

# Pest Alert

## Get the Facts About Citrus Greening (or Huanglongbing)



Figure 1. In the foreground, a pomelo (*Citrus maxima*) displays the yellow shoots that are symptomatic of citrus greening (huanglongbing).



Figure 2. Typical blotchy mottling symptoms of citrus greening on *Citrus* spp.



Figure 3. Interveneal chlorosis associated with citrus greening in an infected lime tree.

Citrus greening is one of the most serious citrus diseases, and a pest responsible for spreading it has now been found in Louisiana.

### What Is It?

Citrus greening (also known as yellow shoot disease or huanglongbing) greatly reduces citrus production in India, Asia, Southeast Asia, the Arabian Peninsula and Africa. The bacterium that causes greening probably originated in China in the early 1900s. In countries where the disease is endemic, citrus trees decline within five to eight years after planting and rarely bear usable fruit (Fig. 1).

In June 2008, LSU AgCenter entomologists confirmed at least one instance of the Asian citrus psyllid, a pest that can spread citrus greening, on a backyard lime tree in Orleans Parish. The same tree also tested positive for citrus greening. Officials now are looking for signs of the disease, which until now has been found only in one other U.S. state — Florida.

The pathogen that causes citrus greening inhabits the phloem (nutrient-carrying tissues) of affected plants and cannot be cultured in the laboratory. Three species of the pathogen, *Candidatus Liberibacter asiaticus*,

*Ca. L. africanus* and *Ca. L. americanus*, cause the same symptoms. The African strain develops only under cool temperatures (between 20 and 25 °C), while the Asian strain develops under both cool and warm temperatures (between 20 and 35 °C). The third *Liberibacter* species has been discovered in Brazil and causes symptoms of greening there.

### What to Look for and Where to Look

#### 1. Check for symptoms.

Citrus plants affected by citrus greening may not show symptoms for years. As the pathogen moves within the tree, whole branches and eventually the entire tree may progressively turn yellow (Fig. 1). The most characteristic foliage symptoms of citrus greening are blotchy mottling (Fig. 2) of the leaves and yellowing of leaf veins and shoots (Fig. 3). Newly infected trees show blotchy mottling; chronically infected trees show symptoms similar to zinc deficiency. Other symptoms are twig dieback, poor flowering, and stunted growth.

Fruit from diseased trees are small and often misshapen. Typically, some green color remains even on ripe fruit. Greening-affected fruit taste bitter, medicinal and sour. Seeds

usually abort, and fruit set (formation) is poor. Symptoms vary according to time of infection, stage of the disease, tree species, and tree maturity.

#### 2. How is greening transmitted?

Citrus greening is primarily spread by two species of psyllid insects — the Asian citrus psyllid and African citrus psyllid. The Asian citrus psyllid, *Diaphorina citri* Kuwayama, is widely distributed in southern Asia and parts of Mexico and Brazil (Fig. 4 and Fig. 5). The African citrus psyllid, *Trioza erythrae* (Del Guercio), can be found in several African countries.

In 1998, *D. citri* was detected for the first time in the United States in southern Florida. The insect is believed to have spread in Florida on nursery specimens of orange jasmine, an ornamental landscape plant and preferred host of *D. citri*. By September 2000, the pest had spread to 31 counties in Florida. *D. citri* and one of its parasites also are present in the Rio Grande Valley of Texas, but the disease has not yet been detected there.

In Louisiana, Asian citrus psyllid is present in five parishes. Greening disease was detected in one lime tree in the Algiers area of Orleans Parish and that tree has been destroyed.



**Figure 4.** Asian citrus psyllid adult. The length of the body and wings is about 3 mm. Note the brown and white color pattern on the wings and the characteristic posture of the wings held above the body at a 45-degree angle.

Citrus greening also can be transmitted by grafting diseased budwood. Although the pathogens are bacteria, the disease does not spread by casual contamination of personnel and tools or by wind and rain.

**3. Where might greening come from?** Citrus greening has been reported in the following African, Asian and South American countries: Bangladesh, Bhutan, Brazil, Burundi, Cambodia, Cameroon, Central African Republic, China, Comoros, Ethiopia, Hong Kong, India, Indonesia, Japan, Kenya, Laos, Madagascar, Malawi, Malaysia, Mauritius, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Reunion, Rwanda, Saudi Arabia, Somalia, South Africa, Sri Lanka, Swaziland, Taiwan, Tanzania, Thailand, Vietnam, Yemen and Zimbabwe.

### What Plants are Preferred by the Disease?

Nearly all citrus species and many citrus relatives (for example, limeberry and trifoliate orange) are susceptible to citrus greening. Sweet orange and mandarin orange are highly susceptible to the disease. Sour orange, grapefruit and lemon are moderately susceptible. For a complete list of citrus hosts, visit [www.aphis.usda.gov/ppq/ep/citrus\\_greening](http://www.aphis.usda.gov/ppq/ep/citrus_greening).

All the plant species mentioned above are potential hosts for the psyllid as well as citrus greening disease. Several citrus relatives also are hosts for the psyllid but have not conclusively



**Figure 5.** Nymph of the Asian citrus psyllid (1-2 mm in length). Note: yellow body and red eyes.

been shown to be hosts for the disease. Those species are important as reservoirs or pathways for infected insect vectors to noninfested areas.

### What Plants Do Psyllid Insects Prefer?

The psyllid insects feed on all the citrus and other host plants listed above, but they prefer orange jasmine, *Murraya paniculata*. This species also is a reservoir for citrus greening disease.

### Where Should I Report Suspect Disease Symptoms or Psyllid Insect Sightings?

To have specimens properly identified, please contact the Louisiana Department of Agriculture and Forestry, 5825 Florida Blvd, Baton Rouge, LA 70806; (225) 952-8100 or [horticulture@ldaf.state.la.us](mailto:horticulture@ldaf.state.la.us)

### For Additional Information

For more information on citrus greening, including program updates, fact sheets, regulatory actions, control and testing protocols, visit

[www.lsuagcenter.com](http://www.lsuagcenter.com)

or

[www.ldaf.state.la.us](http://www.ldaf.state.la.us)

or

[www.aphis.usda.gov/ppq/ep/citrus\\_greening](http://www.aphis.usda.gov/ppq/ep/citrus_greening)

or

[www.doacs.state.fl.us/pi/chrp/greening/citrusgreening.html](http://www.doacs.state.fl.us/pi/chrp/greening/citrusgreening.html)



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