

Citrus: A Short-Term or High Maintenance Relationship for the Homeowner due to Citrus Greening Disease?

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Left: The adult Asiatic citrus psyllid resembles a miniature cicada. Right: The eggs of the psyllid are yellow (top left), yellow nymphs with squiggly wax strands (at tip of leaf) and a grey and brown adult. A giveaway clue to citrus psyllid activity is the white waxy filaments (photo on right) on new growth and the deformed tip of the leaf is caused by psyllid feeding when the leaf was smaller..

One reason I moved to Florida ten years ago was to have the ability to leisurely stroll out the backdoor on a warm Florida winter day and pick a few tangelos and squeeze some fresh orange juice for breakfast. 2011 wake-up call! We have been dealing with a nightmare of a disease which is almost in every community I've been to in Naples.

The citrus industry was hit with the bad news in late August 2005 that a devastating disease, called HLB (short for huanglongbing which means yellow shoot disease, one of the early foliage symptoms). But it is more commonly known as CG or 'citrus greening' because the fruit doesn't ripen evenly and stays green on the bottom end. This is a bacterial disease which affects the phloem portion of the vascular system; the pipelines which carry carbs produced by leaf photosynthesis downward are blocked. It debilitates trees, causing severe dieback and may eventually cause death of the tree over time (six to eight years).

It affects fruit ripening, lowers fruit production and ruins the taste of the affected fruit on any given tree. Dr. Phil Stansly (UF/IFAS, Immokalee Research Center) notes that most affected fruit drop and what is left, looks and tastes normal. The symptoms are difficult to distinguish from several other diseases and nutrient deficiencies.

Several key citrus greening characteristics are: blotchy mottle, an asymmetric yellowing that crosses the veins (micronutrient yellowing tends to be symmetrical and stays between veins); nutrient deficient, dwarfed foliage; initially, one branch exhibits yellow mottling, then it spreads throughout the canopy; fruit drop; small, lop-sided fruit; and the

fruit only half-ripens, that is, the bottom half of the fruit remains green, which is the symptom which sparked the common name, citrus greening.

This disease is spread (vectored) by the Asiatic citrus psyllid, *Diaphorina citri*. The Asiatic citrus psyllid is a sucking insect that was found in June 1998 on the east coast of Florida and has become widespread throughout the state. The adult resembles a miniature, 1/8 inch long cicada with mottled brown wings. Characteristically, they perch at a raised angle on the shoot or leaf as they feed. The immature feeding stages, are called nymphs, they are yellow and can be found along with the yellow-orange colored eggs on the new, tender growth. Look for little white waxy filaments (see picture) on the tip of the nymph's abdomen; these may stand out and are more readily visible than the insect. What makes this pest a season-long concern is that females may deposit more than 800 eggs during their lifetime and there are nine to ten generations per year. However, there is little reproduction during the winter when the trees are not flushing.

Identifying the disease by foliar symptoms requires keen observation. One needs to know there are several micronutrient deficiencies which are induced by the disease as it plugs the vascular flow. Then there is the blotchy mottle, which is one of the tell-tale symptoms of the disease. Use the mid-vein of the leaf as a dividing line. The micronutrient symptoms have a uniform pattern on the leaf; what you see on the left side you see on the right, a mirror image (see photo), pretty much. With CG, there are random dark green "islands" or blotches on a lighter background (see picture). The blotchiness of CG is not uniform.



The leaf on the left exhibits uniform iron or zinc deficiencies (sometimes multiple deficiencies muddy the diagnosing) and the leaf on the right shows the classic random pattern of "blotchy mottle" citrus greening.

More info and pictures of symptoms: <http://tinyurl.com/3lwwcnw>

Also, to help with diagnosing disease symptoms see, A Guide to Citrus Disease Identification, at : <http://edis.ifas.ufl.edu/CH159>.

Another complicating factor is that besides the favorite psyllid hosts of citrus including key lime, it will feed on ornamental citrus relatives including orange jasmine (*Murraya paniculata*) and Chinese box-orange (*Severinia buxifolia*). Fortunately, the disease-causing bacterium doesn't kill the ornamentals and Dr. Stansly reports the ornamentals are a transitory host. But having the plants in the landscape are like having a "typhoid Mary" in the neighborhood which harbors the psyllids. What used to be the dirt common orange jasmine is now hard to find because the Florida Division of Plant Industries requires nurseries to grow it in screen-houses.

The citrus grove management strategy for citrus greening disease is a two-pronged attack: 1/ control the vector and 2/ reduce stress factors such as poor nutrition and drought. It may also be helpful to supplement the poor nutrient status of the citrus trees. Maury Boyd, a local grove owner has prolonged the life of his trees by using repeated spray applications he developed containing salicylate, and nutrients (about 12 to 14 ingredients, see: <http://www.growingproduce.com/floridagrower/?storyid=889>). The best concoction for the homeowner may consist of foliar applications of soluble fertilizers high in potassium and include all macro and micro nutrients. One homeowner product is a Keyplex formulation <http://www.keyplexdirect.com/our-products/207.html> (This web site lists locations where it can be purchased). It is recommended to spray at least 6 times during the growing season. More frequent applications (3-4 weeks) should give even better results.

Check the new growth on your citrus plants weekly. If you see the psyllids, use a 2% mixture of an appropriately labeled horticultural mineral oil on the new growth or a neem oil or malathion plus oil product. However, mineral oil only gets what it hits, that is, there is no residual effect. If a psyllid lands on your plant an hour later it won't be killed by the oil residue. Because psyllids are active all year, another approach rather than frequent spraying (who can keep up with that?) is a one-shot treatment of a soil drench insecticide called imidacloprid. The product labeled for citrus is called Bayer Advanced Fruit, Citrus & Vegetable Insect Control (see label: <http://tinyurl.com/3nt6bb8> It claims season-long control. The Division of Plant Industry has been involved with some parasitic wasp releases, but I haven't noticed them at all in our area. Examine host plants carefully before purchasing and if this psyllid is found at a retailer, notify the owner, as the plants, per Division of Plant Industries regulations, will have to be quarantined until the psyllids are eliminated.

Because I won't be making all of the nutrient and insect control applications, to achieve my dream of fresh Honey Bell orange juice from the backyard, I may need to look at my citrus trees as short-timers, maybe only lasting 7 to 8 years or so. I may have to look at a cycle of replanting a new citrus tree every five to ten years to replace the declining trees.

We need to start looking at planting other fruit which will grow in our unique subtropical climate whether it is low-chill peaches or plums (<http://tinyurl.com/3zwhhag>) or pappayas for that breakfast smoothie!

See more about alternative fruit choices at: <http://trec.ifas.ufl.edu/fruitscapes/>

This article was reviewed and improved with edits by Murray Boyd (<http://www.youtube.com/watch?v=11oYhyy2sM>) and Drs. Phil Stansly and Bob Rouse researchers at UF/IFAS SWFREC in Immokalee. Doug Caldwell, Ph.D., is the commercial landscape horticulture extension agent and landscape entomologist with the University of Florida Collier County Extension Service. The Cooperative Extension Service is an off-campus branch of the University of Florida, Institute of the Food and Agricultural Sciences and a department of the Public Services Division of Collier County government. E-mail dougbug@ufl.edu ; phone, 353-4244 x203. Extension programs are open to all persons without regard to race, color, creed, sex, handicap or national origin. For updates on Southwest Florida Horticulture visit: <http://collier.ifas.ufl.edu>.