Common Vegetable Garden Pests and Diseases

Introduction

This Manual is by no means a comprehensive list of the pests that can attack the type of vegetables we plant; it only includes the pests and diseases that we’ve seen (or expect to see) at the MG Community Garden in Haddam. Some Charts have also been developed to help identify and control certain pests; these charts contain additional information on the particular pests addressed.

Solanaceae Diseases and Pests

Some Common Tomato Diseases

Septoria leaf spot is a condition often seen; it will start at the bottom leaves:

The Fact Sheet from Cornell on septoria leaf spot is at
http://vegetablemdonline.ppath.cornell.edu/factsheets/Tomato_Septoria.htm. You should probably not compost any of the spotted leaves.

Catfacing is common in 2009, most likely because of the cooler night temperatures when fruits were forming, and/or poor pollination. (Other causes are herbicide damage and high N levels, which aren't applicable for the Groton Garden). Here is an image of the cat-facing:

Information on cat-faced tomatoes from U of Illinois is at
http://urbanext.illinois.edu/vegproblems/catface.html. They are fine to eat when ripe, just cut away the damaged area.

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Blossom End Rot is caused by a calcium deficiency, usually because soil is not moist enough. Keep soil moist (but not soaking).

Late Blight of Tomato

Late Blight is affecting tomatoes in this area (2009). Inspect tomatoes and know what to look for; the late blight can be confused with some other diseases (particularly septoria leaf spot), but if there is late blight, you need to destroy and bag the plants and bury or destroy (do not throw in compost).
Note the browning on the stems:

And the fungus on the leaves:

The Cornell Pages about Late Blight is at
http://www.nysipm.cornell.edu/publications/blight/ and also
http://vegetablemdonline.ppath.cornell.edu/NewsArticles/LateBlightJune09.html and
http://www.longislandhort.cornell.edu/vegpath/photos/lateblight_tomato.htm

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The OSU Fact Sheet is at http://ohioline.osu.edu/hyg-fact/3000/3102.html.

**Tortoise Beetle**

*Tortoise Beetles* prefer plants of the family Solanaceae (tomato, eggplant, pepper, potato). Beetles are all members of the Coleoptera order. Since tortoise beetles are easy to catch and kill, and don't do great damage, control other than mechanical is usually unnecessary. There are many variations of this beetle; the one I (believe) I see the most is the Clavate Tortoise beetle, or *Plagiometriona clavata*.

Information from U Fla can be found at http://entnem.ufl.edu/creatures/orn/beetles/Plagiometriona_clavata.htm

**Flea Beetles**
Flea beetles are tiny (1/4" or smaller) black bugs that jump when you go near them. (They just look like rounded black dots). There are dozens of species; potato flea beetles include Epitrix cucumeris, E. subcrinita, and E. parvula. They chew tiny shotgun holes in the leaves. Found in 2009, mostly on the young, tender eggplant, and we used spinosad, an organically approved method. The active ingredient is derived from a naturally occurring soil dwelling bacterium called Saccharopolyspora spinosa. This method works with only 1-2 applications. (Depending on the plant, there are guidelines about the total number of applications and time period between applications).

Information about the flea beetle can be found at:
Colorado State Extension Fact Sheet
http://www.ext.colostate.edu/pubs/insect/05592.html
North Carolina State University
http://ipm.ncsu.edu/AG295/html/eggplant_flea_beetle.htm
National Sustainable Agricultural Information Service
http://attra.ncat.org/attra-pub/fleabeetle.html

Potato Beetle
Leptinotarsa decemlineata (Say)

Colorado Potato Beetles can cause significant damage to tomatoes, eggplant, and peppers, in addition to potatoes. They have developed resistance to pesticides (particularly in the Northeast). Colorado potato beetle populations can be reduced through relatively common cultural practices such as crop rotation, manipulation of planting time and crop varieties, use of mulches, cover and trap crops. When garden is limited to a few potato, tomato, or eggplant plants, hand-picking overwintered adults and egg masses early in the season is the simplest management approach. Most damage is done by larvae, so removing their parents and unhatched eggs should provide fairly good protection of the plants later in the season.

The adult beetles overwinter 12-18 inches below the soil surface, and in protected sites around the field. The adults emerge in late spring, move into the field, establish themselves on a plant, and mate. Females lay orange-yellow egg masses on the undersides of leaves in batches of approximately 25 eggs. A single female may lay up to 500 eggs. Because the eggs are laid in clumps, the larvae tend to be found in clumps as
The larvae are humpbacked with two rows of black spots on each side. They usually feed in groups and damage can be severe. The larval stage lasts two to three weeks. Full grown larvae burrow in the ground to pupate. In five to 10 days, the adult beetle emerges. This insect can go from egg to adult in as little as 21 days. The newly emerged adult female feeds for a few days before egg laying begins.

Information about the potato beetle can be found at:
PotatoBeetle.org (UMaine)
ATTRA:
http://attra.ncat.org/attra-pub/coloradopotato.html
U Kentucky:
http://www.ca.uky.edu/ENTOMOLOGY/entfacts/ef312.asp
U Vermont
http://www.uvm.edu/vtvegandberry/factsheets/potatobeetle.html
Cucurbit Diseases and Pests

Squash Vine Borer
Lepidoptera: Sesiidae *Melittia cucurbitae* (Harris)
Lepidoptera: Ageiriidae *Melittia satyriniformis* (Hübner)

![Adult](image1)
![Eggs Laid Near Base](image2)

Larva inside stem
After zucchini flowers, be on the lookout for the squash vine borer; the adult looks like a red and black fly and lays eggs near the base of the plant. When the larvae emerge, they drill into the stem of the plant and can quickly kill summer squash. Additional info from U of Minn is as follows:

Beginning in late June or early July, squash vine borer adults emerge from cocoons in the ground. Squash vine borer adults are good fliers for moths and resemble wasps in flight. These moths are unusual because they fly during the day while nearly all other moths fly at night.

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Soon after emerging, squash vine borers lay eggs singly at the base of susceptible plants. Everyone who checks on the garden needs to look at the stems of all the squash plants. For those who have not had experience with squash borers, be on the lookout for the yucky brown “frass” that indicates a little borer (or two or three or more!) have made their way into your squash plant. It will typically be on the main stem, about 1 - 3 inches above the ground. It requires a lot of looking to find, so take the time to look at each plant. Approximately one week after they are laid, the eggs hatch and the resulting larvae bore into stems to feed. The larvae feed through the center of the stems, blocking the flow of water to the rest of the plant. The larvae feed for four to six weeks, then exit the stems and burrow about one to two inches into the soil to pupate. They remain there until the following summer. There is one generation per year.

**Damage**

Often the first symptom of a borer attack is wilting of affected plants. Wilting may occur only in strong sun at first, but if the problem is left unchecked, the plants eventually collapse and die. Closer observation of a wilting plant often reveals holes near the base of the plant filled with moist greenish or orange sawdust-like material called frass. Over time, the base may become mushy or rot away altogether. Several borer larvae may attack a single plant.

**Management**

Squash vine borers are challenging to prevent or manage. Use integrated pest management (IPM) methods for the best results. Most management options are limited to control the hatching larvae before they enter the plant. Once the larvae invade the stem, it is difficult to treat squash vine borers. Home gardeners can take a proactive stance against squash vine borers by monitoring your squash for the presence of adult borers starting the last week of June. Monitoring tells you if and when squash vine borers are present. This information helps you determine what further management measures may be necessary. There are two methods for detecting squash vine borer adults. The first is actual observation of adult activity in the garden. These moths are conspicuous insects when flying and easy to detect; watch for them when you’re in your garden. In addition, the adults make a very noticeable buzzing sound when flying that is easy to detect while in the garden.

You can also use yellow trap pans to detect squash vine borer adults. This can be any container (e.g. pan, pail, bowl) colored yellow and filled with water. Because squash vine borer adults are attracted to yellow, they will fly to the container and be trapped when they fall into the water. Place traps by late June, checking your traps at least once a day. When you notice squash vine borer adults in your traps you know they are active and it is time to take further action.

**Cultural**
• Plant vine crops that are usually not attacked by squash vine borers, such as butternut squash, cucumbers, melons, and watermelons.
• A second planting of summer squash made in early July will mature after adult borers have finished laying eggs.
• Promptly pull and destroy any plants killed by squash vine borers.

Physical

You can physically exclude adult borers by placing floating row covers over your vine crops when they start to vine (or for non-vining varieties, starting late June or early July) or when you first detect squash vine borer adults. Keep the barriers in place for about two weeks after the first adult borer has been seen. Be sure the row covers are securely anchored to prevent adults from moving underneath it.

Caution: Generally do not use floating row covers anytime crops are flowering. This prevents bees from pollinating your vegetables which will have a negative impact on plants. An exception to this would be if you pollinate your crops by hand while the floating row cover is erected.

Insecticidal

If insecticides are needed, spray or dust the stems at their base. Start treatments when vines begin to run (or the last week of June or early July for non-vining varieties) or when the first adult borers are detected. Repeat in 7-10 days. Two applications help manage most squash vine borer adults. For more thorough coverage, continue treatments at 7-10 day intervals until the end of July. Below is a list of common names of active ingredients that are effective against squash vine borers.

University of KY at [http://www.ca.uky.edu/entomology/entfacts/ef314.asp](http://www.ca.uky.edu/entomology/entfacts/ef314.asp) and ATTRA at [http://attra.ncat.org/attra-pub/squash_pest.html](http://attra.ncat.org/attra-pub/squash_pest.html) also have some good info on the borer as well as the squash bug.

GardensAlive! at [http://www.gardensalive.com/article.asp?ai=804&bhcd2=1248388859](http://www.gardensalive.com/article.asp?ai=804&bhcd2=1248388859) suggests the following (in addition to some pre-planting techniques:)
“... the most reliable cure may be to grow your squash out in the open and use vigilance to get the eggs. You may not be able to see them, but a weekly spray of the vine with insecticidal soap will smother them nonetheless (use a commercial product, not homemade; there is a fine line between beneficial soap and plant-killing herbicide).

Or use BTK. This is where I assure worried Emily that BTK is indeed organic and non-toxic; one of the oldest organic pest controls, in fact. Sold under brand names like Dipel, Thuricide and Green Step, this form of Bt ONLY kills caterpillars that munch on the sprayed plant part; it affects nothing else. So spray the vines once a week and there will be BTK on the stem when that hungry, hungry caterpillar comes out and starts munching.

Or just wipe the stems every five days vigorously with a damp cloth and wipe away the
eggs. An Auburn University researcher found this tip in a farming book from the 1890’s, when even now-ancient remedies like BT were still half a century in the future! Wiping with BTK or insecticidal soap should be even better.

Once the season is underway, carefully inspect each vine once a week; don’t wait for wilting! If you see a hole near the soil line and that distinctive greenish frass (bug poop) that the borers push back out of their comfy new home, slit the vine with a razor blade and find the caterpillar inside. We will now flash forward to you later heaping compost-rich soil over the damaged part of the vine. (Remember—no laughing like The Joker!)

Or inject the attacked vine with BTK. Or beneficial nematodes; these microscopic garden helpers love to prey on tasty caterpillars, and the moist inside of the vine will protect the nematodes as they go a’ hunting. You’ll find garden syringes sold for injecting nematodes and BTK at some garden centers and by mail order."

### Squash Bug

*Anasa tristis*

**Adult**

**Nymphs**

*Squash bugs* like the lower leaves and stink when crushed. They have piercing mouthparts and feed on plant foliage and suck plant sap. Their feeding results in plant wilt and in some cases plant death. Squash bugs target cucurbits. It is a carrier of Cucurbit Yellow Vine Disease (see UConn IPM info at [http://www.hort.uconn.edu/ipm/veg/htms/cucrbinct.htm](http://www.hort.uconn.edu/ipm/veg/htms/cucrbinct.htm)).

For info on this pest, see:

- U of Minn Extension [http://www.extension.umn.edu/distribution/horticulture/M1208.html](http://www.extension.umn.edu/distribution/horticulture/M1208.html)
- U Kentucky Entomology [http://www.ca.uky.edu/entomology/entfacts/ef314.asp](http://www.ca.uky.edu/entomology/entfacts/ef314.asp)

### Squash Beetle

*Epilachna borealis*

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Squash Beetles *Epilachna borealis* is a common zucchini pest, often mistaken for lady bugs. See Coleoptera: Coccinellidae chart (separate document) for a comparison of this beetle with the lady beetle and the Mexican Bean Beetle.

The squash beetle is one of two species of Coccinellidae (lady beetles) known to occur in the U.S. that eats plant material rather than other insects. The squash beetle feeds upon the leaves of cucurbits. The other species, the Mexican bean beetle (*Epilachna varivestis*), a close relative of the squash beetle, is a serious bean pest. From what I understand, the best way to tell these guys apart is the size (perhaps the color too; but I'm so used to seeing dead lady bugs in my attic that the color is the same to me). There was skeletonizing of some of the squash leaves, which is characteristic of squash beetles. These guys and the eggs, which are laid in July, need to be killed:

Purdue has some good info and pictures on this pest at [http://extension.entm.purdue.edu/publications/E-100.pdf](http://extension.entm.purdue.edu/publications/E-100.pdf).

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Cucumber Beetle

The striped cucumber beetle (*Acalymma vittatum*) and the spotted cucumber beetle (*Diabrotica undecimpunctata howardi*) occur in the Northeast. The striped cucumber beetle, typically the most common in New York, feeds primarily on cucurbits, whereas the spotted cucumber beetle has a much wider range of host plants.

Golden Harvest Organics ([http://www.ghorganics.com/CucumberBeetles.htm](http://www.ghorganics.com/CucumberBeetles.htm)) is a great site for information about the cucumber beetle, including organic controls. One of the problems with this pest is that it spreads bacterial wilt and the mosaic virus. If your plants are wilting, they should be yanked and the debris buried or sealed. The site gives some good suggestions for companion planting; in addition to the well-known nasturtiums with cucurbits, sowing radishes right in with cucurbits is recommended. Something you might want to consider as not just a control, but a way to increase yield without "stealing" space from another crop.

Other resources for the cucumber beetle are:
Cornell’s Vegetable MD Online
[http://vegetablemdonline.ppath.cornell.edu/factsheets/Cucurbit_Beetles.htm](http://vegetablemdonline.ppath.cornell.edu/factsheets/Cucurbit_Beetles.htm)
ATTRA:

Powdery Mildew

Powdery mildew is a common disease on many types of plants. There are many different species of powdery mildew fungi (e.g., *Erysiphe spp.*, *Sphaerotheca spp.*) and each species only attacks specific plants. According to Cornell, the best method of control is prevention. Planting resistant vegetable varieties when available, or avoiding the most susceptible varieties, planting in the full sun, and following good cultural practices will adequately control powdery mildew in many cases.

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Information can be found at:
U California http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7406.html
Cornell (PM of Cucurbits)
http://vegetablemdonline.ppath.cornell.edu/factsheets/Cucurbits_PM.htm

There is also a 1997 study of varieties of squash and resistant to a number of diseases on the UConn IPM site at http://www.hort.uconn.edu/IPM/veg/htms/sqdistol.htm. And see the 1992 study of disease resistant vegetables (many diseases) from Cornell at http://www.gardening.cornell.edu/factsheets/ecogardening/disresveg.html
Like our nemesis the Squash Beetle, the *Mexican Bean Beetle* is part of the lady beetle family. It has a similar appearance and habit (lays eggs in clusters on underside of bean leaves) and can do significant damage. See Coleoptera: Coccinellidae chart (separate document) for a comparison of this beetle with the lady beetle and the squash beetle. Make sure you’re inspecting underneath beans leaves while on Pest Patrol.

Here are some links:
U of Florida [http://entomology.ifas.ufl.edu/creatures/veg/bean/mexican_bean_beetle.htm](http://entomology.ifas.ufl.edu/creatures/veg/bean/mexican_bean_beetle.htm)
Center for Invasive Species [http://www.invasive.org/species/subject.cfm?sub=2594](http://www.invasive.org/species/subject.cfm?sub=2594)
CT Agricultural Station [http://vvv.state.ct.us/caes/FactSheetFiles/entomology/fsen009f.htm](http://vvv.state.ct.us/caes/FactSheetFiles/entomology/fsen009f.htm)
Rutgers Fact Sheet (downloadable pdf) [http://njaes.rutgers.edu/pubs/publication.asp?pid=FS227](http://njaes.rutgers.edu/pubs/publication.asp?pid=FS227)
Wireworms are the larvae stage of the Click Beetle. Note: inspect soil for these critters before sowing.

The National Sustainable Agriculture site indicates, "Horticultural favorites of wireworms are beans, brassicas, carrots, corn, cowpeas, lettuce, melons, onions, peas, potatoes, strawberries, and sweet potatoes."

"Plant Natural" has the following: "Wireworm Control: Thorough cultivation makes conditions unfavorable to the egg laying adults and exposes all stages of the pest to weather and natural enemies. Potatoes make great wireworm traps. Cut a potato in half and run a stick through the middle. Bury the spud about one inch deep so that the stick stands vertically as a handle. Pull the traps out after a day or two and discard wireworms. Apply beneficial nematodes to attack and destroy pests in the soil."

Information on the wireworm and organic controls can be found at http://www.mainepotatoipm.com/ipmfactsheets/wireworm.pdf (Maine Potato IPM Program).

The National Sustainable Agricultural Information Service also has a lot of info and resources for wireworms. (You need to scroll down to get to the wireworm Q and A).
Long-legged fly is a beneficial insect; many were flying around and landing on many of the plants (June 2009), especially the peppers. Adult are general feeders: thrips, aphids, larvae of small insects, spider mites, etc. Immatures of some species prey on small insects, while others are believed to be scavengers.

Information can be found at http://aggie-horticulture.tamu.edu/galveston/beneficials/beneficial-25_long-legged_flies.htm (Galveston Master Gardener Fact Sheet).