Bacterial Canker on Tomatoes

This disease has appeared on many farms in the past couple of weeks. Its sources are many that rely on lack of sanitation on one level or another because this disease is controllable with preventive actions. Plants at any stage of growth are susceptible. The earlier the plant is infected in its life, the more fatal or disastrous the results. Usually, this disease is identified only after bloom.

**Symptoms:**
- Curling and wilting, followed by browning of leaves
- Spots on leaves, stems and eventually the fruit
  * fruit spots have a dark brown center, which becomes raised, and are surrounded by a distinct white halo; they have been termed “bird’s-eye spots.”
  * young, green fruit may also show internal symptoms of discoloration.
- Internal plant symptoms solidify a diagnosis combined with the above characteristics. The inside of the stem should be white to very pale green in a healthy plant.
  * early symptoms will show a yellowing or browning of the vascular tissue if you cut the stem.
  * eventually stems may split, lengthwise, revealing red/brown discoloration.

**Sources & Controls:**
- Seedborne inoculum may serve as one source of the bacterium.
  * use only certified, disease-free seed from canker-free plants.
  * avoid saving seed. If you absolutely have to save seed, be sure to follow a Tomato Seed Extraction and Treatment protocol.
- Carry-over from year to year. Be sure to sanitize, from crop to crop:
  * any field equipment (stakes or other support supplies) greenhouse equipment, soil and supplies
  * rotate fields from tomatoes & peppers to non-host crops, after each crop, especially if you had an infection.
- Consider using copper or streptomycin applications early in production.
- If only a few plants are infected rogue out the ones identified
  * Once you have identified an infection, to minimize spread:
    * decrease transmission from plant to plant by decreasing contact from those infected to those not infected
    * decrease pressure on spray equipment.
Cucurbit Downy Mildew (CDM) has been confirmed on two samples of cucumbers this week from Albany and Rensselaer Counties. Although the infections were limited to a small section of the cucumber plantings, this means that the pathogen is probably pretty wide spread throughout the region and if you have not already added a downy mildew material to your spray list, now is the time.

Look for bright yellow spots on the upper surface of the leaves that are delineated by the veins. When humidity is high (the morning is perfect) you should be able to find dark brown/purple colored spores on the undersides of those bright yellow spots. If not, put the leaves in a plastic bag with a damp paper towel and leave it overnight. If it is CDM, it will usually sporulate overnight and you will see the dark spores in the morning.

There are two questions that keep coming up—first, at which stage of the cucumber do I need to start spraying? Secondly, what can I use that has a short pre-harvest interval (PHI) because I’m picking these cucumbers every day? The answer to the first question is simple—you need to be treating all your cucumbers no matter what the life stage as they are just as susceptible before fruiting as they are during fruiting.

The answer to the second question is not quite as easy. There are several materials that have good activity on CDM and a short PHI. Ranman 400 SC, Forum SC and the phosphorus acids all have a 0 days PHI and a 12 hour re-entry interval (with the exception of the phosphorus acids which have a 4 hour re-entry interval). Revus also has a 0 days PHI and a 12 hour re-entry but, efficacy has been mixed in other states with reports of good control of CDM in pumpkins and poor control in cucumbers. It is also recommended to use a spreading/penetrating agent in order to improve control. Of these, Ranman is reported to be the most effective and must be mixed with a protectant such as chlorothalonil (Bravo) which also has a 0 days PHI and 12 hour re-entry. Revus and the phosphorus acids work fine as long as they are applied before infection occurs. If a PHI is not a concern, Presidio still remains the most effective material, but has a 2 days PHI. One suggestion our from our plant pathologist is to pick whatever cucumbers you will need for a couple days and rotate to one of the other materials like Presidio or Previcur Flex. If you already have or suspect CDM, it is recommended that you tank mix Curzate with one of the following: Previcur Flex, Presidio or Ranman plus a protectant. Curzate has some “burnout” activity, but has very limited residual. By tank mixing with one of the other effective materials for CDM, you can improve your residual and get better control.

What about other cucurbits? Well, we are assuming that the CDM that we found here last week and this week is the same or similar cucumber strain that we have been getting the last several years. We have submitted samples and should know more later this week. This strain is most aggressive on cucumbers, but in my experience it will go to other cucurbits including melons, summer squash, pumpkins and then winter squash.

Cucurbit Downy Mildew Forecasts: According to the Cucurbit Downy Mildew Forecasting website: “HIGH Risk for cucurbits in west-central NY / central and eastern PA / NJ southward along the Atlantic coast into southern GA / southern AL / FL panhandle / northern FL. Low to Moderate Risk near the upper Ohio Valley / southern Lakes, southeast NY, western Carolinas, southern WV, southeast LA, and central and southern FL. Minimal Risk to cucurbits most other areas.” If the forecast stays like it has the last couple of days and we remain somewhat dry, CDM shouldn’t hopefully move too much the rest of the week. –CDB
Unfortunately the rains that came a couple of weeks ago also fired up a fair amount of Phytophthora blight (*Phytophthora capsici*) in cucurbits. If you have had this disease before you know how devastating it can be and how quickly it can move through a field when the conditions are right. We suspect that some of the new infections are a result of flooded fields from last year’s hurricane and tropical storms havoc. There is no way to completely control this pathogen except to avoid introducing it to your fields.

If possible do not plant vine crops in fields that you know are wet, poorly drain or may periodically flood. Do not throw culled fruit you purchased from another farm into your fields. Finally, do not plant vine crops back into fields that have had Phytophthora in the past. Keep a close eye on your fields and if you suspect that you have P. cap, call one of us immediately so we can properly identify it and send samples to Cornell for strain identification and to also see if it is resistant or susceptible to mefenoxam (Ridomil). We can also help you determine a plan of action in regards to what to do with the crop that is presently there. In many cases whole fields or sections may need to be destroyed in order to minimize the spread to other fields or sections on your farm.

Although there are no fungicides that will completely stop P. cap, there are some that can help slowdown the spread throughout a field. These include Presidio, Ranman, Revus and Tanos which you might already be using to help control Cucurbit Downy Mildew. –CDB

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**Aphid populations** have been pretty low until recently when they have shown up in several pumpkin and melon fields in really high numbers. At this time of the year even though they can still transmit virus, more importantly they can really deform leaves and they leave a sticky residue on fruit which we call “honeydew” (nice name for aphid poop). Honeydew doesn't hurt the fruit, but it does not make it very appealing for market and secondary organisms like *Rhzopagus sps* can grow on the residue.

Not all aphids are controlled by the same insecticides. Dan Gilrein, Entomologist, CCE Suffolk County, gives a nice description of the different aphids we deal with in our crops and some control options below:

“We sometimes see high populations in late summer on pumpkins, squash, cukes and melons, which may be related to repeat use of pyrethroids for beetles. Some species transmit mosaic viruses. Choice of control may depend on species present. Melon aphid has been most common in the

(Continued on page 4)
past, but green peach and potato aphids are also sometimes found. Melon aphids are usually in colonies of mixed dark and pale green or yellowish individuals with-tails’ (cornicles) completely black. Green peach aphids are of somewhat similar size and usually a consistent pale green (sometime pinkish) with only a dark tinge at the tips of the ‘tailpipes.’ Potato aphids are a much larger species, usually darker green with pink individuals mixed in; it tends to be more pear-shaped with longer legs and ‘tailpipes’ lacking any apparent shading. Potato aphids are generally susceptible to most materials. Green peach and melon aphids are toughest to control.

Effective options for aphids include Fulfill, Beleaf and Assail (all 0 DTH). Lannate (3) can be used for melon aphid (except on pumpkins and winter squash) and Metasystox R (14) for green peach aphid. Include a penetrating type spray adjuvant with Fulfill, Assail and Beleaf. LI 700 is commonly used in DE and is also an acidifier; other options include LI Combo (an acidifier and compatibility agent) and Agra Wet. M Pede and horticultural oils for organic growers can control aphids but coverage is difficult.

Direct sprays to leaf undersides and treat when crops are not under moisture stress or during excessively warm (over 85°F) conditions.” (Source of quote: Long Island Fruit and Vegetable Update, No. 20, August 16, 2012)

One benefit of the dry conditions this summer has been the nearly total absence of Cercospora leaf spot. It has been a pleasant change from 2011 when it started early and stayed with us through the fall. With the change in weather conditions we can expect this disease to appear again. It is caused by Cercospora beticola occurs wherever table beets, Swiss Chard, sugar beet, and spinach are grown. It is one of the most important diseases affecting the Chenopodium group. It can result in significant losses, particularly in late summer when conditions are favorable (high temperatures, high humidity, long leaf wetness periods at night). Leafy greens become unmarketable, and beet roots fail to grow to full size when disease is severe.

Identification: Symptoms appear as numerous, initially small circular leaf spots (see photo). Spots have a pale brown to off-white center with a red margin. Lesions expand in size, coalesce, turn gray as the fungus sporulates, and can result in extensive loss of foliage. Leaves at the center of the plant are often less severely affected. The pathogen produces sclerotia or stromata which can be seen with a hand lens as small, black dots in the center of lesions. Lesions may also occur on petioles, flower bracts, seed pods, and seeds. Leaf symptoms are similar to those caused by Beet Phoma (Phoma betae), except that the phoma will have more obvious tiny fruiting bodies in the lesions and can also affect the roots.

Source and survival. C. beticola survives between crop cycles in residues from infected crops (as sclerotia), in weed hosts, and on seed. It can survive in the soil for up to two years. High levels of disease can result from just a few infected plants, since each lesion produces numerous conidia. Several cycles of infection and conidium production may occur with favorable environmental conditions. Spores can penetrate the leaf directly through open stomates. The pathogen is favored by high relative humidity and temperatures between 75–85°F and is spread by rain splash, wind, irrigation water, insects, workers, and equipment. Leaf wetness during the night, even with dry conditions during the day, encourages disease. Successive plantings made close together can allow disease to move from one planting into the next.

Cultural management: Bury infected crop residues and destroy volunteer plants and weed hosts. Start with certified, disease-free seed or treat seed with hot water or fungicides. Rotate to non-host crops (not in the Chenopodium family) for 2-3 years. If disease is present, do a once-over cut rather than cutting chard or spinach for regrowth. Avoid planting succession crops close together. Avoid overhead irrigation if it will result in prolonged leaf wetness periods (eg, through the night); irrigate mid-day when leaves will dry fully or use drip irrigation.

Chemical controls: For optimum results use protectant fungicides as a preventive treatment, prior to infection and symptom development. Pathogen populations resistant to
sterol demethylation-inhibiting (DMI’s, FRAC Group 3) fungicides have been reported, so although these products are labeled, fungicides with other modes of action should be used. These include azoxystrobin (Quadris) (Group 11); basic copper sulfate (Basic Copper 50W HB and other copper products) (Group M1); pyraclostrobin (Cabrio) (Group 11); trifloxystrobin (Flint) (Group 11). Do not alternate Group 11 strobilurin fungicides with each other (Cabrio, Quadris and Flint). Products that simply kill spores on contact will not prevent the continuing production of spores nor protect leaves from new infections. By Bess Dicklow, Rob Wick and Ruth Hazzard, UMass Extension Vegetable Notes, Volume 23, NO. 17, August 16, 2012

Continue to look for and manage post-harvest diseases on garlic

Despite excellent harvest and drying weather in the Capital District this year, garlic growers are starting to find minor issues in the stored garlic. The key to addressing these issues is correct identification, followed by quick action. This list provides details about the 4 most common issues we are seeing.

**Embellisia skin blotch:** Embellisia is a largely cosmetic post-harvest disease caused by the fungus *Embellisia allii* (*Helminthosporium allii*). Lesions, which appear as diffuse charcoal colored blotches, are generally restricted to the first few layers of wrapper leaves and can be removed to make the garlic marketable. In severe infections lesions can spread through all the wrapper leaves, making the garlic unmarketable. Spores can overwinter on old leaf tissue, so cleaning and sterilizing drying and storage areas can help to prevent bulbs from being infected in storage. The disease spreads when the relative humidity is above 70%. Keeping humidity below that level is the best way to keep this disease in check if it is present.

**Aspergillus (black mold):** Black mold is another largely cosmetic disease which is also regularly found on both garlic and onions. Black mold, caused by the pathogen *Aspergillus niger*, leaves distinct black spots on surface of garlic bulbs. Black mold is extremely common in the soil and in the air. It only attacks dead plant tissues, and often starts on damaged parts of the bulbs or on naturally decaying wrapper leaves. Due to the widespread presence of the disease, management is more important than prevention.

Black mold thrives in warm growing (above 86°F) and storage (above 75°F) conditions. We can’t control the growing conditions, and warm temperatures are good during initial drying to prevent a host of other issues, but after garlic is dry it should be stored in a cool, dark place. Like Embellisia, spread of this disease is slowed by relative humidity below 70%.

If you do find this disease in storage, try to reduce temperature and humidity to slow its growth, and remove and dispose of infected wrapper leaves. Use of a fungicide at planting can help curb perennial issues with the disease as well.

**Blue Mold:** Blue mold, caused by *Penicillium sp.*, is an issue on garlic that has been damaged during harvest and handling. At times the disease will be found in the soil around garlic during the growing season, but it rarely attacks healthy living tissue. The primary method of preventing blue mold outbreaks is careful harvest and handling of garlic. Secondarily, preventing other diseases also reduces blue mold infections. While grading and cleaning garlic, discard any heads that have blue mold infections.

**Fusarium basal and bulb rots:** Even if you culled all bulbs visibly infected with fusarium during the growing season and at harvest, additional symptoms may continue to appear in storage. Fusarium basal rot (*Fusarium culmorum*) tends to be easier to cull during harvest or initial trimming due to its more obvious symptoms,
though some bulbs that were marginal may have continued to deteriorate and may now be unmarketable. Even if the majority of the bulb looks good, if you can see any basal rot the infection will continue to expand into the cloves. These bulbs should not be saved for seed or sold.

Fusarium bulb rot (Fusarium sp.) can be more difficult to detect and manage, since small lesions form under blemish-free skin in initial infections. In some cases a pink discoloration may appear on the wrapper leaves with both fusariums, but this is not always the case and should not be relied on for diagnosis. Fusarium is seed borne, so removing as many infected heads/cloves as possible when grading for sale and again when cracking garlic to plant is an important step in managing this disease. More information on fungicides treatments at planting for fusarium is forthcoming. - CLS (Images by CLS, except blue mold image, courtesy of Oak Leaf Gardening.

**Berry Update**

### Late Summer Weed Control Options for Berries

**Strawberry Weed Control:** Controlling fall germinating winter annuals such as chickweed and shepherds purse is critical at this time of year.

Devrinol (napropamide) is a preemergent herbicide that can cause problems with rooting of daughter plants so this material should be used after early forming daughter plants have rooted. Because daughter plants that form after late August don’t usually contribute as much to the yield, Devrinol can be applied without much effect at that time, but BEFORE winter annuals emerge. Devrinol must be moved into the soil by cultivation or water after application.

Sinbar (terbacil) is a preemergent herbicide with some postemergent activity. Usually Sinbar is applied after renovation or after the berries have gone dormant in the fall. If leaves are present during application, immediately apply 0.5-1 inch of water to wash the chemical off the strawberry foliage. Otherwise severe injury many result. Do not use Sinbar on soils with less than 2% organic matter and do not use on Guardian, Darrow or Micmac, as these cultivars have shown extreme sensitivity while some growers report that Honeoye and less vigorous cultivars have an increase in root rot following Sinbar use. Sinbar is limited to 8 oz/A per growing season.

Poast (sethoxydim) is a postemergent, grass herbicide. This material works well applied in late summer or early fall to actively growing grasses. Don’t waste your time and the product on summer annual grasses like foxtails and crabgrass that will be killed by frost. Poast can be used in the fall to suppress perennial grasses such as quackgrass; control early emerging small grains, and kill winter annual grasses such as wild oats. Poast must be applied with crop oil.

**Highbush Blueberry Weed Control:** August is the time to focus on problem weeds, especially woody perennial plants.

As perennial weeds begin to move carbon stores to their roots, they will efficiently move systemic herbicide to the root zone. But, so will blueberry plants! Be very careful with your application. A shielded sprayer is a must, better yet would be a wick applicator. A 2% Round-Up solution (41% a.i./gallon) will kill most of your problem herbaceous weeds, but if you have large woody material, you might want to use a higher solution. The Round-Up Pro label gives mixing instructions for many concentrations up to a 50% solution. The cut-stem application method is also listed for problem woody plants. Using a 50-100% solution of Round-Up, apply the material directly to the woody stem using a wick applicator immediately after cutting. Many growers use a roller/wiper application to the edges of their mulched row to keep grass from encroaching. Be sure that your mulch is nice and thick and that no blueberry roots are obvious.

For pre-emergent control of fall annuals there are several choices. Sinbar can be used after harvest in all but 1-year old plantings. Devrinol should be cultivated or watered in within 24 hours of application. Solicam is also a good choice at this time of year, IF you did not apply this material in the spring.
Bramble Weed Control
Late summer and fall is an excellent time to control troublesome perennial weeds like thistle, dock, smartweed, and morning glory by spot spraying with Round-Up, but take EXTREME caution to avoid getting herbicide on bramble canes. For grass control, now is the time to apply the second Poast application. This should be done while grasses are actively growing. The further you get in August, the poorer the control. To suppress winter annual germination, both Sinbar and Devrinol can be used. Slicam, if not applied in spring, is a good choice unless you have a new planting or light soils. Make sure that you read the label as herbicides have caveats re: soil organic matter content and rates.

Organic Options: If you are an organic grower or trying to reduce your herbicide usage, late summer is a good time to consider going through the berry plantings with a crew to hand weed or use a flamethrower in plantings. Cultivation is an option for strawberries and materials like vinegar could also be very helpful for weed control. Cleaning up a patch, then applying mulch where it is appropriate will save time next season. Do not ignore late season weed control just because you don’t use herbicides. -LGM

Corn Trap Catches for the week of Aug. 21

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Weekly and Seasonal Weather Information

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