# **Cornell Cooperative Extension**

Eastern NY Commercial Horticulture Program

## **VOLUME 6, ISSUE 11 – JUNE 27, 2018**

## Squash Bug Adults Laying Eggs Now: Go Scout! Ethan Grundberg, CCE ENYCHP

Squash bugs (Anasa tristis) are now actively laying eggs on winter squash, pumpkins, summer squash, and zucchini. The adults (pictured in image 1) can be easily mistaken for a stink bug both because of their similar appearance and the distinctive odor they emit when crushed. However, squash bug adults have a narrower body than stink bugs and have a noticeable flare on their rear legs like other species in the "leaffooted bug" family. Adults overwinter in debris around field edges and begin to mate in the spring. Eggs (image 2) are copper colored and laid in clusters both on the top and bottom of leaves between veins. The eggs being laid now will hatch in 7-10 days and produce small grayish -blue nymphs. While squash bugs do most of their damage on the foliage, adults will also feed directly on fruit later in the season causing extensive pock-marking and creating entry points for other pathogens like black rot. Both adults and nymphs inject toxins into the plant tissue when they feed which can cause "anasa wilt," both reducing plant photosynthetic and increasing the risk of other foliar diseases like powdery mildew (image 3).

Squash bugs can be challenging to manage with chemical controls, so eliminating overwintering





habitat on field edges by thoroughly incorporating cucurbit crop residues and picking up leftover bulk bins and pallets is a crucial management tactic. Now is the time to scout fields, especially of pumpkins, to look for egg masses. If more than 1 egg mass per plant is found on average, an insecticide should be applied once the small nymphs have just hatched.

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Many pyrethroids, neonicotinoids, and carbamates are labeled for squash bug, but care must be taken to not kill off pollinators if plants are flowering. Several studies have found Warrior II w/Zeon Technology (lambda-cyhalothrin, IRAC Group 3A) at 1.5 oz/ac to be among the most effective options.

For organic growers, labeled azidirachtin formulations are effective, though some studies are also showing even

more promising results from Azera (azidiracthin + pyrethrins) at 2-3 pints/acre. Since nymphs are often clustered around the base of the plant or on the undersides of leaves, getting good spray coverage and penetration through the leaf canopy is essential for effective insecticide applications, so consider spraying at a slightly higher PSI and/or using a spreader in the mix.

## Common Bacterial Diseases of Tomatoes in Eastern NY Region Teresa Rusinek, CCE ENYCHP

Bacterial speck, spot and canker have been increasing in occurrence and severity in Northeastern United States. Bacterial canker is presently the most serious disease in production systems. Already this season, we've seen several outbreaks of bacterial canker in the field and high tunnels. Pith necrosis is another bacterial disease that we are seeing as well. Those who've seen these bacterial diseases before are likely to see them again as the bacteria persist for several years in soil as well as on stakes and in transplant production areas. Below are some tips on identification and management of bacterial tomato diseases.

#### Bacterial Speck (Pseudomonas)

- dark blisters on fruit
- development favored by cool moist conditions
- dark lesions on leaves with discrete yellow halo

#### Bacterial Spot (Xanthomonas)

- dark, scabby lesions on fruit
- can start on or spread to peppers
- favored by warm weather
- often misdiagnosed as speck Bacterial Canker (Clavibacter)
- dark lesions on leaves starting at the edge
- light blisters on fruit (bird's eye blister)
- cankering of branches.



Bacterial Speck: Specking on fruit and leaves



Bacterial Canker: Marginal necrosis on leaves, Bird's eye spots on fruit

• systemic infections can kill plants

#### Controlling Bacterial, Speck, Spot and Canker:

Tanos when tank-mixed with full rate of copper fungicide has some suppressive activity on Speck, Spot and Canker. Copper plus mancozeb or ManKocide, which is premix of mancozeb + copper hydroxide appears to be just as effective. The reason for mixing the two together is the addition of the mancozeb increases the effectiveness of the copper by releasing more of the copper ions. Gavel is also labeled due to the mancozeb component of the material but must also be mixed with a high rate of fixed copper.

ActiGard is a plan activator (fungicide that induces resistance), it is not approved for organic production. Trials conducted by Cornell plant pathologists Christine Smart and Margaret McGrath found Actigard to provide excellent control of bacterial speck without a reduction in yield. They used 0.75 oz. /A applied at 100 gpa on a 7-day schedule. It takes at least three days for Actigard to induce plant defenses, so it is necessary to begin applications before symptoms appear on the plant.

In organic systems, the grower is limited to OMRI approved copper compounds such as Champ or Cueva. LifeGard is a new biological plant with a similar mode of action to ActiGard. It is now labeled for use in NY and is OMRI approved. LifeGard is labeled for the control of bacterial spot and speck as well as other diseases, but not labeled for control of canker. It should be used preventively in combination or alternating with other fungicides/bactericides.

#### Pith Necrosis

Pith Necrosis is another bacterial disease of tomatoes that we have been seeing more of. It is caused by any of several soil borne speices of Pseudomonas or *Pectobacterium carotovorum* that enter the plant thruogh a wound or natural opening. Often, just a few plants are affected in a field or high tunnel, but I have also seen an entire high tunnel planting wiped out from pith necrosis in a matter of 2-3 weeks. Symptoms include: wilting at the top of the plant, yellowing leaves, stem splitting, stem rooting, dry brown stem canker, a hollowing or stepladder look of the pith, and watery decay of tissue especialy when Pectobacteria are involved. Fruits may develop watersoaked, greasy lesions on the blossom end. Some of these symptoms may be confused with that of bacterial canker, samples can be sent to the Cornell diagnostic lab for confirmation.

Conditions that favor the development of this disease are cool night temperatures, cloudy days, high humidity (often an issue in high tunnels), excessive fertility and irrigation, and rapid growth. Pith necrosis disease progression is slowed during warm and sunny periods and plants may recover from the disease once fertility conditions are corrected.

Bacteria survive in infected plant debris and soil, seed and tranplants. The pathogens spread on workers hands, pruning tools, and by splashing rain or irrigation.

Copper sprays are not effective in controlling pith necrosis and there are no resistant varities available. Avoid planting in fields where there were cull piles and use properly managed compost free of plant



Top: Pith hollowing- step ladder look. Bottom: The entire high tunnel planting was lost to pith necrosis, tomatoes developed water-soaked lesions on blossom end. All photos by Teresa Rusinek.

pathogens. Delaying planting in springs that are cool and wet may help avoid the disease from developing. Avoid excessive nitrogen rates, especially in the spring when vegetative growth is rapid. (Don't frontload all your N at planting!) Ventilation in high tunnels and greenhouses, even when it's cold outside, is critical in disease management as are good sanitation practices.

More resources on Pith Necrosis:

http://u.osu.edu/vegetablediseasefacts/files/2014/05/ pithNecrosisFactSheet02-1wygptg.pdf

https://www.extension.umn.edu/garden/fruitvegetable/plant-diseases/pith-necrosis-tomato/ index.html

## Oh My, Why are my Tomato Leaves Rolling? Chuck Bornt, CCE ENYCHP

I'm actually surprised I didn't get this call a couple weeks' sooner, but it's that time of the season when we start to see lots of tomato leaves are starting to roll and folks get nervous something is the matter! No one really wants to hear this but, there pretty much nothing you can do about it – no sprays or fertilizing will really help it and this is why as explained the best way I've seen it by Jerry

Brust, a Vegetable Specialist with the University of Maryland:

"Tomato leaf roll is a problem with a variety of causes that we have been seeing a lot of this year. Tomato leaf roll starts with upward cupping at the leaf margins followed by inward rolling of the leaves. Lower leaves are affected first, and can recover if environmental conditions

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Excessive pruning and hot dry conditions are just a couple reasons for leaf curling symptoms in this tomato plant. Photo: CDB

and cultural factors are adjusted to reduce stress. Not all leaves on a plant roll, but eventually the rolling can involve most leaves on a plant and last through the season. In severe cases, whole plants can be affected.

The margins of adjacent leaflets may touch or overlap. rough and leathery but are otherwise normal in size and no discoloration of *leaf veins associated* with this problem. The good news is

that leaf roll rarely affects plant growth, fruit yield, or fruit quality. Leaf roll is often seen just after plants are heavily pruned during dry soil conditions. If the tomato plant's top growth is more vigorous than root growth and we are hit with a dry hot period the foliage may transpire water faster than the root system can absorb it from the soil, and the plant will respond by rolling its leaves to reduce the transpiration surface area.

Another cause of this disorder is growing high-yielding cultivars under high nitrogen fertility programs. Oddly enough leaf roll disorder also has been found to be caused by excess soil moisture coupled with extended high temperatures. Leaf roll severity appears to be very cultivar dependent. Cultivars selected for high yield tend to be the most susceptible. Indeterminate cultivars seem to be more sensitive to this problem than determinate cultivars. It has been found that sugar and starch accumulating in the lower leaves cause the leaf to roll; the more they accumulate the worse they roll. Leaf roll is usually something we see when we have hot dry conditions in June or July, when plants are most actively growing. Leaf roll seldom affects yield, therefore no corrective measures are needed.

Rolled leaves become However, it is important to distinguish leaf roll from other problems that affect tomato leaf shape. Some viruses or herbicide injury can look similar to tomato leaf roll, but if the symptoms appear suddenly, involve many of the plants appearance. There is in a field, and largely affects the lower leaves, it is probably leaf roll. You can reduce symptoms by maintaining consistent, adequate soil moisture of about 1 inch per week during the growing season. This will also help with calcium up-take, reducing blossom end rot problems. Growers also should not prune heavily during hot dry conditions or over-fertilize with nitrogen."

> So, as you can see there are lots of things that can cause leaf rolling and probably most of it is what we've induced by pushing the plants hard or what Mother Nature has or hasn't delivered in regards to moisture and temperatures!

## What's an Acre Rate When Using Plastic Mulch and Fertigating? Chuck Bornt, CCE ENYCHP

With early squash harvest underway and tomatoes starting to set and size their fruit, I don't think there is anything that makes more sense than applying your fertility to your vegetable crops grown with plastic mulches by fertigation (the injecting of fertilizers into drip irrigation water). Why? Think about it – you're applying a fertilizer already dissolved in water taking one step out of the uptake process. Second, you're applying the water as close to the root system as you can, making it more efficient; third the plastic mulch will help reduce any nutrients such as nitrogen from volatizing; and its easy! I know many of you know this stuff, but it's always good to review so below are some general "rule of thumb" reminders when using fertigation:

First, calculating fertilizer needs where plastic mulches and drip irrigation is used is not the same as broadcasting a fertilizer over an entire acre! A "field acre" is not the same as a "plastic mulch acre". When determining your fertilizer needs for mulches, only calculate the area that is covered by the mulch. To determine this, you need to:

- 1. Determine the width of your bed or the area across that your mulch covers. For example, if you are using a Rain-Flo raised bed maker, a typical bed top width is 30 inches or about 2.5 feet. There are other machines and other systems that might use a different width so you need to go out and measure it.
- 2. Take this value and multiply it by the row length.

Then multiply that by the number of rows per section that you irrigate at one time or "zones". For example, if my bed width is 2.5 feet, my rows are 345 feet long and I have 5 rows per section then my total acreage would be  $(2.5 \times 345 \times 5)$  divided by 43,560 (number of square feet in an acre) which would <u>be 0.1 acres</u>!

3. Calculating fertilizer amounts: Remember that the 3

numbers on the bag or jug refer to the percentage of each nutrient (N-P-K) in that blend. So a bag of 20-10-20 contains 20% nitrogen, 10% phosphorous and 20% potassium.

- a. In the case of fertigation, not all dry fertilizers make for good fertigating. You really want one that easily and completely dissolves in water such as a greenhouse grade material. Urea can also be dissolved in water with lots of agitation. Other excellent fertigation materials are liquid fertilizers (such as UAN which is a solution of urea and ammonium nitrate sometimes referred to as Nitan).
- b. Organic options include Chilean nitrate, potassium sulfate, Neptune's Harvest Hydrolyzed Fish Fertilizer and Liquid Products, LLC Liquid Organic Fertilizer.
- c. The key to using liquids is to know the weight per gallon in order to figure out the lbs per gallon of the actual nutrient.
- Back to calculating fertigation needs: If I want to apply 10 pounds of actual nitrogen (per field acre) and the analysis of my nitrogen source is 20% nitrogen, divide 10 pounds by 0.20 (that is the fertilizer analysis expressed as a decimal). One way I remember that equation is "what I need divided by what I've got". That means for one field acre I would need 50 pounds of this fertilizer for one "field acre". BUT, because I'm only treating the acreage that is covered by the mulch, I actually only need to dissolve 5.0 lbs. of this fertilizer to get my 10 pounds of nitrogen per acre. Why? I only have 0.1 acres to actually treat so if you need to multiply your actual acreage (0.1 acres) x the amount of fertilizer needed for an entire acre (50 pounds) = 5.0 pounds of actual 20-20-20 to dissolve in solution.
- 5. When in doubt, please call me (Chuck Bornt) at 518-859-6213 and I'll do my best to help you out!

#### Some other things to remember:

- Before you go through all the work to plumb in a fertigation unit on your drip system, make sure that the unit you purchase meets the required "gallons per minute" (GPM) needs otherwise it will not operate correctly! For example, if you purchase a Mazzi injector that needs 10 GPM and you are only irrigating a section at a time that is only using 8 GPM, there is not enough flow rate to syphon the fertilizer solution into the main line.
- 2. Make sure the system has been turned on long enough to pressurize it completely. Failure to do this will result in all of your fertilizer solution getting sucked up all at once and only going to a couple rows.
- 3. The longer the fertigation event can occur the better the distribution of fertilizer will be. That means if a typical irrigation event for you is 3 hours, then try to have the fertigation happen during the majority of this run time minus the full pressurization and time at the end to make sure the lines are flushed. Minimally I would like to see 15—25 gallons per acre of water used to dissolve your fertilizer to help ensure the best distribution of fertilizer. If you can use more than great!
- 4. Know your irrigation water pH: this is something that I know many of us do not do often enough and is a critical factor in nutrient uptake when fertigating. Most crops optimally mine most nutrients (in particular nitrogen and potassium) at a pH of 6.2— 6.5. If your irrigation water is above that, you may not be getting the biggest bang for your buck with your fertigations. You can use either sulfuric acid or citric acid to help acidify your water and use the <u>online alkalinity calculator</u> to get your acid concentrations. Be sure to follow all directions on the calculator and pay careful attention to the pull down menus on the input side to get the correct recommendations.

In my opinion, weekly fertigation (which some growers are doing) and spoon feeding our plants is a better way to go instead of applying a large dose of fertilizer a couple times a season. It might be that this constant feeding and watering may improve not only yield but fruit quality as well. Large doses of fertility on certain crops may lead to issues such as fruit cracking (tomatoes) or over vegetative growth. If you need help calculating rates or have questions about these recommendations or need recommendations for other crops, please feel free to contact Chuck Bornt at 518-859-6213.

## What I'm Seeing this Week: Potato Leafhoppers Charles Bornt, CCE ENYCHP

Colorado potato beetles continue to march into eggplant, tomatoes and potatoes this week with lots of egg laying and hatching going on. The key for control is to make sure you start your control when larvae are small! See last week's newsletter for an extensive list of control options.

Late last week I also found the very first Potato Leafhoppers in potatoes – even though they weren't at threshold yet for this particular farm, (1 adult per sweep or 15 nymphs per 50 leaves) it's time to really step up the scouting. In the last week I've had at least two growers say to me what difference controlling leafhoppers early made in not only their overall potato harvest but the quality of potatoes to! According to some findings, leafhoppers can account for up to a 50 – 90% reduction in yields. Focus on early maturing varieties such as Yukon Gold, Red Gold, Norland etc., as they seem to be more susceptible to damage. Don't forget that snap beans are just as susceptible if not more so!

It's not a surprise that leafhoppers are around as first cutting hay, alfalfa and lots of rye straw has been mowed and the adults are looking for new foraging areas. Adult leafhoppers are wedge-shaped, iridescent green in color, and 1/8 inch long (Figure 1). The body is widest at the head. Eggs are laid singly on the underside of leaves. Both adults and nymphs are very active, running forward, backward, or sideways but only the adults can fly. The damage they inflict is called "hopperburn" and is caused by the insect continually probing the leaf tissue, injecting a toxin via their saliva into the plant cells to dissolve the cell contents and then sucking the contents back out. The continual probing and saliva injection eventually causes blockages in the vascular tissues of the leaf. Most commonly, hopperburn will be found first on the leaf tips and margins; leaf tips will become wilty, usually turn reddish purple then yellow in color and eventually turn brown, and die (Figure 2). In beans, the leaf becomes distorted in shape. The entire process takes four to five days.

For conventional growers Dimethoate 400 (dimethoate) has been the go to material but many products are effective including many of the pyrethroids (Warrior II, Pounce etc.).



Hopper burn turns leaf margins purple and then brown. Image: CCE ENYCHP Amy Ivy

If you there are no Colorado Potato beetles, Assail (a neonicotinoid) can also be used quite successfully. For organic growers, timing and coverage of the plant is essential. Pyganic plus a sticker like NuFilm P or better yet M-Pede (an insecticidal soap with some activity by itself and also helps as a sticker), applied late in the evening will work for a quick knockdown but should be followed up within a couple days with another



Adult Potato Leafhopper. Picture courtesy of Purdue University.

application. If you have a high PH water, buffering with something like citric acid to a PH 6.5-6.0 will also improve Pyganic efficacy. Other materials include azadirachtin containing products (Ecozin Plus, Aza-Direct, AzaMax etc.). Surround or kaolin clay can also be used as a deterrent, but needs to be applied often to keep new growth covered or to replace what's been washed off by rain or overhead irrigation.



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https://mailchi.mp/7a7cc033546c/k24yc2ayt1

## Sweet Corn Pest Catches: 6/25 & 6/26

County	CEW	ECB-Z	ECB-E	FAW	WBC
Albany	0	7	1	0	0
Columbia	0	2	0	0	0
Orange	1	0	0	0	0
Dutchess	0	3	2	х	х
Ulster 2	0	0	1	х	0
Ulster 3	4	0	0	х	х
Montgomery	0	0	2	0	0
Schoharie	0	1	0	0	0
Washington	х	0	0	0	0
Rensselaer 1	0	0	0	0	0
Clinton 1	0	0	0	0	0
Clinton 2	0	0	0	0	0
Ulster 1	1	2	2	0	0



# **Upcoming Events**

June/July 2018



Previous 20 Minute Ag. Manager sessions area now available on our ENYCHP YouTube—Learn the highlights in just 5 minutes!

### June 28, 2018 - Garlic Twilight Meeting, 5pm-7pm

See various cultural techniques to minimize fusarium demonstrated on a field level, including black plastic and white plastic mulches compared to straw and bare ground. We will also have a discussion of allium leaf miner management! Free event, Registration appreciated: <u>https://enych.cce.cornell.edu/event.php?id=959</u>

#### July 12, 2018 – FSMA Training

VEG NEWS

Cornell Cooperative Extension, Albany County – Voorheesville, NY. More information at <u>https://enych.cce.cornell.edu/event.php?id=951</u>

#### July 18, 2018 - New York Soil Health Summit

Empire State Plaza, Downtown Albany, NY. For more information at this time, contact David Wolfe (dww5@cornell.edu) or Aaron Ristow (ajr229@cornell.edu).

July 31st, 2018– Reduced Tillage in Organic Systems Field Day 9am—3pm Cornell Willsboro Research Farm, free and open to the public, for question s call Amy Ivy at 518-570-5991 or adi2@cornell.edu, DEC Credits have been applied for. Vegetable Specialists

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