties adapted to local conditions and markets in order to re-establish wheat as a viable specialty crop. Virtually all the wheat that we eat is grown thousands of miles away, and has been bred to succeed under large-scale production systems with climate and soils very different from New England.

UMass has established a research and extension project to trial heritage and modern wheat varieties in collaboration with Eli Rogosa, coordinator of the 'Northeast Organic Wheat' project. Eli Rogosa has brought her extensive collection of heritage wheats and wheat relatives, gathered from both western and eastern Europe, the Middle East, and numerous gene banks, for evaluation at the UMass Research Farm as well as other farms in the region. The Heritage Wheat Field Tour on July 7 will offer a chance to see the remarkable diversity and vigor of these wheats when they are at their peak, just before harvest. The tour will start at the UMass Crops Farm and finish at Seed Farm, Eli's home farm in Colrain.

The projects's goals include:

- * trial and select heritage and modern wheats to that are well-adapted to the organic soils of the UMASS Farm and other farms in the region,
- * identify promising varieties for on-farm selection of elite landraces to develop locally-adapted varieties,
- * explore ways to integrate wheat production into cropping systems on organic diversified farms, and work with farmers to develop resources to assist them in this process.
- * involve local bakers and consumers in evaluating the baking quality and flavor of locally-produced organic wheat, and test nutritional quality,
- * cooperate with international organic wheat researchers and traditional farmers funded by NOW for in-situ conservation and crop improvement with a focus on climate resilience, productivity in organic systems, and nutritional quality.

Please join us at the Heritage Wheat Field Tour

Wednesday, July 7

1:00 - 3:00 - UMass Research Farm, 89-91 River Road off Route 116, Deerfield, MA

3:30 - 5:30 - Seed Farm, 400 Adamsville Rd. Colrain, MA

Join us to discover delicious heritage wheats that thrive in New England spanning einkorn, emmer and Transcaucasus wheats to varieties beloved by French and German bakers and more. Learn how to integrate small grains in a diversified rotation. Share practical experiences to build a local wheat-to-bread system. Taste high-nutrition, gluten-safe einkorn bread.

Contact Eli Rogosa to register: growseed@yahoo.com. Pre-registration at www.growseed.org is encouraged but not required. Funded by NESARE.

-- Ruth Hazzard and Masoud Hashemi, UMass Extension and Eli Rogosa, Northeast Organic Wheat and Heritage Wheat Conservancy.

CORN REPORT

Irrigation was a priority for just about every grower across the state this week. With no rain in the forecast for the next week, irrigation will most likely continue. Corn plants have been growing well with the pleasant 70-80 degree temperatures we have been having. Harvesting has started for a lot of growers with others expecting to pick within the week. Harvests have been earlier than usual and sales are up and should continue through the fourth of July holiday weekend.

The first European corn borer flight is over with trap captures at zero in most locations, or with only a few moths hanging on. Scouting has shown that there are still a high number of borers feeding in pretassel and tasseling corn. Many fields are below threshold but “clean up” from the first generation may still be needed. Remember to count only new feeding damage and live worms when scouting after a spray has been applied to get an accurate picture of current infestation levels.

Corn earworm trap counts are at zero again this week in most locations. Some areas in the eastern part of the state (Concord and Framingham) have caught two moths this week but no flight has been detected in the Connecticut valley or in the western part of the state. With no anticipated storm fronts, we can expect trap counts to remain at zero or below the spray threshold. If you have silking corn keep your traps up, large populations can arrive overnight and begin laying eggs that will hatch on fresh silk and tunnel into developing ears. Watch for coastal storms which may bring greater numbers up to the Northeast.

Currently there is a “no spray situation” on most farms. The next week or two usually represents a break in the spray routine, if there has been one; the first generation of ECB flight is over, CEW and FAW have not arrived, so there are no eggs being laid. However there still could be large ECB caterpillars feeding if early sprays did not take care of infestations. Keep scouting and checking your traps to stay on top of what is going on in your fields.

Location	ZI	EII	Total ECB
CT Valley			
South Deerfield	0	0	0
Sunderland	0	0	0
Hadley	0	0	0
Southwick	0	0	0
Granby	0	0	0
Hatfield	0	0	0
Feeding Hills	0	0	0
Central & Eastern MA			
Rehobeth	1	7	8
Concord	4	0	4
Northbridge	0	0	0
Spencer	0	0	0
Lancaster	0	0	0
Littleton	0	0	0
Dracut	1	0	1
Tyngsboro	0	0	0
Sharon	0	0	0
Framingham	0	0	0
NH			
Litchfield, NH	0	1	1
Hollis, NH	0	1	1
Mason, NH	0	1	1

UPCOMING MEETINGS

Cold Spring Orchard Research Farm, Belchertown

July 15

Summer Fruit Growers Meeting

For more information please contact Wes Autio; 413-545-296

MNLA/MFGA Great Ideas Summer Conference and Trade Show

July 21

www.progrownews.com or www.umassgreeninfo.org; Tina Smith 413-545-5306

Field Day at the UMass Crops Research and Education Farm

89-91, River Rd, South Deerfield, MA

Wednesday August 11, 2010

3:00 – 8:00 PM

Vegetable, Field and Energy Crops

For more information contact: Masoud Hashemi 413-545-1843, masoud@psis.umass.edu or Ruth Hazzard 413-545-3696, rhazzard@umext.umass.edu

NOFA-MA 36th Annual Summer Conference

August 13-15, 2010

University of Massachusetts, Amherst

Join the Northeast Organic Farming Association (NOFA) as we celebrate local food at our 36th Annual Summer Conference from AUGUST 13-15th, at UMass Amherst. This year's keynote speakers are Sally Fallon Morrell, of the Weston A. Price Foundation, and Dr. Fernando Funes, from Havana, Cuba, of the Cuban Association of Foresters and Agronomists. To add to our captivating speakers, as always, the Summer Conference will feature a fantastic Children's Conference, a Teen Conference, a local meal, dozens of exhibitors, a live auction, live evening entertainment, and an afternoon fair.

REGISTRATION is available online now at www.nofasummerconference.org.

Vegetable Notes. Ruth Hazzard, editor and Amanda Brown and Andrew Cavanagh, assistant 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; author and photographer is R. Hazzard if none is cited.

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