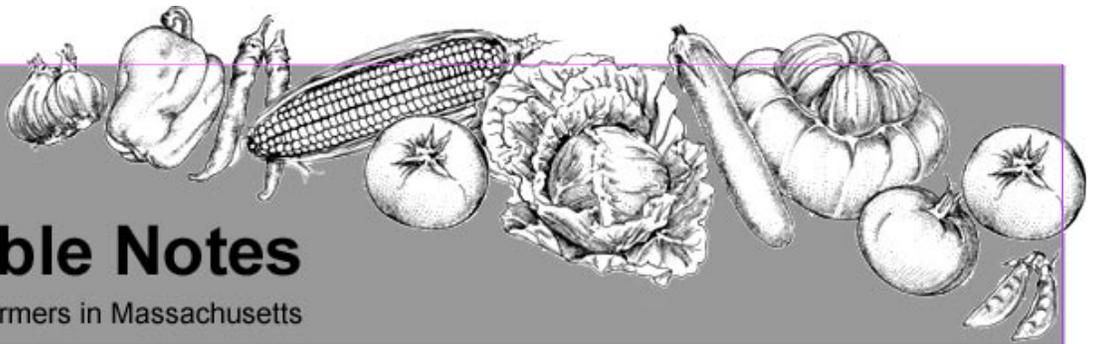




UMASS
EXTENSION



Vegetable Notes

For Vegetable Farmers in Massachusetts

Volume 16, Number 11

July 14, 2005

CROP CONDITIONS

After last week's washout and flooding rains, hot sunny weather has been welcome to dry out fields and give time for spraying, cultivating, harvesting, and planting fall crops. Some areas only received moderate rainfall last week (1 inch or so) while others received 3 inches or more – in an hour. Growers are harvesting cabbage, zucchini, summer squash, sweet corn, beets, green onions, broccoli, lettuce, carrots, and sweet corn. Crops have not really caught up yet and the weather extremes have made it not the easiest of seasons so far. Spring broccoli has been reported to be of poor quality due to the extreme heat in early June. Brassica greens bolted quickly in the cold/heat extremes. Eggplant and peppers, however, are growing fairly well, although *Phytophthora* is a concern in peppers and one case in the Connecticut Valley has been confirmed at the Disease Diagnostic Lab. Second plantings following early harvest are going in: fall peas, lettuce, late brassicas – or cover crops. Vine crops are growing well.

--R.Hazzard

TORTOISE BEETLES

Watch for tortoise Beetles and their damage in sweet potato (*Ipomoea batatas*) and water spinach (*Ipomoea aquatica*). These insects, commonly known as “goldbugs” feed on plants in the family Convolvulaceae. Rarely are tortoise beetles abundant enough to be considered damaging to the sweet potato tubers. The damage however may be devastating if the sweet potato leaves are the crop of interest as it is the case for some African cultures or if the crop is water spinach, a popular green for stir fry or soups in many Asian countries. Tortoise beetles can also be found on bindweed and morning glory, which are closely related.



Adult tortoise beetle

Identification: The tortoise beetle is oblong-oval, and may be bright gold or dark red, up to 8 mm long, with rounded shell-like body and thin flat membrane at the edge

of its thorax and abdomen. The beetle has the ability to change color from its brilliant gold to dull red in a very short period. The larva has a dull yellowish to reddish brown body up to 12 mm long with black head, legs, spots, and spines. Larvae pile their frass on their backs as a protection. Adult and larvae chew leaves. The typical form of injury is numerous small to medium-sized irregular or round holes. Both stages usually inhabit the lower surface, but eat entirely through the foliage. A related, dark colored tortoise beetle species can also put holes into tomato or potato leaves.



Tortoise beetle larva with frass collected to ward off predators

Scouting and recommendations: Injury is easily noticed on leaves, but the larvae and adults are more difficult to find. Scout by searching underneath leaves and on stems. I am not aware of any research-based thresholds for tortoise beetle. For sweet potato, controls are needed only if damage is severe enough to reduce tuber yield. For greens, decide on treatment based on whether the level of direct damage to leaves will reduce marketability. Use products that are labeled for all leafy greens or for sweet potato.



Tortoise beetle larva

--Ruth Hazzard

PEST BRIEFS

Potato leafhoppers have been around long enough to begin producing nymphs. Beans and potatoes should be scouted. Young beans are especially susceptible (threshold is one nymph per leaflet during prebloom) and it is easy to overlook the presence of adults and nymph unless you

shake the leaves and turn leaves over. July is when we expect **squash vine borers** to be flying and laying eggs. The adults look like black and red wasps, and fly during the daytime. The small brown eggs, laid individually on leaf stalks and vines, hatch in seven to 10 days. The newly hatched larva immediately bores into the stem. A larva feeds for 14 to 30 days before exiting the stem to pupate in the soil. This is often not considered a pest in larger commercial fields in MA, but is frequently mentioned by small market farmers and home gardeners. Pesticide applications should target first hatch of larvae; scout for frass of newly boring larvae, and eggs. **Pepper maggot fly** usually becomes active in mid to late July. Look for oviposition stings on its favorite fruit, hot cherry peppers. This will indicate the fly is present in the field.

--R Hazzard; Sources include Alan Eaton, Univ. of New Hampshire, Ric Bessin, University of Kentucky, and Jude Boucher, Univ. of Conn.

SWEET CORN UPDATE

Even cooler parts of the state are starting to pick their earliest corn, while the warmest areas are halfway through the plantings started on plastic. No one seems to be completely happy with the taste and eating quality of the earliest corn varieties—there is a never-ending search for corn that will germinate in miserably cold soils and still taste good when it ripens. ‘Temptation’ is mentioned often in conversations about good early corn, but it’s not quite early enough for many.

The first European corn borer flight is over (3 moths per week or fewer) nearly everywhere; exceptions being sites in Hatfield (14 moths), Hadley (8) and Dracut (14) which are still declining. Corn earworm flights are 1 or less at ALL locations, a delightful condition, which is below threshold for silking corn. Until more big storms move up the coast and ECB flight starts again (expected in about 2 weeks), we have a break from new invasions of moth eggs and larvae in corn plantings. Where earlier sprays were timed well and, in some cases, repeated more than once as needed, corn is going into harvest very clean. As ears begin to develop, it is worth checking down the stalk and ‘behind the ears’ for signs of borer feeding and tunneling. The last of the first ECB generation may still be active, especially in cooler areas of the state. It is more difficult to control borers at that stage, but probably worth the effort if infestation is >15%; target ear zone if possible. If pre-silk infestations were cleared up and moth flights remain low, silk does not need to be sprayed.

It is also a time when ladybeetles, minute pirate bugs and other predators that feed on aphids, pollen, and small caterpillars populate sweet corn. If they have been killed off by synthetic pyrethroids, aphids may be able to build up more quickly. Nonetheless, these predators will re-inhabit

corn because the resources they need are plentiful.

It’s not too late to invest in a pheromone trap for corn earworm. Given the value of the crop and the speed with which a flight of corn earworm moths can arrive, lay eggs, hatch out and crawl into ears, the Heliiothis net trap and *Helicoverpa zea* pheromone lures for 8-10 weeks, which cost about \$80, are one of the best investments any corn grower can make. Sources include **Great Lakes IPM** (1-800-235-0285) and **Gemplers** (1-800-382-8473). As soon as you have silking corn, put up your trap, and keep moving it into a block of fresh silk (every week or two) which is preferred by the corn earworm moths. Corn earworm could arrive just about any day now, or they could **not** arrive for several weeks...knowing which it is makes a great deal of difference in spray cost and clean corn. Note, again that non-target moths can be captured at this time. See July 7 issue for photo of corn earworm, or www.nevegetable.org.

SWEET CORN TRAP COUNTS 7-8 TO 7-13

LOCATION	DATE	ECB ZI	ECB EII	Total ECB	CEW
Berkshires, W. MA/ Champlain Valley					
Westminster, VT	7-13	0	0	0	0
Brandon, VT	7-13	-	-	-	0
Pittsfield, MA	7-13	0	0	0	0
CT River Valley					
S. Deerfield	7-13	0	2	2	-
Old Deerfield	7-13	1	0	1	0
Hatfield	7-13	2	14	16	0
Hadley	7-13	6	2	8	1
N. Hadley	7-13	0	0	0	0
Feeding Hills	7-12	0	1	1	1
C. & E. MA					
Dracut	7-13	10	4	14	0
Dighton	7-13	9	2	11	0
Still River	7-13	0	0	0	0
Concord	7-11	2	1	3	1
Lancaster	7-13	1	0	1	0
Tyngsboro	7-11	1	2	3	0
Leicester	7-13	1	1	2	0
Monson	7-13	0	0	0	0
R.I.					
Coventry	7-13	9	12	21	0

--R.Hazzard, A.Duphily, B.Hunsdorfer

CORN EARWORM THRESHOLDS

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	no spray
0.2 - 0.5	1.4 - 3.5	6 days
0.5 - 1 days	3.5 - 7	5 days
1.0 - 13.0	7 - 91	4 days
Over 13	Over 91	3 days

SCOUTING VINE CROPS

Vine crops are taking off and fruit set on fall crops has begun in early fields. It is time to take scouting seriously! Scouting at this point involves checking both older and fully grown young leaves – including upper and lower surface, throughout the field canopy (50 leaves, in groups of 5 at 10 locations in the field). Also observe stems, blossoms and fruit development. Your goal is protect fruit from disease, and keep foliage in good health long enough to bring the fruit to maturity.

The first concern in scouting for disease at this time is Plectosporium blight, which has become a problem on more farms in New England over the past three seasons. Look for spindle-shaped lesions on the stems or spots on the fruit. Start spraying a protectant fungicides (eg chlorothalonil) when fruit is formed (melon size for pumpkins, 4-6 inches for winter squash). This will also protect against black rot.



Powdery mildew spots on upper leaf surface
Photo: R. Becker and B. Precheur

Although downy mildew of cucurbits is present in New Jersey, no downy mildew has been reported any further north than New Jersey. The North American Disease Forecast Center forecast for this week states that all areas north of southern New Jersey have low risk of downy mildew at this time. These forecasts are updated regularly at: <http://www.ces.ncsu.edu/depts/pp/cucurbit/forecasts/c050712.php>

These can be very helpful in determining how to choose the most effective sprays for your vine crop program. Although it is not here yet, we can expect downy mildew to arrive earlier than was typical before the 2004 season. If it is detected, the most effective materials are Ridomil (or Ridomil/Bravo) and Prophyte.

It is also time to scout for **powdery mildew** in vine crops. Scout on the undersides of older leaves, and look in areas where dew lasts longer. PM usually shows up the last week of July or early August. The first signs are pale yellow spots on leaves, vines or petioles. These spots enlarge

and become covered with white spores that appear powdery. Make the first application of a PM fungicide when powdery mildew is detected in the field by scouting (one lesion on the underside of 50 older leaves). Once powdery mildew shows up, a good powdery mildew product should be included in the fungicide program, such as Pristine, Cabrio, Nova, Procure or Sulfur. Pristine is recommended as the first spray. Cabrio, Nova and Procure should be used only once per season because resistance is likely to develop. Always include a protectant fungicide (sulfur or Bravo) with any of these fungicides that has a single mode of action to reduce risk of resistance development. Note that PM resistance to Quadris is widespread. Sulfur provides as good control of PM as Bravo. Get good coverage and use at least 40 gal of water per acre.



Powdery mildew on the underside of a leaf
Photo: R. Becker and B. Precheur

If you wait until powdery mildew becomes obvious in the field, it may be too late to bring it under control effectively. Scout your fields by looking at the older leaves first. The threshold for starting a fungicide program is 1 lesion found on a sample of 50 leaves. Fields in low lying areas where mist forms and remains for long periods during the night are usually affected first. These lesions will usually cause yellow spots to appear on the upper surface of the leaf. Left untreated, these areas will grow together causing the entire leaf to turn yellow which will eventually become necrotic.

Given last week's drenching rains (at least in some areas of the state), be on the lookout for *Phytophthora capsicii*. An additional case of *P. capsicii* from hubbard squash was confirmed at the Diagnostic Lab this week.

Squash bug eggs are likely to be hatching into the gray, black-legged nymphs. **Cucumber beetles** are still active, though numbers are down and as vine crop flowers, you will see more in flowers than on leaves. **Honeybees, bumblebees** and native **squash bees** are busy pollinating – but you have to get out to the field by 5 am to see the wide open flowers and first bee visits. **Aphids** may be present,

but rarely build up in vine crops. If you make a count of the % of leaves with > 10 aphids per leaf, the threshold for treatment is when > 20% of leaves have more than 10 aphids. Beneficials generally keep aphids under control. See also article on angular leaf spot.

-R. Hazzard,. Sources: adapted from Ron Becker and Bob Precheur, *VegNet* Vol. 12, No. 13. July 14, 2005, Ohio State University Extension Vegetable Crops; Lynn Adler, Dept of Plant Soil and Insect Science, UMass

ANGULAR LEAF SPOT IN VINE CROPS

Angular leaf spot (caused by the bacterium *Pseudomonas lachryman*) has been identified from one squash fields and could be present in other locations. This disease attacks cucumbers, squash, and watermelon. It is a bacterial disease which first appears as small water-soaked spots on the leaves. These spots expand until they reach a leaf vein and are limited by the surrounding veins. This results in the spots having a squared-off or angular shape. The spots become more obvious after they dry and turn tan. Initially they look water-soaked or brown, then the tissue becomes translucent and dead, or may fall out as the leaf ages or grows. They may also drop out leaving holes in the leaf. The disease is spread by splashing rain, people or insects. Spread is enhanced when leaves are moist from rain or dew. Avoid working in fields with wet foliage and work in non-infected fields first. Do not save seed from an infected crop, because the pathogen can be seed-borne. Crop rotation for two years eliminates the inoculum that carries over in the crop debris.

Initially, ALS is limited to the older leaves. Little spread is to be expected during dry weather. The disease could spread to younger leaves if wet periods occur. Generally, this disease has not significantly affected yields in New England. Some cucumber varieties are resistant, but non-resistant varieties and other vine crops should be treated if your crop has a significant amount of angular leaf spot, appears to be spreading to younger leaves, and weather conditions are favorable.

Copper spray materials (See *New England Vegetable Guide*) offer some protection and can help limit the spread of the disease. The activity of these materials can be enhanced by tank mixing them with mancozeb fungicides. It is not certain that copper applications are effective in preventing spread of the disease. If you do apply copper, use a boom sprayer. Do NOT use an airblast sprayer, which spreads the bacteria throughout the field. When using copper products -- especially with young vine crops -- avoid higher than label rates and wait for cooler temperatures if possible, as high rates at high temperatures have some risk of phytotoxicity.

Chlorothalonil and copper do not react with each other,

but they are generally compatible. Read labels for compatibility with other fungicides.

Angular leaf spot is not a fruit disease and only causes injury to leaves. However, the leaf symptoms are similar to another disease, Bacterial spot of cucurbits, caused by *Xanthomonas campestris* pv. *cucurbitae*, which can cause injury to both leaves and fruit. It infects cucumbers, gourds, pumpkins, and summer and winter squashes. Symptoms on leaves appear as small, dark, and angular lesions (very similar to ALS). The centers of the lesions gradually become translucent. The lesions may grow and cause serious foliar blight. However, because of their small size, leaf symptoms can easily be overlooked.

The most readily identifiable symptoms of bacterial leaf spot of cucurbits occur on fruit. The appearance and size of fruit lesions can vary, depending on rind maturity and the presence of moisture. Initial lesions are small, slightly sunken, circular spots, 1/16 to 1/18 inch in diameter, with a beige center and a dark brown halo. Later the cuticle and epidermis crack, and the lesions enlarge, reaching up to 1/2 inch in diameter. The large lesions may have scab-like appearance and give rise to tan, raised blisters. On mature fruit, saprophytic fungi often colonize the dead, tan tissue at the center of the lesion. Penetration of the bacteria into the flesh can lead to significant fruit rot in the field or later in storage.

Because of the similarity of leaf symptoms and big difference in impact of the disease, we recommend that growers use the Disease Diagnostic Lab to determine which disease they have. (Call 413-545-1045 or 577-1827; samples can be sent overnight from any location).

Photos of these diseases can be found in the Photo ID Supplement of the *New England Vegetable Management Guide* which is available in hard copy from the UMass Outreach Bookstore (414-545-2717) and online at www.nevegetable.org and also at Cornell' Vegetable MD Online, <http://vegetablemdonline.ppath.cornell.edu/>

(ps. This is not caused by the same pathogen that causes as bacterial leaf spot of tomato or pepper).

--R.Hazzard, R.Wick

MEXICAN BEAN BEETLE: A CHANCE FOR BIOLOGICAL CONTROL

Mexican bean beetles are active in snap beans. They may also be found in soybeans (either the grain soybean or edamame) although these are not their preferred crop. Eggs were observed on 7/13 in Bolton. The coppery brown, spotted adults, that look like large ladybeetles, lay yellow-orange egg masses on the underside of bean leaves. These hatch into bright yellow, spiny oval larvae, which feed, molt several times as they grow, and pupate on the

underside of leaves. Feeding damage of adults and larvae can reduce yield and injure pods if numbers are high. Suggested thresholds: treat when defoliation exceeds 20% in prebloom or 10% during podding, or if >25% of plants are infested. Reapply in 7-10 days if needed. Target adults and larvae. See *New England Vegetable Management Guide* for recommended materials. Hot weather >90°F will kill eggs.

A beneficial insect, *Pediobius foveolatus*, is commercially available for Mexican bean beetle control and has a good track record in the mid-Atlantic states and among Massachusetts growers who have tried it. (*Pediobius*, pronounced “pee-dee-oh’-bee-us”). It is mass-reared and sold by the New Jersey Dept of Agriculture and is also available from other beneficial insect suppliers. This small, non-stinging, parasitic wasp attacks and kills Mexican

bean beetle larvae, especially the young larvae. Wasp larvae feed inside the MBB larvae, kill it, and pupate inside it, forming a brownish ‘mummy’. Twenty five or more adult wasps emerge from one mummy. Control continues and in fact gets better as the season progresses



Mexican bean beetle adult and larvae

and successive generations of the wasp emerge and search out new bean beetle larvae. This makes it well suited to our succession-planted snap bean crops. After a release in the first plants, it is advisable to leave that planting intact for a while, until the new generation of wasps has emerged from their mummies.

New Jersey Dept of Ag. recommends two releases, two weeks in a row, timed for the beginning of egg hatch. Timing is important, because the wasps prefer to lay their eggs in young MBB larvae. The release rate should be at least



Adult Mexican bean beetle

2000 adult wasps per field (or per acre, if more than one acre is grown); 1000 adults costs \$25 plus shipping for overnight delivery. I would advise investing in an adequate release rate from the outset if you want to make this method work. Now is the time! Instructions for handling and release will come with the wasps. Because wasps reproduce in the field and are still present when the second generation of MBB hatches out, it should not be necessary to make more than two releases. Like beans, *Pediobius* wasps are killed by frost.

Contact information for New Jersey source: Tom Dorsey, 609-530-4196 or 530-4192; address NJDA Phillip Alampi Insect Lab, State Police Dr., W. Trenton, NJ 08628. You’ll also get advice on how to use the wasps from this office.

Pediobius may also be available from the following suppliers: ARBICO, 800 -827-2847 (AZ), <http://www.arbico.com/>; The Beneficial Insect Company (NC), 336-973-8490, <http://bugfarm.com/> ; Rincon Vitova (CA), 800-248-2847, <http://www.rinconvitova.com/>; The Green Spot (NH), 603-943-8925; or Carol Holko, Maryland Department of Agriculture, Plant Protection and Weed Management Section, 410-841-5920.

--R. Hazzard

SOIL BUILDING COVER CROPS

The soils in many fields were compacted during the wet year of 2004. If you have fields that won’t be planted this year, or when you take off peas, early beans, or other spring crops, consider planting sudangrass, sorghum-sudan or buckwheat. These crops add a significant amount of organic matter that will improve soil aggregation and water holding capacity. The roots of sudan will grow through compacted layers making channels for drainage of excess water. For sudangrass and sorghum-sudan apply 40 lbs/acre of nitrogen to ensure rapid growth if there’s no residual nitrogen from a previous crop. Plant 50 lbs/acre of seed, preferably with a grain drill, to get good seed-soil contact. A good stand of sudan will choke out weeds. When it reaches a height of 3 feet mow it to promote a proliferation of roots and shoots. This will keep the stalks from becoming too woody. Mow again in the fall and disc in well to promote breakdown of the stalks. Incorporating sudan green will reduce plant diseases and nematodes to some extent but this must be done before a frost. A rye, oats, etc. cover crop can be seeded for over winter. Buckwheat has the ability to thrive on poor, low fertility soils. Plant 60 lbs/acre of seed. Mow or incorporate at early flowering to avoid seed set and subsequent weed problems. Two successive buckwheat cover crops in summer followed by winter rye can effectively reduce weed pressure in a field. Buckwheat is frost sensitive. It decomposes rapidly.

--Carol MacNeil,
Cornell Cooperative Extension

MARK YOUR CALENDARS: **UPCOMING TWILIGHT MEETINGS**

• **Thursday, August 25, 2005**

Verrill Farm

11 Wheeler Road, Concord, MA 01742

(<http://www.verrillfarm.com/>)

Refreshments at 5:00 PM. Starts at 5:30

Contact: Verrill Farm 978-369-4494

or Frank Mangan (413)-545-1178

Verrill Farm grow 140 acres of fruits and vegetables for sale in our farm stand, and to many of the finest restaurants in the Boston area. Flavor is our primary criteria for variety selection, from asparagus to zucchini. Great care is used in harvesting at the optimum time, and in post harvest handling, to achieve the maximum in superb flavor and quality.

Please stop by and visit us today!

Our mission at Verrill Farm is “to nourish the body and soul of our customers by providing healthful food of superb flavor in surroundings of beauty. Through the use of sound and efficient farming practices, we strive to maintain our land, and provide a good living for our employees, and a reasonable return to the owners”

Program will include:

- heirloom tomatoes sold by variety
- covercrops for weed management and organic matter/nitrogen addition.
- cultivation equipment
- flame weeder
- use of plug transplants throughout the year to better manage weeds
- tour of stand
- weed management in mixed vegetable production

• **Wednesday September 28th, 2005**

Marini Farm

259 Linebrook Rd., Ipswich, MA 01983

(<http://www.marinifarm.com/>)

Starts at 5:00 PM

Contact: Marini Farm: (978) 356-0430

This 200-acre vegetable farm, which has been in operation since 1928, is managed by Mario Marini and his son Michael. They sell 60% wholesale and 40% retail at their farmstand. The farm has used IPM since 1985, and has hired a private IPM consultant for many years. Flowers, vegetables and berries are key crops.

Features of the tour will be: late crops for after frost including sweet corn and tomatoes harvested green and stored (with irrigation for frost protection); customer entertainment such as a corn maze and a straw man scare crow; plasticulture for vegetables and strawberries and a plastic retriever which Mario designed; use of IPM in sweet corn including releases of *Trichogramma* wasps for control of European corn borer and *Avaunt* for fall armyworm; weed control programs in sweet corn including the new herbicide *Callisto*.

****One hour of pesticide recertification credit has been requested for each twilight meeting.**

Vegetable Notes, Ruth Hazzard, editor and Ben Hunsdorfer, Assistant Editor. *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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