

Asian Citrus Psyllid and Huanglongbing (Citrus Greening) Disease

Peggy Mauk¹ Tom Shea², and Eta Takele²

¹Department of Botany and Plant Sciences, University of California, Riverside

²University of California Cooperative Extension, Riverside County



Asian citrus psyllid is an insect that carries a pathogen that causes a fatal disease of citrus. The disease is known as Huanglongbing (HLB), which in Chinese means Yellow Dragon or yellow shoot disease. It is also referred to as “Citrus Greening”. Many long time Riverside residents may remember a disease that had the potential to wipe out citrus, Citrus Tristeza Virus (Quick Decline). Quick Decline is a serious disease that is controlled using rootstocks that are tolerant to the virus, HLB is much worse because there is no cure; the end result is truly devastating, tree death. However, with the cooperation and support from our communities, we can save the California citrus.

In California, Asian Citrus Psyllid (ACP) was confirmed in San Diego in September of 2008. Eradication efforts were quickly implemented and the pest population was well controlled in San Diego. Unfortunately, it also arrived in Los Angeles County but was not detected until 2010 and was found to be widespread in 2011. The lack of early detection impacted the eradication efforts for Los Angeles County and thus the pest will not be eradicated. The Asian citrus psyllid, scientific name *Diaphorina citri*, is a very small sucking insect pest that is difficult to identify with an untrained eye. It is only about 1/8 to 1/4 of an inch in size. When it feeds on the stem of a plant, it is the size of an aphid. Although ACP causes damage to the plant, the real concern is the bacterial pathogen that it carries. The pathogen, *Candidatus Liberibacter asiaticus*, is known to cause the disease Huanglongbing (HLB).



Figure 1. The Huanglongbing disease symptoms are asymmetrical mottling of the citrus leaves.

The pathogen is lethal to all varieties of citrus trees and can be harbored in other plants that are citrus relatives, such as, Indian curry leaf and orange jasmine (not star jasmine). The HLB citrus disease is the most devastating disease of citrus known in the world. It has severely affected the citrus industries of China, Brazil, and in the USA (Florida). Since the discovery of HLB in Florida in 2005, commercial citrus has been reduced by nearly one-third. In all, there are over 40 countries on the continents of Asia and South America that have been impacted.

The disease is a very serious threat to the California citrus industry, as well as, to our own backyard trees. Once ACP transmits the bacterium into the plant it may take 1 to 2 years before there are visual symptoms of the disease. This disease has the potential to kill a mature citrus tree in 3 to 5 years. It is the lag between infection and symptoms that make this disease so difficult to eliminate. By the time an infected tree is discovered, the psyllids have been spreading the pathogen for 1-2 years. When newly established trees become infected, they generally do not survive to full production. An early symptom of HLB on a citrus tree is what is called “yellow dragons” or sections of a tree that are yellow or yellow-green. Another early symptom is “asymmetrical blotchy mottle of the leaves”, that is, the yellowing of the leaves in just one part or sector of the tree (Figure 1). The blotchy mottling will occur on one side of the midvein half of the leaf but not the other half. This can occur on just one small branch or on several branches. Although the blotchy mottling is symptomatic of HLB, it is important to note that yellowing leaves can occur due to a number of other reasons, such as, nutrient deficiencies of iron, zinc or other nutrients. What is unique to HLB sectoring is that the pattern of yellowing is usually asymmetrical (nutritional deficiencies are symmetrical and more uniform). As the disease progresses, fruit will be misshapen and have dark aborted seeds and may have unusual fruit color, where ripe fruit will be green on the navel end half of the fruit and the fruit will drop prematurely. Over time, the HLB infected fruit will become bitter, sour and uneatable. The infected citrus tree begins to lose many of its leaves and has a very open appearance due to twig and branch dieback. Three to 5 years after the tree is infected, it will die. Currently, there is no known cure for this bacterial pathogen.

HLB was discovered in the Spring of 2012 in Hacienda Heights, approximately 50 miles from Riverside. It is too close for comfort. It is critical that we control the vector (ACP). By controlling ACP, we reduce the number of insects that can move and transmit the pathogen. If we don't control ACP, the disease will rapidly spread. This was the situation in Florida. When the insect was discovered, a choice was made to not control it. Some people thought the disease wasn't in Florida and therefore there was no need to control the insect. The disease spread throughout Florida in 3 years. The best approach for California is to kill ACP and continue to keep their population low with continued sprays. Early detection and rapid response is critical to keeping your citrus trees alive and productive. Due to the small size of the ACP, it is hard to see a solitary ACP insect but you might see adults feeding on the young stems and leaves (Figure 2). The adults can feed on stems and mature leaves as well as young tender leaves (Figure 3).

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Figure 2. Adult Citrus Psyllids feeding on a young stem. Note the 45° angle of the insect.

There are some unique physical characteristics of ACP that may help you to further identify this pest. The flying adult feeds with its tail raised up at about a 45-degree angle (Figure 2). Often it is easier to see the young insects (nymphs) clustered at the base of new leaves (Figure 4). They frequently secrete white waxy tubules that look like spaghetti on the soft green new growth (Figure 4). You will only see the eggs and feeding nymphs on the soft new green growth and flowers. The intermediate nymph stages secrete tubules of a white honeydew material that looks like spaghetti strands that end in a bulb form (Figure 4). Also, a key characteristic of feeding by nymphs or adults is notched leaves (Figure 5). The notching is the result of feeding (sucking) injury causing the leaf to become distorted growth.

On March 30, 2012, the first HLB disease infected ACP insect and first HLB infected citrus tree was confirmed in Hacienda Heights, California, in Los Angeles County. This citrus tree was a lemon tree that was grafted to pummelo. The tree was removed and destroyed. The grafting material came from a budwood exchange conducted at the homeowner's church. The United States Department of Agriculture is now doing a traceback/traceforward investigation on the original source of the budwood and what other citrus trees may have originated from this source. Trees that were budded from this tree are likely to be infected with the pathogen. The CDFA crew found only the one HLB-infected citrus tree. So far, surveys within 1,300 yards of the original find site have not found any additional positive trees. Unfortunately, due to the lag between infection and detection, it may be a year or more before we can detect HLB in other trees. All citrus trees within a one-half mile radius of the infected tree are being treated for psyllids. CDFA is surveying the area regularly to determine if there are any additional infected psyllids. As of March 31, 2012, all sales and shipments of citrus trees within a 5-mile radius of this original infection site have been suspended.



Figure 4. Nymphs secreting the white honeydew tubules.

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If a citrus tree is found to be positive for HLB, CDFA requires that the tree be removed. This is to protect any other citrus trees that may have been planted next to it, as well as, any other citrus trees in the nearby communities. An HLB tree is like a tree with "Typhoid Mary"; any ACP that feeds on the infected tree will have the potential to pick up and spread the pathogen. Because trees can be infected but not have symptoms, it is important that no citrus grafting be conducted by any homeowner group or any private individual. Instead purchase trees and grafting materials from reputable nurseries. Without proper laboratory testing, it is impossible to tell if any grafting material is infected with HLB or not. It is critical that we follow this guideline to protect all citrus in California.

If you think you have seen the Asian citrus psyllid on any of your citrus trees or even your neighbors, friends or relatives' trees, then call the California Department of Food and Agriculture (CDFA) at the toll free hotline 1-800-491-1899 or contact the Riverside County Agricultural Commissioner's office at 951-955-3045. The CDFA personnel will come out and inspect your citrus trees AND they will treat the trees for the insect at no charge. Treatments being made throughout Southern California will have the greatest impact on limiting the spread of this insect pest elsewhere. All citrus trees where ACPs have been found and any surrounding citrus trees will be treated by CDFA teams with a foliar and a systemic insecticide that is not harmful to humans or animals; for additional information go to <http://www.californiacitrusthreat.org> or <http://www.saveourcitrus.org>. CDFA is the best source for more specific information about treatment. This idea of area wide treatment, not just the single tree where an ACP has been found, has proven to be effective in slowing the movement of HLB. You must continue to inspect any citrus trees on a regular basis, at least monthly or even better, every week. If ACP is found you need to treat with the appropriate insecticides.



Figure 3. Two adult Asian citrus psyllids on a young tree's leaves. Note the yellow-orange nymph feeding on the top right edge of the leaf (left panel). Notice white tubules from nymphs above adult on right panel.



Figure 5. Leaf notched from long term feeding by adult psyllid.

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How can you as homeowners help? Please see [page 7](#).

How homeowners can help fight the threat to citrus



- Buy citrus trees with CDFA tags only from reputable, CDFA licensed California nurseries.
- Do not exchange trees, give or receive budwood. The disease is initially symptomless so you will not know if the budwood is clean.
- Do not move citrus plants, citrus plant materials or fruits in or out of quarantine areas, across state or international borders.
- Inspect your citrus plants regularly for pests and diseases.
- If you are in an area known to have ACP, dry out or double bag your citrus prunings to prevent moving ACP to new areas.
- Cooperate with county and state inspectors when they ask to place insect traps on your property to find ACPs.
- Report any citrus trees that look sick or dying to CDFA at 1-800-491-1899.
- Be aware that there are fines and penalties in place for knowingly moving citrus and violating quarantines that range from \$1,100 to \$60,000 per violation!

The best way to control this lethal disease, Huanglongbing, is to kill the Asian citrus psyllid. **Remember if you think you have seen the Asian citrus psyllid on any of your citrus trees or even your neighbors', friends' or relatives' trees, then call the California Department of Food and Agriculture at the toll free hotline 1-800-491-1899 or contact the Riverside County Agricultural Commissioner's office at 951-955-3045.**

Save your citrus
Save our citrus
Don't move citrus!



Contributions to the Endowment Fund May 2012 - July 2012

Endowment Fund Contributions

Thank you to all who contributed to Victoria Avenue in memory of, or in honor of, your loved ones. Your gifts will be used to help protect and care for Riverside's living legacy – Victoria Avenue. We want to make sure to acknowledge every one. If your gift is not acknowledged in this issue of the *Avenews*, it will be in the next one.

Recently the late Gail Ferman was acknowledged with an outpouring of memorial gifts to Victoria Avenue Forever. We want to be sure to acknowledge every one in our next issue.

Tad and Marilyn Dunagan	In Memory of Pauline Karidakis
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The Bridge Club	In memory of Mary Wadding
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Power Resources	In memory of Manuel Garcia
Ronald and Louisa Buroker	In memory of Marilyn Buroker
Susan, Willy Pechan and Joey Weinfurter	
	In memory of Dr. Bernard and Mary Frances Weinfurter

Important! Victoria Avenue Forever is sending the *Victoria Avenews* via email to members who have email. This will save us dollars that can be better spent on new trees and improvements, and is also the **green** way.

Please send us an email (at info@victoriaavenue.org) with your first and last name along with a current physical mailing address (we need this for verifying your name with our internal membership list), and of course the email address where you would like the newsletter sent. VAF will not share this information with anyone else. **Your privacy is important to us.**