UMASS EXTENSION

Vegetable Notes

For Vegetable Farmers in Massachusetts

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CROP CONDITIONS

One grower commented that there was really nothing to complain about this week. Everything is growing well, enough rainfall has come to alleviate the dry conditions, most crops like the heat, corn harvest season has begun, and harvests are rolling in. Weeds also took off as a result of the rains, and easily get out of hand. Beets, carrots, sweet corn, green onions, and greenhouse tomatoes are being added to the already long list of crops being harvested.

Early season insect pests are past their peak. There seem to be a lot of comments about low cucumber beetles this year. On the other hand, potato leafhopper is worse than usual and causing injury in both potatoes and beans. Squash vine borer moths are being captured in pheromone traps in New Hampshire, suggesting that they are active throughout central and southern New England as well. Growers have noted an increase in flea beetle feeding this past week in Brassica crops, suggesting that the new adults are emerging and ready to feed. Migratory moths have not arrived yet: corn earworm, fall armyworm and cabbage looper are low or absent to date. European corn borer is between generations, with new flight expected in the next week or two. Based on time of year and weather conditions, it is time to look for the first early blight lesions on lower leaves of tomato, and to be using protective fungicides for early blight of tomato.

BACTERIAL DISEASES OF TOMATO-UPDATE 2007

Three bacterial diseases affect tomato crops-Bacterial Spot (*Xanthomonas campestris* pv. *vesicatora*), Bacterial Speck (*Pseudomonas syringae* pv *tomato*), and Bacterial Canker (*Clavibacter michiganensis* pv *michiganensis*).

Bacterial spot caused by *Xanthomonas campestris* pv. *vesicatora (Xcv)* is present wherever **tomato and peppers** are grown. In general, *Xanthomonas* pathovars have narrow host ranges. *Xcv* consists of different strains that vary in their pathogenicity to tomato, pepper, and solanaceous weeds. The bacterium is able to survive on tomato volunteers and can overwinter in diseased plant debris. Seed is an important mechanism for survival and dissemination of *Xcv*. Disease development is favored by temperatures between 80˚ and 90˚ F and by heavy rainfall. The bacterium is spread by wind-driven rain, workers, farm machinery, and aerosols. It penetrates through stomates and wounds created by insects, wind-driven sand, and tools. *Xcv* affects all aboveground plant parts. On leaves, the spots are generally brown, circular, and water-soaked. Bacterial spot lesions do not have concentric zones or a prominent halo. When conditions are optimal for disease development, spots can coalesce to form long, dark streaks. A general yellowing may appear on foliage with many lesions giving the plants a scorched appearance, and the plants may exhibit severe epinasty. Only green tomato fruit is susceptible to infection and lesions are quite distinct, beginning as minute, slightly raised blisters with a halo that resemble the birds-eye spot caused by *Clavibacter michiganense* (bacterial canker). As lesions enlarge, they loose their halo and become brown, raised, and scab-like. Lesions on ripe pepper fruit may be scab-like or sunken.

Bacterial speck occurs on tomato not pepper. It is a cosmopolitan disease, generally of minor concern, favored by low temperatures and high moisture. The bacterium *Pseudomonas syringae* pv *tomato* causes a fruit spot and foliage blight. This bacterium is also seedborne, spreads within fields in the same manner as bacterial spot, and may persist in weed species. Lesions on leaves are round and dark brown to black with a halo that develops with time. Spots may coalesce, killing large areas of tissue. On fruit, small (1/16 inch), dark spots or specks develop with the tissue around them often more intensely green than unaffected areas.

Bacterial canker (*Clavibacter michiganensis* pv *michiganensis*) is one of the most destructive tomato diseases in Massachusetts. Initial symptoms are the result of primary, systemic infection and first affect the lower leaves causing leaf curling, wilting, chlorosis, and shriveling. In advanced stages, the pathogen spreads throughout the plant and causes poor growth, wilt, and plant death. Foliage throughout the canopy wilts, yellows, turns brown, and collapses. Stems can split resulting in open breaks or cankers and stems break easily. Secondary infections occur from rain splash onto foliage, stems, and fruit. Spots occur on green fruit and are very characteristic: white to yellow spots, 3-4 mm with raised brown centers (“bird’s eye spots”).

Three key principles for preventing losses to bacterial diseases are:

1. Start with certified, disease-free seed or treat seed with hot water, hydrochloric acid, calcium hypochlorite, or other recommended materials. See the fact sheet entitled, *Preventing Bacterial Diseases of Vegetables with Hot-water Seed Treatment* for further details at www.umassvegetable.org.

2. Control bacterial populations that may be present on the leaf surface of transplants in the greenhouse. Young transplants may not display symptoms of bacterial diseases. Inspect and remove suspect transplants. Lower the water pressure in irrigation equipment to avoid damaging leaves. Avoid the practice of mowing

transplants to regulate transplant height.

3. Plant into a clean field. Promptly incorporate crop debris after harvest. Rotate to a non-host crop before returning to tomato and do not allow volunteer tomato or weed hosts to survive.

Research at the University of Michigan has shown that: 1) the pathogen can move readily from infected plants onto clean plants in the course of regular greenhouse activities, and 2) carryover in the greenhouse from one season to the next may not be as important as was once thought. In one experiment, seedlings that carried systemic infections with bacterial canker were placed in known locations in a grid of transplants in the greenhouse. Watering was from hand-held sprinklers; no special precautions were taken to prevent disease spread. Plants nearest the infected plants developed bacterial canker symptoms (wilting) and died in the greenhouse. Many other plants showed no symptoms in the greenhouse, but the bacteria could be found residing on the surface of the leaves. When these healthy-looking plants were set out in the field, they developed symptoms during the season and the yield losses were serious. This type of infection -- bacteria that enter from the surface of the leaf through natural leaf openings or wounds -- causes the "marginal scorch" symptoms that are so common in Massachusetts. Once the bacteria enters the plant -- which could occur in the greenhouse or in the field -- it can take anywhere from 7 to 84 days for symptoms to appear.

If infected plants are present, the movement of bacteria from one plant to another during normal watering, handling, and ventilating activities occurs readily. *Controlling the bacteria at this stage can prevent yield losses.* Bacteria on the surface of transplants can be effectively controlled by sprays of copper hydroxide or streptomycin in the greenhouse. Kocide DF, Agri-Strep and Agri-mycin 17, and Dithane F-45 are labeled for greenhouse use on tomato.

In another experiment at the University of Michigan, Kocide 40DF, alone or mixed with Dithane F-45, or Agri-Mycin 17 was applied on a five-day schedule from the first true leaf stage until transplanting. Bacteria on leaf surfaces were effectively suppressed. Plants were not sprayed after being set out in the field. Yields of sprayed, exposed transplants were equal to clean plants that were grown in a separate greenhouse and had never been exposed to the bacteria. Unsprayed, infected plants had lower yields. Using bactericide in the greenhouse means a lower volume of chemical is used compared to multiple copper sprays in the field. Avoid working in fields when bacterial diseases are present and the fields are wet.

Rotate your tomatoes to a different field. Setting clean transplants into a field where infected tomato was grown the previous year will result in early infection and reduced yields. Bacteria survive in the field as long as there is any infected crop debris. They persist longer in debris on the surface than in buried debris. Plowing after harvest will help to speed up the decomposition. Keep each field out of tomato (and related crops such as potato and eggplant) for two to three years. Avoid using overhead sprinkler irrigation in the field. Use new stakes or stakes that have been cleaned and disinfected. Periodically and regularly sanitize tools such as clippers and pruning shears with an approved disinfectant during field operation.

Prevention is cost-effective. All of these tactics focus on **prevention** -- ensuring that disease-free plants go out into a "clean" environment. Bacterial disease outbreaks in the field require regular sprays with a copper or copper/maneb mix, with limited success. Prevention strategies are both the least expensive and the most effective way to treat these diseases.

Chemical recommendations:

acibenzolar-S-methyl (Actigard 50 WG): 0.3 to 0.75 oz/A (14 dh, REI 12 h).Do not apply more than six times per crop season or on less than a 7 day schedule. Under certain conditions, this product, when used on tomatoes, may lead to reductions in yield.

copper hydroxide (Champ, Champion WP): 4 tbs/1000 sq ft (0 dh, REI 24 h). Greenhouse and Shade house crops .Begin applications when disease first threatens and repeat at 7-10 day intervals as needed. Do not apply in a spray solution with pH less than 6.0 or phytotoxicity can occur.

mancozeb plus copper hydroxide (ManKocide): 2.5 to 5.0 lb/A (5 dh, REI 24 h). Begin applications when disease threatens and repeat at 7-10 day intervals as needed. Use higher rates and 3-7 days when disease pressure is severe.

streptomycin sulfate (Agri-mycin 17): 200 ppm (REI 12 h). Use only up to transplant.

-Dr. Robert Wick, Dept of Plant, Soil & Insect Sciences, University of Massachusetts, M. Bess Dicklow, UMass Extension Plant Diagnostic Lab.

REPORT FROM THE UVM PLANT DIAGNOSTIC CLINIC

(Ann Hazelrigg, University of Vermont Extension)

There has not been much in the way of diseases in the field although I think this last week of on and off rains with lots of good infection periods will change that!

I have seen quite a few samples of bacterial canker in greenhouse tomato. This disease usually strikes when the first fruit are being produced. Symptoms include dieback of leaflets that extends into the stem. If you cut open the stem you will see browning in the vascular (water conducting tissue.) Send a sample to the clinic for a rapid assay to see if the bacterial disease is involved. Remove infected plants ASAP. Some growers are trying AgriPhage, a virus that attacks this specific bacterium. Studies are showing that growers are able to prolong the life of their crop when infected with canker. Large growers out west use a specially formulated bacteriophage for their specific canker pathogen found in their greenhouse developed by the OmniLytics company. Since our NE growers are much smaller, the company will send a "bacteriophage cocktail" formulated for NE conditions. For more information on the bacteriophage go to www.phage.com/products/agriphage/agriphage_info/agriphage_overview.html

Remember, other fungi can cause cankers that can look like bacterial canker including Botrytis, which causes dieback of leaflets that are covered with fuzzy gray spores. The best control for this is to improve air circulation and reduce relative humidity. Please feel free to send in a sample if you are not sure. To access

the Plant Diagnostic Clinic form to send with samples go to www.uvm.edu/pss/pd/pdc/pdf/pdcform.pdf. There is no charge for Vermont commercial growers.

Notes: UMass Clinic see http://www.umass.edu/agland/diagnostics/veg_flori.htm or call 413-545-3209.

CUCURBIT DOWNY MILDEW FORECAST: LOW RISK TO MASSACHUSETTS AND SOUTHERN NEW ENGLAND

Cucurbit Downy Mildew Update for 12 Jul 2007, from the North American Disease Forecast Center http://www.ces.ncsu.edu/depts/pp/cucurbit/epidemic_history.php

Downy mildew is present in Ontario, Ohio and western New York, and in North and South Carolina. It has been found only in cucumbers and cantaloupe. These are the 'source' locations for spores that may move into other regions.

What do downy mildew forecasts mean? The Disease Forecast Center uses several types of information for their downy mildew forecasts: 1) the location of sources of inoculum (ie, downy mildew spores from an existing field outbreak) 2) predicted air movement from the source into other regions (the trajectory of spore transport), 3) predicted survival of the spores (cloud cover or sun) 4) predicted rain ('washout' or deposition of spores) These are combined to assess the risk that live spores will reach a certain area and that conditions for infection of crops will be favorable. Sunny conditions kill spores, while cloudy conditions allow them to survive. Rain causes them to 'washout' and be deposited in an area. These factors are all combined to determine a risk rating. The risk for a certain area may be 'low', 'weakly moderate', 'strongly moderate', or 'high'. This forecast site is updated twice weekly.

Forecast for Tuesday July 10: Sources of Downy mildew spores in Ohio and western New York are moving mostly northeast this week resulting in a High risk to cucurbit crops in northern and eastern Ohio, and to crops in central and northern New York. **A moderate risk for cucurbit crops in Northern Vermont and northern New Hampshire is forecast. Low risk to cucurbit crops elsewhere from these sources.**

Downy mildew spores continue to move north along the Atlantic coast from sources in North and South Carolina resulting in a moderate risk to cucurbit crops in eastern North Carolina, and a weakly moderate risk to crops in southeastern Virginia and the Delaware/Maryland/Pennsylvania peninsula. **Low risk to cucurbit crops elsewhere from this source of spores.**

--Bess Dicklow and Ruth Hazzard

SCARAB BEETLE UPDATE: JAPANESE, ORIENTAL AND ASIATIC GARDEN BEETLES ARE ACTIVE

Japanese Beetles have emerged and are showing up in various crops and non-crop habitats. **Oriental Beetles** are also active and, though less damaging, may appear in vegetable fields as well. **Asiatic Garden Beetles** become evident mostly through their damage, because they feed at night. All species are feeding and starting to lay eggs now.

There are four species of scarab beetles that are common in New England turf, fruit and vegetable crops. These were all introduced to the US. Japanese beetles are the most common and widely distributed but Oriental and Asiatic Garden beetles are expanding their range and activity. Below are brief descriptions.

JAPANESE BEETLE adults are about half an inch long, with a metallic green head. The wings are shiny copper or bronze color, and there are a few tufts of white "fur" along the side of each wing when it is folded back over the body. The adults are active in daylight and feed on many different kinds of trees, fruit and flower crops. Fruit and ornamental plants are preferred, but beetles can congregate in vegetables also. In vegetables, adults can cause silk clipping in corn, and leaf damage in sweet basil, collards, other greens, green beans, eggplant, asparagus, rhubarb, and peppers. Though numbers may be high, there is no need to treat unless actual feeding damage is significant. In corn, if there are more than two Japanese beetles per ear and corn is less than 50% pollinated, an application may be warranted to reduce clipping and ensure adequate pollination.

ASIATIC GARDEN BEETLES are about half as long as a Japanese beetle adult, and somewhat more "plump" or domed in appearance. They are reddish-brown or copper-colored. They often are found near roots of plants when one is weeding. Adults tend to cause more damage to vegetable crops than Oriental Beetle, but less than Japanese beetles. Because they feed at night, one may find damage without seeing the beetles. During the day they hide in the loose soil or mulch around the base of the plants. Scout with a flashlight at night, or sift through soil to find them. Larvae feed on beet, carrot, corn, lettuce, onion, Swiss chard and strawberry. Adults feed on carrot, beet, parsnip, pepper and turnip. One grower reported heavy beetle feeding on peppers that were held under row cover through the end of June: this could be the result of Asiatic garden beetles that emerged under the cover. He could not find beetles, only damage. Beware the events that occur under row cover while unsuspecting farmers are looking the other way!

ORIENTAL BEETLES fly at night, but are very active during the day as well. The beetles are smaller than Japanese beetles, and usually are a rather mottled gray with black splotches. The pattern and color varies. Occasionally an individual will be almost all black or almost all gray. The antennae are branched and are quite striking if you take a close look. Oriental beetles have a long flight period – through early August – and are very mobile. Adults tend not to feed heavily in vegetable crop foliage. Grub damage may be worse in drought years and in weedy fields, but is not commonly a problem in vegetable fields and crops, though this is not well studied.

A fourth species may also be found: **EUROPEAN CHAFERS**, which are slightly larger than Japanese beetles and are a fairly dull brown or tan in color. They are night fliers but can be seen in large numbers just at sunset, when they congregate in large numbers in favorite trees (such as locust or willow). Adults are not foliage feeders and grubs are mostly a turf problem.

LIFE CYCLE

The **life cycle** of the Japanese beetle fits most of the species of grubs we encounter in New England, with minor variations depending on the species and the location. They have a one-year life cycle, with adults emerging from the soil in early July in most of Massachusetts (later farther north) to feed and mate. The females burrow into the soil (often in or near wide expanses of grass or sod) to lay eggs, usually beginning in late July. Eggs hatch into tiny grubs (cream-colored larvae, C-shaped, with brown heads). The first grubs usually appear around late July or early August and begin feeding on roots of grasses and other plants (especially corn). After about two weeks of feeding, the grubs molt to a second "instar", and feed for another three weeks. The grubs molt once more, to the "third instar" (or large grub) around the middle of September, and continue feeding until the soils begin to cool down. **In late fall the grubs migrate downward** through the soil profile, staying below the frost line throughout the winter. **In the spring** as the soils warm up, the grubs move back into the root zone and resume feeding for about six weeks. By the middle of June, most grubs have completed their feeding requirements and pupate (still in the soil) for about a week before emerging as new young adults.

CONTROLS

On turf, insecticide controls normally target young grubs just as they begin to emerge from eggs. In vegetables, managing the grub stage may not be feasible (or necessary) since the grubs are most likely feeding elsewhere. Vegetable growers could run into problems with grub damage if turf or sod is plowed under in fall or spring and followed by a spring vegetable crop. Insecticides may be needed to control adult beetles if numbers are high and damage is significant. The *2006-2007 New England Vegetable Management Guide* lists products for Japanese and/or Oriental Beetles in basil and sweet corn. For controls in a crop where these beetles are rarely a pest and therefore not mentioned in the Guide, check the label of commonly used broad spectrum synthetic pyrethroids, carbamates, and neonicotinoids (as foliar spray). Organic options include neem products and pyrethrin.

-R. Hazzard, adapted from Pat Vittum, Turf Entomologist, UMass, Beth Bishop, Michigan State University, Michael Seagraves, Cornell Cooperative Extension, and Ann Hazelrig, University of Vermont

ONION THRIPS IN ONION AND BRASSICAS

Onion thrips are active and may be causing injury in onions or late season Brassicas. The following update on thrips is from adapted from the onion thrips sections of the updated *New England Vegetable Management Guide*, written by Jude Boucher, Univ. of Connecticut. Available online at *www.nevegetable.org*

Onions. Onion thrips range in color from yellow to black and are only 1/16" in length. They spend the winter as adults in crop remnants, alfalfa, wheat, greenhouses and weeds along the border of crop fields. Thrips have rasping mouth parts which they use to tear open plant cells and feed on inner juices. Feeding occurs in protected areas between leaves. Damage may appear as silver lines, white patches, tip dieback and curling, slowed growth, reduced bulb size and yields, or result in plant death. Populations are favored by hot, dry weather. Plants are most sensitive when bulbs are forming and still small. Heavy rain or overhead irrigation can lower populations quickly. Lacewing larvae, pirate bugs and predatory thrips are important natural enemies. Reduce populations by cleaning up crop residue after harvest to limit overwinter sites. Do not plant onions near alfalfa, clover, cucurbits or Brassica crops that can harbor large populations of thrips, which may migrate to onions when these crops are cut or harvested.

Brown scarring on upper and lower surface of late Broccoli leaf, from onion thrips feeding.

Scout plants along field margins where infestations build early. Begin applications when damage is first noticed or when there are three or more thrips per leaf. Repeat applications at 7 to 10 day intervals. From 3 to 6 applications may be necessary, but rotate between insecticide groups after 2 applications to help prevent resistance. Use a shorter interval in hot weather. Use spreader-sticker for better coverage. Apply in early evening, using high pressure and 100 gal water/A for best results.

Brassicas. Primarily a problem on cabbage where thrips feed on inner leaves which are difficult to target by spraying. Thrips cause rough, golden or brown scars to form on leaves or produce a discolored layer within cabbage heads. Thrips damage can be confused with edema. Leaves of other cole crops (broccoli, collard) may also be injured. They are favored by hot, dry weather. Heavy rain or overhead irrigation can lower populations. Reduce populations by burying crop residue after harvest to limit overwinter sites. Do not plant cabbage or other Brassicas near Alliums (onion family), alfalfa, clover, or cucurbits crops that can harbor large populations of thrips, which may migrate to cabbage when these crops are cut or harvested.

Thrips damage on onion

Scout 25 plants per field.

Begin applications when damage is first noticed. Repeat applications at 7 to 10 day intervals. Use a shorter interval in hot, dry weather. Use spreader-sticker for better coverage. Apply in early evening, using high pressure and 100 gal water/A for best results. Rotate between insecticide groups (pyrethroids, carbamates) to help prevent or delay resistance. Organic insecticide options include kaolin clay, (Surround WP), *Beauvaria bassiana* (Mycotrol-O) and pyrethrin (Pyganic 4EC). In Brassica crops, spinosad is labeled for control of thrips among other pests; however, spinosad is not labeled for use in onions.

If thrips are a perennial problem on cabbage, plant more tolerant varieties (Bobcat, Ducati, Fresco, Little Rock, Matsumo, Rio Verde, Ruby Perfection, Solid Blue 770 or 780, Blue Pack, Ruby Ball, Heads Up, Bravo, Brutus, Green Cup, Roundup, Superette, Vantage Point, and Zerlina). Avoid planting highly susceptible varieties, such as Atlantis, Columbia, Morris, Ramada, Supergreen, Market Prize, Princess, Charmant and Solid Blue 690.

CUCURBIT DISEASE MANAGEMENT

Managing cucurbit diseases is an increasingly complex and sometimes daunting task. Recent years have seen *Plectosporium* blight added to the list of diseases affecting these crops. Downy mildew has become a problem for many growers since 2004. *Phytophthora* blight is an increasing problem without effective chemical management options. In addition, there is the very real danger of losing the most effective materials to fungicide resistance development in pathogen populations. The following article provides some guidelines for making decisions about spray schedules that will result in the best control with the least threat of fungicide resistance.

Systemic fungicides provide the best control of many cucurbit diseases because they move within the plant and protect both the upper and lower leaf surfaces. However, systemics have one mode of action per fungicide group and thus are more likely to cause resistance development. Contact fungicides attack many sites in disease organisms. Fungicide resistance can occur in a single season if a product is overused. Once a disease organism develops resistance to a systemic material, the pathogen may quickly become resistant to other products in the same fungicide group (i.e. DMIs, strobilurins). Newer materials tend to work better than older products, but not for long. In contrast, many contact fungicides have been used for decades without experiencing resistance problems. Although strobilurin fungicides are some of the most effective materials to become available in recent years, Powdery mildew and black rot have already developed resistance in some states, and resistance in Downy mildew has occurred outside the U.S. The best resistance management strategy to help preserve the useful life of fungicides is to make a single application from each effective fungicide group (anilides, strobilurins, and DMIs) in a given season. In addition, pathologists are now recommending that all systemic materials be applied with a contact fungicide to help slow resistance development. Systemics must be alternated with fungicides outside of their group to prevent the build up of resistance.

Contact (protectant) fungicides such as copper hydroxide and maneb may aid in the control of *Plectosporium* blight and other diseases, but do not provide sufficient protection alone. These fungicides should be mixed or alternated to produce a combination that will provide a full range of disease protection. In addition, copper can cause phytotoxicity in many new varieties of pumpkins. Chlorothalonil (i.e. Bravo) is effective at controlling *Plectosporium* blight but does not work as well as many systemic fungicides on powdery mildew. It can be mixed with systemics, such as the DMIs, myclobutanil and triflumizole (Nova or Procure), or protectants like sulfur (i.e. Microthiol Disperss) which work well on powdery mildew but do not control Plectosporium blight or other important cucurbit diseases.

Scout pumpkin and summer squash plantings weekly for symptoms of both *Plectosporium* and Powdery mildew. Examine the lower surface of 50 leaves for small (1/4”), white powdery mildew colonies and all plant parts for Plectosporium lesions. If Powdery mildew is detected first, begin spray schedule with a strobilurin fungicide mixed with a contact fungicide. We are recommending Pristine which contains boscalid, a new effective systemic material for powdery mildew control, and pyraclostrobin, the same active ingredient found in Cabrio. Pristine is more effective against strains of Powdery mildew resistant to Quadris and older strobilurins. Alternate with a DMI fungicide (Procure or Nova) at the high rate on the label mixed with a contact fungicide. Applications should be applied 7-10 days apart, and should be limited to a single application per season for each fungicide group.

In unusually wet weather, in unrotated fields, or if *Plectosporium* is detected before powdery mildew, start your spray program as soon as the disease is detected or at fruit set. Scout your fields weekly for symptoms of Plectosporium blight and Powdery mildew. Apply chlorothalonil (i.e. Bravo) on a weekly basis until Powdery mildew is found. In the unfortunate circumstances that Downy Mildew shows up before Powdery Mildew, control options include a phosphorus acid product like Prophyt, alternated with Tanos (famoxadone and cymoxanil) mixed with chlorothalonil, copper, sulfur, or maneb.

Sulfur (i.e. Microthiol Disperss) and chlorothalonil (i.e. Bravo) can be used alone for late-season sprays to rest the systemic materials and still provide effective control of *Plectosporium* blight, powdery mildew, black rot (Gummy Stem Blight) and scab. Caution: do not apply sulfur if temperatures exceed 90˚ F, before/with/after oil applications, or to melons due to phytotoxicity problems. If Downy mildew is found prior to September, other systemics (i.e. Ridomil/Bravo) may be needed with sulfur late in the season. There is no need to control downy mildew on pumpkins during September, because this disease only affects leaves and not fruit.

Example Spray Schedules:

I. Powdery Mildew (Occurs every year)
Beginning when lesions are first detected:
- Pristine alternated with
- Nova (high rate) plus chlorothalonil or Procure (high rate) plus protectant alternate with
- Cabrio or Flint plus copper, sulfur, or other labeled product

II. Most seasons after fruit set and if rotation is less than two years (Gummy Stem Blight/Black Rot)
- Bravo or other chlorothalonil product alternated with
- Amistar, Quadris or
- Topsin-M (thiophanate-methyl)

III. If Plectosporium Blight has been previously found, less than a 2 year rotation practiced, and if July-August rains occur (wet soils):
- Bravo or maneb or mancozeb (not Pumpkin or winter squash) alt with
- Cabrio, Flint plus protectant

IV. If Phytophthora Blight has previously occurred on your farm (apply appropriate cultural management tactics) or forecasts exist for Downy Mildew airborne from other states:
- Phosphorous acids (ProPhyt, Agri-Fos, Phostrol) alternate with
- Tanos plus protectant or
- Forum, Curzate plus contact, Gavel (not pumpkin or winter squash), or
- Ridomil Gold Bravo, Reason plus protectant

T. Jude Boucher, University of Connecticut, Cooperative Extension System, Thomas Zitter, Dept of Plant Pathology, Cornell University. www.vegetablemdonline.ppath.cornell.edu.

Adapted by Andrew Cavanagh and M. Bess Dicklow, University of Massachusetts Extension Service

Next week: more on organic and biologically based fungicide choices and schedules.

SQUASH VINE BORER UPDATE

Squash vine borer is more likely to be a problem where infestations were heavy the previous year and on thick-stemmed squash and pumpkins. Monitor for moths with a Scentry Heliothis Trap from early June through early August. Treat if more than 5 moths per week are caught. Note; in New Hampshire this week, squash vine borer traps reported captures of 4 moths per week in Milford, 11 in Litchfield, 15 in Mason, 7-9 in Hollis.

Squash vine borer larva

Scout for squash vine borer starting in late June by inspecting stems for frass. Control newly hatched larvae by making 2 to 4 applications at one-week intervals beginning in late June or early July. Timing is important. Thoroughly treat stems. Treat late in the day to avoid injury to bees. Some selective materials, such as spinosad (SpinTor or Entrust), provide excellent control of hatching SVB larvae.

-Jude Boucher, University of Connecticut. From update to the New England Vegetable Management Guide, www.nevegetable.org

NEW HAMPSHIRE VEGETABLE AND BERRY GROWERS' TWILIGHT MEETING

Tuesday, July 31st, 5:30-8:30pm

Location: Edgewater Farm, Plainfield, NH

Contact: Seth Wilner, 603-863-9200

Edgewater Farm is a diversified farm growing fruits, vegetables, ornatmentals, and cut flowers. They market their crops retail through a farm stand, wholesale, PYO, and through a CSA membership. This meeting highlights a variety of technologies used in crop production, including high tunnels and plasticulture, as well as crop rotation and cover cropping.

In addition to presentations by UNH and UVM extension specialists and the host farmers, Pooh and Ann Sprague, you will have ample opportunity to ask questions, get answers, and share your own experiences with other participants!

Directions: From Rte 89 North, Take exit 20 for Rte 12A in West Lebanon. Take a left at the end of the ramp onto Rte 12A south. After 4 miles, there will be a four-way intersection with the Riverbend Veterinary Clinic on your right. Take a right onto River Road at the clinic and proceed one half miles to the greenhouses. This is where the meeting will take place.

From Rte 89 South: Take exit 20 for Rte 12A in West Lebanon. Take a right at the end of the ramp onto Rte 12A south, and follow the rest of the directions above.

Sweet Corn Trap Counts for July 12th, 2007

Location	ZI	EII	Total ECB	CEW	FAW
South Deerfield	0	0	0	0	-
Deerfield	4	0	4	0	-
Granby	0	0	0	1	-
Whatley	4	2	6	0	-
Hadley (2)	1	0	1	0	-
Hadley (1)	0	0	0	0	-
Easthampton	0	0	0	0	-
Amherst (1)	1	1	2	0	-
Amherst (2)	0	0	0	0	-
Sunderland	0	0	0	0	0
Southwick	1	0	1	0	-
Concord	0	0	0	0	0
Leicester/Spencer	0	0	0	0	0
Northbridge	1	0	1	0	0
Tyngsboro	2	0	2	0	0
Tewksbury	0	0	0	0	0
Lancaster	0	2	2	0	0
Still River	1	0	1	0	-
Mason, NH	0	2	2	0	0
Hollis, NH	0	2	2	1	0
Litchfield, NH	0	0	0	0	0

CORN UPDATE

Harvesting has begun and farm stands are full of fresh sweet corn and eager customers. Corn is selling well for those growers who are fortunate enough to be picking already. Transplanted corn seems to be coming in at about the same time as corn started under plastic or under row cover. (We could use a good cost analysis on these three techniques!) Some fields need to be hand picked at this point in the season when maturity can be spotty. Most retail stands are selling out their daily pick and are getting anywhere from 5-7 dollars per dozen across the state.

European corn borer: Moth flight (trap captures) continue to be low everywhere, and many sites had no moths at all in E or Z traps. We are between ECB flights, expecting the second flight to begin within the next 7-14 days. **Silking corn:** Since trap captures are 0-4 moths/week at all locations, no silk sprays are needed for ECB at this time. At locations that were scouted in the Connecticut Valley fresh silk blocks showed no remaining borers in tassles, stalks or behind the ears, and we did not recommend any silk sprays at this time. (This of course was based on CEW catches of 0 as well). Check behind the developing ears to be sure that ECB is cleaned up. **Pretassel corn:** We found most pretassel and tasseling corn to be very clean this week and we did not recommend sprays for the majority of the growers, who were all well below the 15% threshold. Keep checking tassels and spray if you are finding 15% or more of your tassels infested.

Corn earworm: No moths were caught throughout the state this week except for one moth at two locations. Refer to spray schedule below for recommended spray schedules if you are catching moths. At 2 or more moths per week, growers need to be on a 6 day schedule on silking corn. Want to know what the numbers are on YOUR farm? For less than $100 you can have a trap (Scentry Heliothis net trap) and lures (Hercon luretape for Helicoverpa zea) for the season. Sources: Great Lakes IPM, Gemplers.

Sap beetle: We are seeing sap beetles in fields were ECB was initially a problem. Sap beetles are usually secondary pests of sweet corn associated with damage caused by other pests. Sap beetles overwinter as adults and lay eggs in the spring. There a several generations per year. They are more common on farms that produce a variety of fruit and vegetable crops. You should start monitoring for sap beetle when silks start to wilt. Inspect the silk area at the tip of 20 ears at five separate locations throughout the filed and determine the percent of ears infested with adults, eggs or larvae. Sprays for other ear pests usually control spa beetles, but if other pests are absent and more than 10% of ears are infested with sap beetles, treat for sap beetle.

Aphids:We have not seen corn leaf aphids building up in tassels in any fields scouted. Several natural enemies – ladybeetles (adults and larval stages), flower bugs, parasitic wasps-- keep these under control most of the time. Outbreaks occur where there is some combination of beneficials being knocked about by pyrethroids or carbamate insecticides, nitrogen present in excess, plant stress from drought, and hot weather. Don't spray at first sign of aphids. Only if numbers are building up to high levels with excessive honeydew dripping onto husks or aphids moving into the ear zone do they become a problem.

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 day	3.5 - 7	5 days
1.0 - 13.0	7 - 91	4 days
Over 13	Over 91	3 days

Note: spray intervals can be lengthened one day if daily temperatures are below 80 degrees F.

-Amanda Brown, UMass Extension

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