Asian Citrus Psyllid and the Citrus Disease Huanglongbing

Psyllid

Huanglongbing

Beth Grafton-Cardwell
Department of Entomology
UC Riverside

Photography: M. Rogers, S. Halbert and E. Grafton-Cardwell
The psyllid (pronounced síl - lid) is a small insect, about the size of an aphid.
It has an egg stage, 5 wingless intermediate stages called nymphs, and winged adults.

The lifecycle takes about 4 weeks to complete.

5 Nymphs
(insects molt to grow bigger)
Adult psyllids can feed on either young or mature leaves. This allows adults to survive year-round.

When feeding, the adult leans forward on its elbows and tips its rear end up in a very characteristic 45° angle.
The eggs are yellow-orange, tucked into the tips of tiny new leaves. They are difficult to see because they are so small.
The nymphs produce waxy tubules that direct the honeydew away from their bodies. These tubules are unique and easy to recognize.

Nymphs can only survive by living on young, tender leaves and stems.

Thus, nymphs are found only when the plant is producing new leaves.
As the psyllid feeds, it injects a salivary toxin that causes the tips of new leaves to easily break off. If the leaf survives, then it twists as it grows.

Twisted, notched leaves can be a sign that the psyllid has been there.
What plants can the psyllid attack?
All types of citrus and related plants in the Rutaceae family

- *Citrus* (limes, lemons, oranges, grapefruit, mandarins...)
- *Fortunella* (kumquats)
- *Citropsis* (cherry orange)
- *Murraya paniculata* (orange jasmine)
- *Bergera koenigii* (Indian curry leaf)
- *Severinia buxifolia* (Chinese box orange)
- *Triphasia trifolia* (limeberry)
- *Clausena indica* (wampeii)
- *Microcitrus papuana* (desert-lime)
- Others.....

[Calamondin image]
Asian citrus psyllid feeds and reproduces on plants that we don’t think of as citrus: such as the ornamental orange jasmine.

This orange jasmine plant, *Murraya paniculata*, is grown throughout Florida as a bush, tree or hedge. It is a preferred host for the psyllid because it produces new leaves continuously. It is not a common plant in California or Arizona.
How did the psyllid spread through Florida?

The psyllid was first detected in backyard citrus trees in southern Florida in 1998. The psyllid spread very rapidly both by flying (green areas) as well as riding on nursery plants (blue areas), such as orange jasmine, that were moved between retail nurseries throughout the state.
Asian citrus psyllid feeds and reproduces on Indian Curry Leaf

This Indian curry leaf, *Bergera koenigii*, is grown in Hawaii and the leaves are shipped to California for use in restaurants. It is a favorite host of the psyllid.

Shipments of ACP-infested leaves have been intercepted at airports.
Why are we so worried about this psyllid?

The Asian citrus psyllid can pick up the bacterium that causes Huanglongbing (HLB) disease and move the disease from citrus tree to citrus tree as it feeds. The bacterium blocks nutrient flow in the tree.

Huanglongbing means “yellow shoot disease” in Chinese.

It causes the leaves on some of the branches of citrus to turn yellow.

*Candidatus Liberibacter asiaticus*
An early sign of the disease is yellowing of the leaves.

Leaves with HLB disease have a blotchy yellow pattern that is not the same on both sides of the leaf.

Leaves with nutrient deficiencies (Zinc is an example) have the same yellow pattern on both sides of the leaf.
HLB leaf symptoms can range from slight to nearly completely yellow.

In addition to yellow mottling, the veins of the leaf may be thickened.
HLB disease prevents the fruit from developing the proper color.

The lower half of the fruit may remain green, which is why this disease is also sometimes called citrus greening.
Even more devastating, HLB causes the fruit to be small, oddly shaped, with aborted seeds and bitter juice.

The fruit is small, grows crookedly, forming uneven segments and the seeds are aborted.
In as little as 5 years after HLB infection, the tree stops bearing fruit and eventually dies.

There is no cure for the disease!

This citrus tree in a backyard in Florida is obviously very sick, with few leaves and no fruit.
The HLB leaf and fruit symptoms can look very similar to another disease called citrus stubborn

Don’t panic if you see yellowed leaves or off-colored fruit – but do get them checked out!
How does the bacterium spread? – Two ways

The bacteria can be spread by grafting infected plant material

When the insect feeds it takes up the bacteria and passes it on when it feeds on the next citrus tree or ‘citrus-like’ plant.

The psyllid can pick up the bacteria as a nymph or adult and then it carries the bacteria in its body for the rest of its life (weeks to months).
Where did Asian citrus psyllid and the HLB disease come from?

Most likely ACP and HLB came from India or Asia riding in and/or on citrus or closely related plants. The disease first showed up in the Americas in 2005.
How fast did the disease spread in Florida?

It took less than 3 years for HLB to spread through most of the citrus growing regions of the state.

Citrus production in FL has been reduced by nearly 50% due to two diseases: Canker and HLB.

HLB was present in Florida before the psyllid arrived.

ACP-infested orange jasmine in the retail nurseries helped spread the disease.
How did the psyllid get to California and where is the disease?

The psyllid was first found in California in 2008

The psyllid most likely arrived in California from Mexico.

The disease is rapidly spreading in Mexico and will likely spread to California in illegal plant material or in the bodies of psyllids.
In March 2012, HLB was found in a residential tree in Southern California. How did it get there?

Illegally imported citrus trees or budwood:
Most likely an HLB-infected tree or infected budwood was brought illegally into California and planted or grafted onto a residential tree. The disease just sits inside the plant, until a psyllid arrives and picks it up and moves it.

It is very important to obtain disease-free trees and budwood from reputable nurseries, rather than trading plant material of unknown origin.
How can I help prevent the spread of the pest and disease?

Know where your home is in relation to the pest and disease.

If you are inside a psyllid-infested quarantine area, don’t move host plants to or through uninfested areas of the state.

Keep citrus plants local!

Psyllid quarantine: blue lines
HLB quarantine: red lines

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www.ucanr.edu/sites/acp
Citrus trees in nurseries in the quarantine areas will have a tag on them.

The tag explains that the tree should not be moved out of the quarantine area.
Be sure to buy citrus trees only from a reputable nursery

If you don’t know where the plants came from, then don’t buy them!

They may be full of pests and diseases.
If I am in the quarantine area, is it ok to pick the fruit and give it to my friends?

The psyllids can’t live on citrus fruit. So as long as you brush or wash the fruit and make sure it is free of leaves and twigs before transporting it, it is ok to move it.
If I am in an area known to have ACP, what should I do about green waste?

To avoid spreading Asian citrus psyllid, when your citrus trees are pruned, make sure the green waste:
• Dries out for two weeks before putting it in the recycling can
• Or double bag it before putting in trash cans
• Or chip and shred it to dry it out before disposing of it
How do I look for the psyllid?

Look at new leaves for adult and nymphal psyllids and the waxy tubules they produce.

If you find it, you can call your county ag commissioner or the CDFA hotline – either way act fast to contact the authorities.

If You Find it: Act Fast, Time is Critical

Think you found the Asian citrus psyllid or HLB symptoms on your tree?

- Time is critical.
- Secure psyllids and leaf samples in a clean, sealed sandwich bag, jar or plastic container.
- Contact your local Agricultural Commissioner’s office or call the California Department of Food and Agriculture hotline immediately.

Call 800/491-1899
How do I look for the disease?

Look for blotchy yellowed leaves and small oddly shaped fruit.
If a psyllid is found, all of the host plants in that yard and 400 meters around the yard, are treated with a foliar and a systemic insecticide. A professional applicator treats the backyard citrus trees and closely related plants with insecticides -cyfluthrin (Tempo) a foliar pyrethroid -imidacloprid (Merit) a systemic neonicotinoid
# Insecticide treatments available to homeowners – treatments to apply when CDFA does not treat

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>Pesticide Name</th>
<th>Effectiveness against ACP</th>
<th>Duration of control</th>
<th>Application timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional treatment</td>
<td>Tempo &amp; Merit</td>
<td>High</td>
<td>Months</td>
<td>Foliar: when psyllids are present Systemic: summer or fall</td>
</tr>
<tr>
<td>Homeowner-applied broad-spectrum foliars</td>
<td>Sevin, Malathion</td>
<td>Moderate</td>
<td>Weeks</td>
<td>When psyllids are observed</td>
</tr>
<tr>
<td>Homeowner-applied soil drench</td>
<td>Bayer Advanced Fruit, Citrus &amp; Vegetable</td>
<td>Moderate</td>
<td>Months</td>
<td>When psyllids are observed in summer or fall</td>
</tr>
<tr>
<td>Homeowner-applied soft foliars</td>
<td>Insecticidal soaps, oils and pyrethrins</td>
<td>Low to moderate</td>
<td>Days</td>
<td>Every 7-10 days especially during <em>leaf flushing</em></td>
</tr>
</tbody>
</table>

*Flushing: when new leaves are first developing until they expand and harden*
What about natural enemies?

There is a tiny parasitic wasp that lays its egg inside the psyllid nymph. The wasp develops and kills the nymph.

The wasps are specific to the Asian citrus psyllid and pose no risk to people.
The hope is that the parasitoid can reduce the psyllid population in the urban areas and help to slow the spread of the disease.
How can you protect your citrus and help prevent HLB disease spread?

• Plant only certified disease-free citrus plants (or graft budwood) obtained from a reputable nursery.

• Do not move plant material around the state

• Learn to recognize the pest and disease.

• Call the Department of Food and Agriculture hotline if you think you might have the psyllid or the disease.

• If CDFA does not treat psyllids in your area, and you see psyllids, then treat the plants yourself.

All of these steps will protect your citrus tree and buy time for the scientists to find a cure for the disease!
Where can I get more University of California information?

- ACP HLB Website: www.ucanr.edu/sites/ACP
- UC IPM Pest note for homeowners http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74155.html
- UCIPM Quick tip for homeowners http://www.ipm.ucdavis.edu/QT/asncitruscard.html
For an in-depth study of the psyllid and ACP in English, take the ANR Online Class on ACP for Master Gardeners http://class.ucanr.edu