

# Inspection, survey and diagnosis of citrus canker and greening

By L.W. Timmer, H.L. Chamberlain and M. Irey

**T**he attention of the citrus industry for many months now has been focused on the two recently introduced diseases — canker and greening (syn=Huanglongbing or HLB). Canker is widespread in South Florida and on the East Coast, but the Ridge has not escaped and the disease continues to turn up in new locations. HLB is more often found in the southern areas, but the status of this disease has not been completely determined and it continues to be detected in new areas farther north almost daily. Control of both diseases depends heavily on scouting and accurate identification of these problems. Survey and detection is the first step in an integrated management plan for citrus canker and greening locally and regionally.

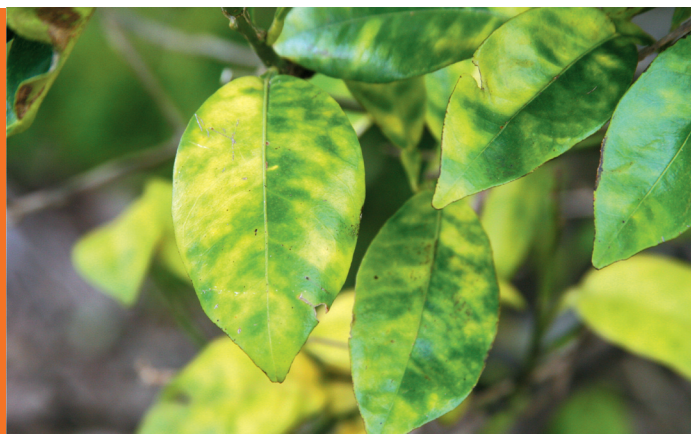


**Fig. 1. Citrus canker lesions on grapefruit.**  
Photo by H.L. Chamberlain, UF/IFAS-CREC.

## CITRUS CANKER

Identification of canker is no longer a problem for most growers; they have already had a great deal of experience with the disease (Fig.1). Nevertheless, there are many situations where identifying the disease is important so that it can be dealt with appropriately. Currently, there are still many areas free of the disease. If canker is found in isolated areas, it may be possible to suppress it for a time by tree removal and defoliation of surrounding trees. Thus accurate identification and surveying of surrounding groves to ensure those areas are disease-free before taking action is vital to growers.

This season, fresh fruit from Florida can be shipped only from blocks that have been inspected and found free of canker by the Division of Plant Industry. Thus, growers of fresh fruit need to know where canker is present in their groves and to the extent possible in surrounding areas. Thorough surveys are important so decisions for the remainder of this season can be made and in planning for next year. State inspections and grower self-surveys are reported to FDACS-DPI and program updates may be accessed on the following Web site: <http://www.doacs.state.fl.us/pi/canker/recentfinds.html>



**Fig. 2. Citrus greening suspect symptoms on round orange.**  
Photo by Mike Irey, U.S. Sugar Corp.

## HUANGLONGBING (HLB)

HLB is a very difficult disease to identify in the field. Foliar symptoms are similar to those of nutritional deficiencies and other problems in groves. Fruit symptoms and tree decline occur only in the later stages of the disease and even then are not always diagnostic. However, with experience and training, it is possible to identify the disease with a great deal of accuracy based only on symptoms on the foliage at certain times of the year.

Identification and prompt removal of affected trees is essential for management of greening (Fig. 2). It is highly unlikely that the disease can be managed solely by control of the psyllid vector. Groves should be inspected regularly for greening. In areas where greening is not known to occur, inspections should begin with surveys of the areas by driving through blocks in search of weak areas, which should then be inspected on foot.

HLB often appears first along roadways, grove edges, interfaces between young and old trees, and in grove areas surrounding ponds and native vegetation. These areas should be thoroughly inspected first. Even if no HLB is found by those inspections, all blocks should be inspected on foot tree by tree. Symptoms are not usually obvious enough for detection of individual trees by inspections in vehicles.

In one grove where HLB was recently confirmed, one entire block was found to be uniformly infected and scattered trees were found in other blocks. In another case, about 10 percent of the trees were found to be infected, but they were scattered across the entire grove with few foci encountered.

In areas where HLB has been found, groves should be inspected three to four times a year. Symptoms are most obvious on mature leaves in the fall and winter and thus inspections should be concentrated from September to March.

When a large amount of new flush is present, it is very difficult to find symptoms of HLB. Multiple inspections need to be made by crews dedicated to that purpose. Nevertheless, all workers that spend time in groves should be trained in identification of the disease and they can make significant contributions to the discovery of affected trees.

Any suspicious symptoms in new blocks should be sent in for confirmation by laboratory testing (see below). Once it has been confirmed that HLB is present in an area, most of the identifications can be based solely on symptoms.

## RESOURCES AVAILABLE

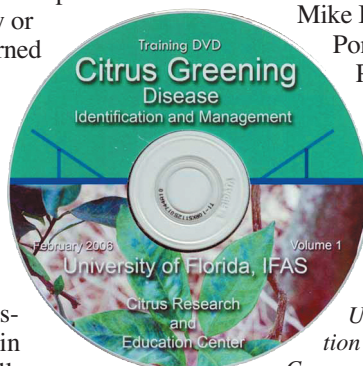
The Institute of Food and Agricultural Sciences (IFAS) has developed materials that are useful for training in the identification of these diseases. DVDs for canker and HLB have been developed and are available in English and Spanish on each DVD. Card decks and laminated sheets with photos of these two diseases, as well as symptoms of problems with which canker and greening can be confused, are available in English and Spanish. Materials have been prepared to train packinghouse graders to identify canker on fruit. Packinghouse training materials are available at <http://postharvest.ifas.ufl.edu/>

These materials are usually available from the County Extension offices in counties where citrus is grown as well as at UF/IFAS-CREC in Lake Alfred.

Numerous presentations have been made statewide and will continue so in the future to assist growers in identification of these diseases (Fig. 3). Growers may contact County Extension offices or UF/IFAS-CREC for assistance in training of groups of inspectors or for materials.

U.S. Sugar Corporation/Southern Gardens Citrus Corp., in conjunction with IFAS, has established a laboratory for identification using a molecular technique called PCR and has made that service available at no cost to all growers. Samples can be sent in directly by growers individually or through IFAS. Results of the analysis are returned directly to the grower and are reported to DPI so that the distribution of the disease in the state can be monitored. Samples need to be submitted along with a form providing the location and information on the grove and a disclaimer must be signed.

DPI and the USDA also can handle some samples, but their diagnostic facilities serve mostly to determine the distribution of the disease statewide. Results are usually available in two weeks, but high volumes may occasionally cause



**Fig. 3. Citrus greening training, SWFREC, Immokalee. Photo by H.L. Chamberlain, UF/IFAS-CREC.**

some delays. Symptomatic foliage should be immediately refrigerated and delivered directly or sent overnight to U.S. Sugar along with the forms. The sampling protocol and the forms are available at County Extension offices or can be provided by email from CREC or are at <http://www.hccga.com/posgreen.shtml>

For more information and for testing of samples, contact Mike Irey, U.S. Sugar Corp. Technical Operations, 111 Ponce de Leon Ave., Clewiston, FL 33440 Phone 863-902-2249

Trees with HLB need to be identified and removed as soon as possible; growers are encouraged to be proactive in disease control. HLB is the most severe threat ever to the Florida citrus industry and the only one with the potential to eliminate the entire industry.

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