The Asian Citrus Psyllid and the Citrus Disease Huanglongbing

Psyllid

Beth Grafton-Cardwell
Dept of Entomology, UC Riverside and Director Lindcove Research and Extension Center

Huanglongbing
It has an egg stage, 5 wingless intermediate stages called nymphs, and winged adults.

The pest insect

Adult

Egg

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.

M. Rogers
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 leaves can be a sign that the psyllid has been there.
What plants can the psyllid attack? All types of citrus and closely 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** (wampei)
- **Microcitrus papuana** (desert-lime)
- Others…..
Asian citrus psyllid feeds and reproduces on plants that we don’t think of as citrus: like 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.
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 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.

Huanglongbing means “yellow shoot disease” in Chinese.

It causes branches of citrus trees to turn yellow.

Bacterium: *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.
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 grows crookedly, forming uneven segments.
Symptoms may not show up in the tree until 1 to 2 years after it becomes infected.

The bacterial disease
The HLB leaf and fruit symptoms can look very similar to another citrus disease called citrus stubborn. Don’t panic if you see yellowed leaves or off-colored fruit – but do get them checked out!
Within 3 to 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.
How does the insect pick up the bacteria?

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 pest insect and the pathogen

The psyllid carries the bacteria in its body for the rest of its life (weeks to months).
Where did the Asian citrus psyllid and the HLB disease come from?

Most likely ACP and HLB came from India or Asia. Both the psyllid and disease are affecting citrus production in Brazil, Cuba, Mexico, Belize and Florida. California has the psyllid in southern California but does not yet have the disease.
Where are the psyllid and the disease found in the US and neighboring countries?

ACP (orange and green areas) is now found in portions of:

- Florida
- Texas
- Louisiana
- Alabama
- Georgia
- S. Carolina
- California
- Arizona
- Hawaii
- Also Cuba
- Belize, Mexico,
- Honduras
- & Nicaragua

Distribution of Asian citrus psyllid in orange and distribution of Huanglongbing in green.

To track HLB, see the USDA site: www.saveourcitrus.org
Expansion of the quarantine zones due to new Asian citrus psyllid finds on trap cards
Santa Ana, Orange, Los Angeles, Riverside Counties Aug-Oct 2009
Arizona Nov 2009
How does the psyllid (and HLB) get around?

It can spread naturally by flying or it can be transported on plants into new areas of California.

- **Psyllid-infested curry leaves shipped in boxes**
- **Unprocessed fruit infested areas**
- **On ornamentals in floral bouquets from Mexico**
- **Citrus riding across the border in vans**
What happens when Asian citrus psyllids are found in a California backyard?

If a psyllid is found, all of the host plants in that yard and adjacent yards as far out as 400 meters, 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

Homeowners will soon have available:
- imidacloprid (Bayer Advanced Fruit, Citrus & Vegetables)
How does the quarantine affect plant movement?

- Citrus and closely related plants cannot be moved out of the quarantine area.
- Wholesale nurseries must treat their plants with insecticides just prior to shipping if the plants are destined for retailers within the quarantine area.

Wholesale Nursery treatment choices – both a systemic and foliar insecticide treatment are required

**Systemic Insecticides**
- imidacloprid (Admire, Merit, Marathon, Discus, CoreTect)
- thiamethoxam (Flagship)
- dinotefuran (Safari)

**Foliar Insecticides**
- fenpropathrin (Danitol, Tame)
- cyfluthrin (Baythroid XL, Tempo SC Ultra)
- chlorpyrifos (Chlorpyrifos Pro)
- carbaryl (Sevin XLR Plus, Sevin SL)
- spirotetramat (Movento)
How does a psyllid infestation affect commercial citrus orchards?

- The grower will need to treat during periods of flush and to make sure the trees are disinfested prior to harvest.
- This will require 2-5 additional insecticide treatments (depending on region).
- Treatments will negatively affect the IPM program because many of the effective insecticides harm natural enemies needed for other pests.
- Organic options are very limited (short-lived, poor efficacy)

### Commercial citrus orchard treatments for psyllid foliar insecticides

*fenpropathrin (Danitol, Tame), cyfluthrin (Baythroid XL)
chlorpyrifos (Lorsban Pro), dimethoate
carbaryl (Sevin XLR Plus, Sevin SL), formetanate (Carzol)
spinetoram (Delegate)
diflubenzuron (Micromite)

### Systemic insecticides

*imidacloprid (Admire)
spirotetramat (Movento)
If we don’t have HLB in California, why should I treat for Asian citrus psyllid?

• Areawide treatments are essential for slowing ACP spread through the state (both urban and commercial citrus)

• The lower we suppress ACP, the less likelihood of it finding an HLB infected plant and moving the disease into commercial citrus

• We are buying time for the scientists to create a plant that can resist the disease

• We can not ‘live with HLB’. It will destroy the California citrus industry
How are California Department of Food and Agriculture (backyards) and Citrus Research Board personnel (citrus orchards) detecting the psyllid?

Yellow sticky cards and visual surveys

Detect the insect

Sticky cards are most effective at 1 meter height

E. Grafton-Cardwell
You can help search for the psyllid!
It is critical for California to keep this insect from establishing

Look for immature stages of psyllids (eggs and nymphs) on the tips of branches in the new flush.

Detect the insect
What should I look for?

Look for psyllids, waxy tubules and twisted flush

**Adult psyllids**

**Eggs**

**Twisted leaves**

**Nymphs with tubules**

Detect the insect
What should I look for?

Adult psyllids line up on veins of leaves and stems
What should I look for?
Nymphs will be at the ends of branches, among new leaves – in the same place you will find leafminers and aphids.
How can I help prevent the pest and disease from establishing?

• Be sure to plant only California-grown certified trees bought at a reputable nursery.
• Don’t bring plant material into California from other states or countries.
• Learn to recognize the pest and disease symptoms.
• Check flush foliage of citrus and citrus relatives wherever you go.
• Call your County Agricultural Commissioners office or the CDFA hotline immediately, if you suspect you have either the pest or the disease.

If You Find it: Act Fast, Time is Critical

Think you found the disease-carrying insect?
• Time is critical.
• Secure psyllids in a clear, locked sandwich bag, jar or plastic container.
• Contact your local Agricultural Commissioner’s office or call the California Department of Food and Agriculture.
www.CaliforniaCitrusThreat.org
This web site, funded by the Citrus Research Board, provides users with basic information about the psyllid and disease.

For more Information

Is a Disease-Carrying Insect Killing Your Citrus Tree?

The Insect
The Disease
What To Look For
If You Find It
Other Resources

Want to keep the psyllid out of your backyard?
Get breaking news and important information about keeping the insect out of California.
Sign Up

The Insect
The Asian Citrus Psyllid is a sign of danger.

The Disease
Huanglongbing produces yellow, splotch leaves and kills trees.

What to Look For
Detect the insect & determine if your tree is infected.

Found the Insect? Time is Critical! Contact your local Agricultural Commissioner.
Languages:
English
Spanish
Chinese
Hmong
Vietnamese
Lao
Khmer
Punjabi