

LOUISIANA PLANT PATHOLOGY

DISEASE IDENTIFICATION AND MANAGEMENT SERIES



Citrus Greening

Huanglongbing

Citrus greening, also known as yellow shoot disease or huanglongbing, is one of the most devastating diseases of citrus worldwide.

In the United States, citrus greening was positively identified first in south Florida in 2005. It appeared for the first time in Louisiana during 2008 in the Algiers neighborhood of New Orleans. Since that time, however, no new Louisiana cases were reported until recently. During March 2014 and 2016, the disease was again confirmed from several citrus varieties at multiple properties in the Gentilly area of New Orleans.

Citrus greening is a bacterial disease, and the bacterium resides in the phloem (food conducting tissues) of the tree. Three strains of citrus greening bacteria can cause the disease. The Asiatic form (*Candidatus Liberibacter asiaticus*) is the most widespread, while the African form (*Candidatus Liberibacter africanus*) is present in Africa and the Middle East. The American form (*Candidatus Liberibacter americanus*) so far is found only in Brazil.

Citrus greening affects all citrus cultivars and hybrids. It also can cause disease in several other members of Rutaceae family, including *Murraya paniculata* (orange jasmine) and *Severinia buxifolia* (Chinese box orange). Sweet oranges and mandarin oranges are highly susceptible, while sour oranges, grapefruit and lemons are moderately susceptible to the disease.

Citrus greening is a systemic disease. Affected trees may not show symptoms for years. Depending on the citrus cultivar, the symptoms can vary greatly.

The pathogen causes blotchy mottling of leaves (Figure 1) that can resemble symptoms produced by nutrient deficiencies. Blotchy mottling caused by citrus greening is irregular, asymmetrical and crosses veins – in contrast to nutrient deficiency mottling, which is highly symmetrical and usually confined by the leaf veins. Affected leaves become thick, leathery and exhibit raised corky veins (Figure 2). Infected trees produce yellowing of one or more shoots randomly in the canopy. Fruit produced on infected trees is small, becomes lopsided (Figure 3) and tastes bitter. Fruit-set



Figure 1. Blotchy mottling of leaves caused by citrus greening on a grapefruit tree.



Figure 2. Thick, leathery leaf exhibiting raised corky veins.



Figure 3. Lopsided fruit caused by citrus greening.

usually is poor, and seeds abort in affected fruit. Infected fruit does not ripen uniformly, and some green color remains on the ripe fruit. Twig dieback also occurs, and infected trees eventually decline and die (Figure 4).

The disease is vectored effectively from infected to healthy trees by two species of psyllid insects – Asian citrus psyllid (*Diaphorina citri*) (Figure 5) and African citrus psyllid (*Trioza erytreae*) – but it also can be transmitted by grafting infected budwood. The Asian citrus psyllid can transmit both Asian and American strains, and the African citrus psyllid can transmit only the African form of the citrus greening bacterium. Both the adults and nymphs (immature) of Asian citrus psyllid can acquire and transmit the bacterium throughout their life spans. The adult female psyllid lays yellowish-orange eggs inside the whorls of new growth on citrus trees. The nymphs have yellow bodies with red eyes and produce white waxy secretions that can be spotted from a distance if there is a heavy infestation (Figure 6).

Once a tree is infected, it stays infected for rest of its life. There is no cure, and there is no chemical control available for citrus greening bacterium.

Commercial citrus producers must start with disease-free nursery stock. Growers should regularly scout for Asian citrus psyllids and inspect trees for suspicious symptoms. Nursery producers must follow all quarantine regulations and avoid movement of citrus trees out of quarantined zones. Infected trees should be promptly removed, but growers must get the trees checked for positive detection of the disease before tree removal. Homeowners must buy citrus trees from certified nurseries only.

Management of the Asian citrus psyllid is necessary to stop the spread of the disease. Check with your local LSU AgCenter county agent, or consult the LSU AgCenter Insect Management Guide for up-to-date information on use and selection of insecticides to manage Asian citrus psyllids. If you suspect your citrus trees are infected with citrus greening, please consult the LSU AgCenter “plant doctor” Raj Singh at 225-578-4562 or rsingh@agcenter.lsu.edu.



Figure 4. Infected citrus tree exhibiting twig dieback symptoms caused by citrus greening.



Figure 5. Adult Asian citrus psyllid.



Figure 6. Citrus shoot infested with adults and nymphs of Asian citrus psyllid. Notice the waxy secretions produced by nymphs.

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