



# The Asian Citrus Psyllid and the Citrus Disease Huanglongbing



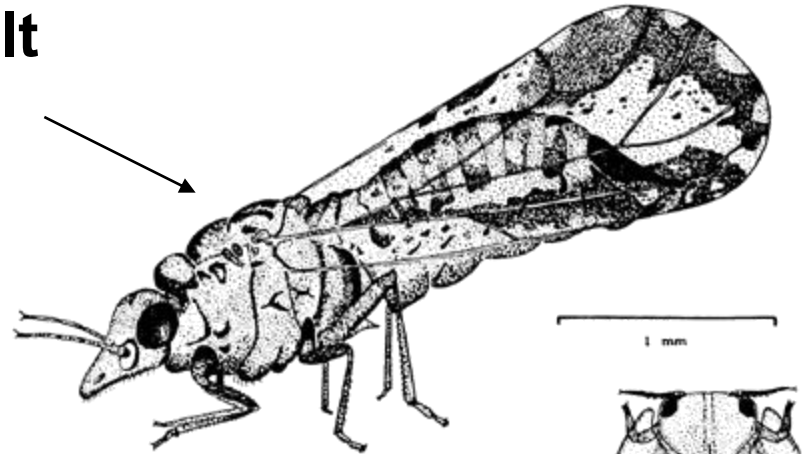
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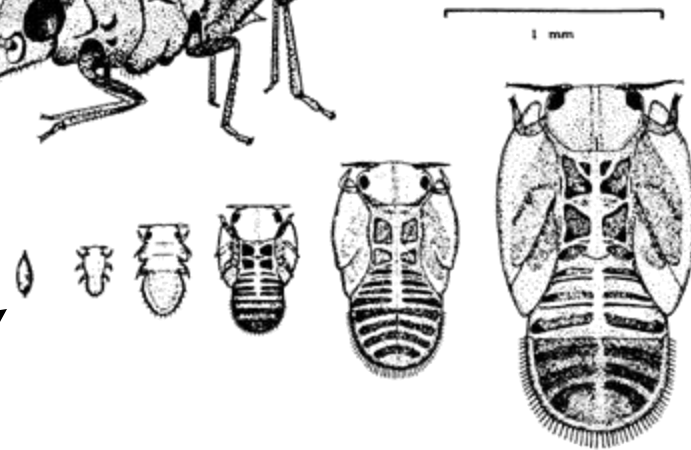


**It has an egg stage,  
5 wingless intermediate stages called  
nymphs, and winged adults**

**Adult**



**Egg**



**5 Nymphs**

**(insects molt to grow bigger)**

**The  
pest  
insect**



**Adult psyllids can feed on either young or mature leaves. This allows adults to survive year-round.**

**The pest insect**



**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  
pest  
insect**



M. Rogers



**The nymphs produce waxy tubules that direct the honeydew away from their bodies. These tubules are unique and easy to recognize.**

**The pest insect**



**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.**

**The  
pest  
insect**



M. Rogers

**Twisted leaves can be a sign that the psyllid has been there.**



M. Rogers



M. Rogers



# 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* (wampeï)
- *Microcitrus papuana* (desert-lime)
- Others.....

Plants  
affected



Calamondin



# Asian citrus psyllid feeds and reproduces on plants that we don't think of as citrus: like the ornamental orange jasmine

## Plants affected



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.



Plants  
affected



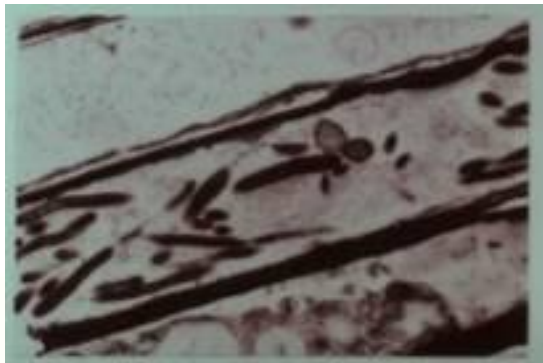
## Why are we so worried about this psyllid?

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*



F. Grafton-Cardwell

The  
bacterial  
disease

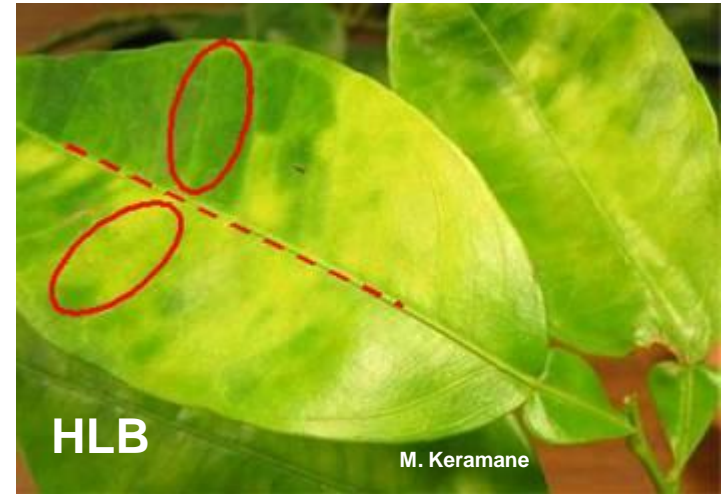


## An early sign of the disease is yellowing of the leaves

### The bacterial disease

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



The  
bacterial  
disease



S. Halbert



# 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.



S. Halbert



S. Halbert

The  
bacterial  
disease



**Even more devastating, HLB causes the fruit to be small, oddly shaped, with aborted seeds and bitter juice**

**The bacterial disease**

**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

Other diseases



G. vidalakis

So don't panic if you see yellowed leaves or off-colored fruit – but do get them checked out!



D. Gumpf

*Clementine topworked on  
Stubborn Marsh Grapefruit*



**Within 3 to 5 years after HLB infection, the tree stops bearing fruit and eventually dies. There is no cure for the disease.**

**The bacterial disease**

**This citrus tree in a backyard in Florida is obviously very sick, with few leaves and no fruit.**



S. Halbert



## 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



M. Rogers



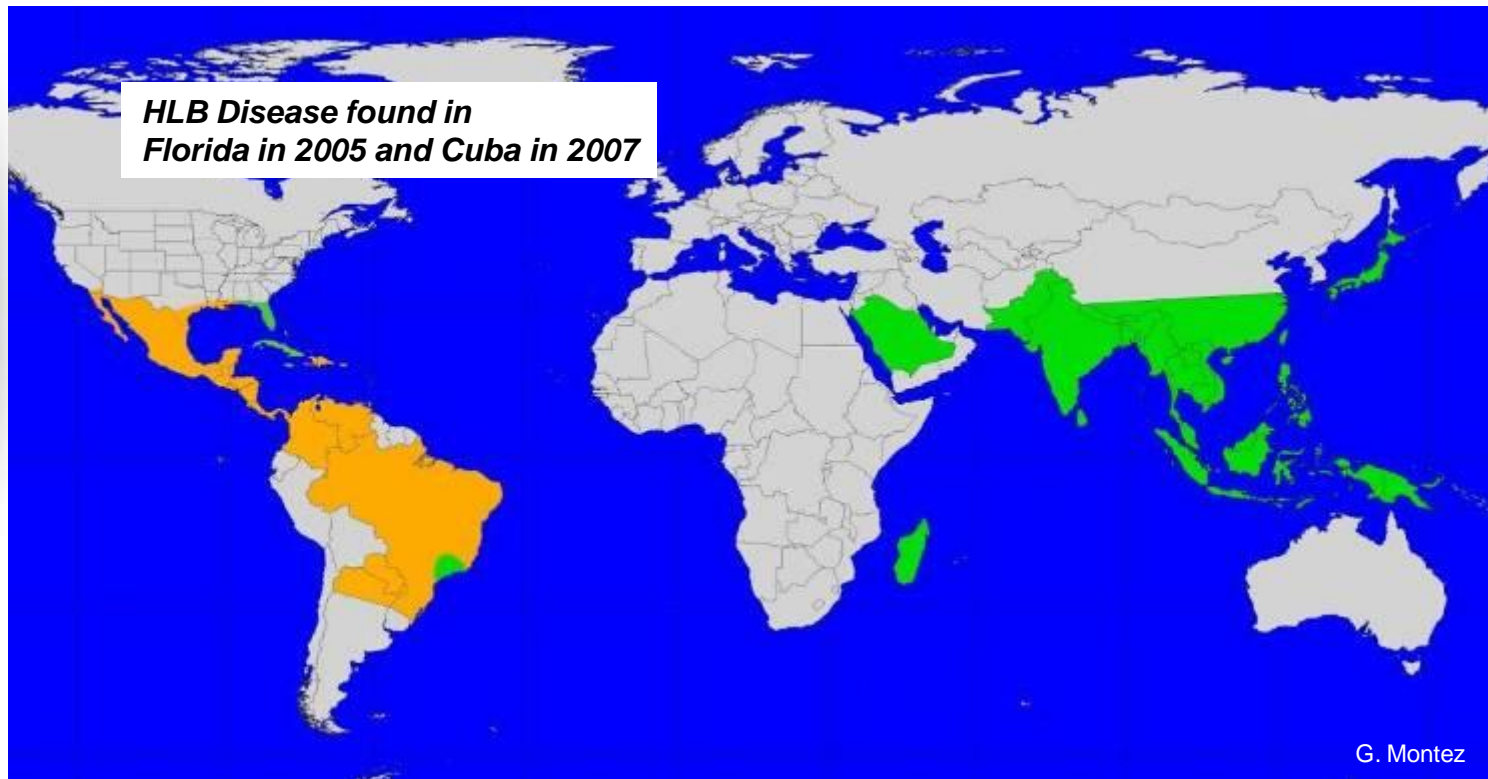
M. Rogers

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.**



**Both the psyllid and HLB disease**  
**Asian citrus psyllid, but not the disease**

**Distribution  
of the pest  
and disease  
around the  
world**

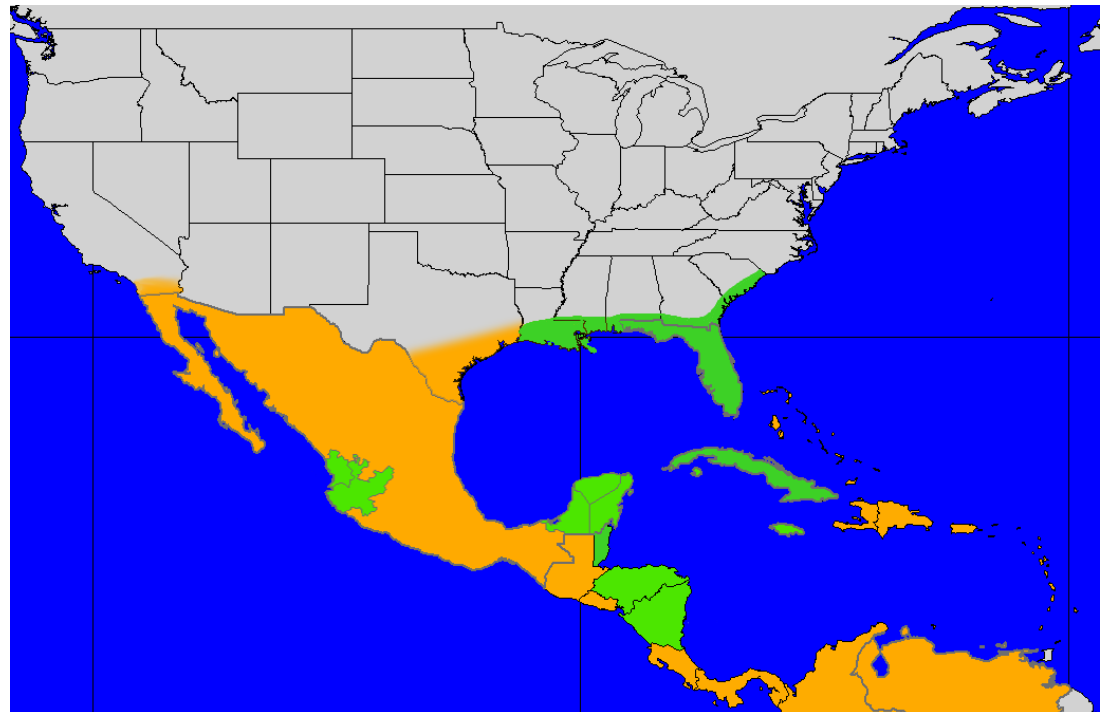


## Where are the psyllid and the disease found in the US and neighboring countries?

**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](http://www.saveourcitrus.org)

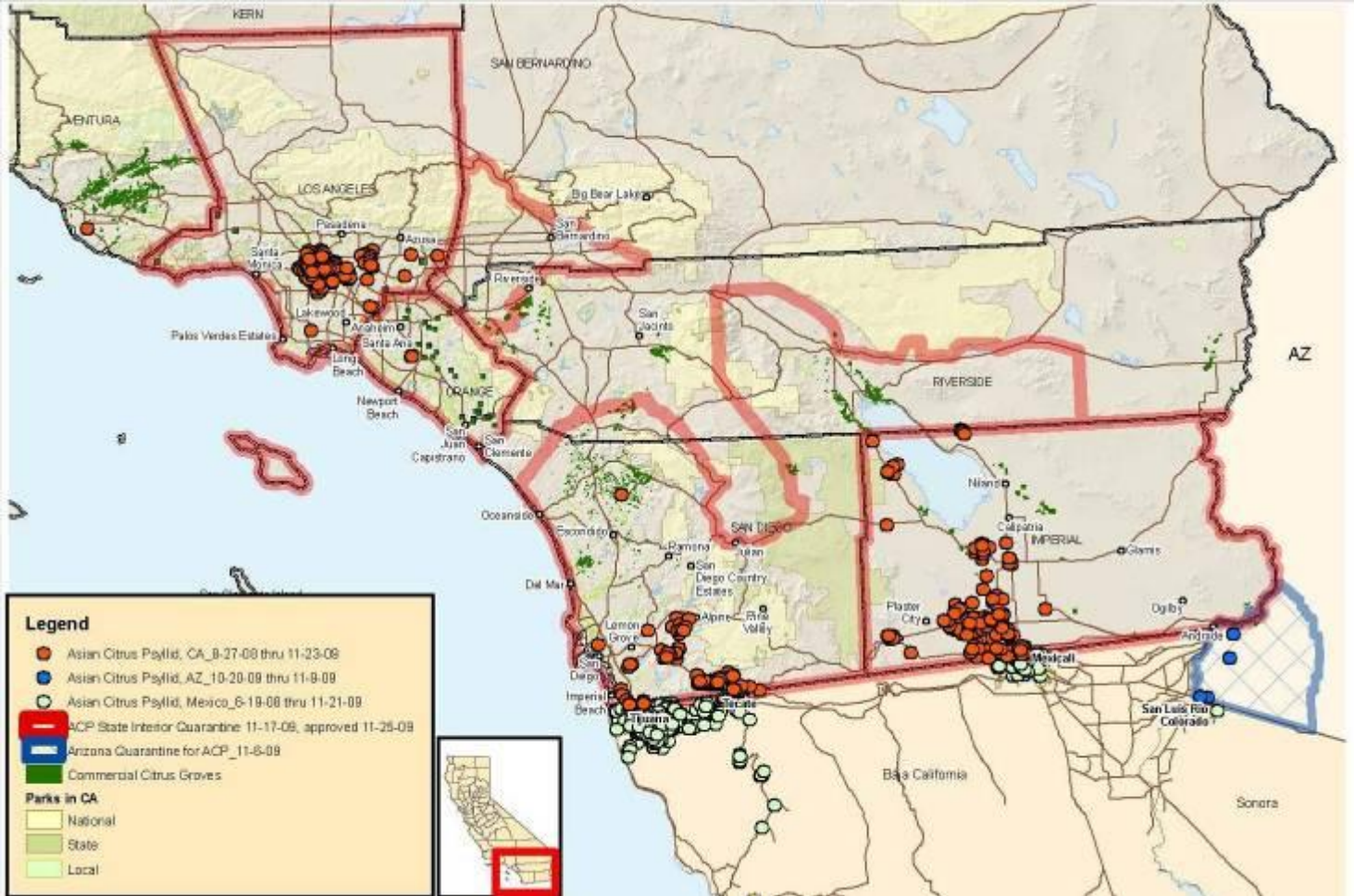
Distribution  
of the pest



# 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

## Psyllid Spread





# 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



The pest insect



# 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)

**Backyard citrus**





## How does the quarantine affect plant movement?

- Citrus and closely related plants can not 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.

## Nurseries

**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)



## Citrus Orchards

# 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**

**ACP  
Management**





# 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

Sticky cards are most effective at 1 meter height



E. Grafton-Cardwell

Detect the insect



# 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



E. Grafton-Cardwell



# What should I look for?

## Look for psyllids, waxy tubules and twisted flush

Eggs



Adult psyllids



M. Rogers

Nymphs with tubules



Twisted leaves



Detect the insect



## What should I look for?

Adult psyllids line up on veins of leaves and stems



Detect the insect



## **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**



**Detect the  
insect**



## 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

Detection  
and  
reporting

### If You Find it: Act Fast, Time is Critical

Think you found the disease-carrying insect?

Call

800/491-1899

- 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.

This web site, funded by the Citrus Research Board, provides users with basic information about the psyllid and disease.



For more  
Information

[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](#)

## Is a Disease-Carrying Insect Killing Your Citrus Tree?



Stop the Asian Citrus Psyllid from delivering what could be a death sentence for California citrus trees.

The insect, which can be a carrier of a fatal citrus tree disease, can be stopped – but we need your help. Protect your citrus trees and the availability of California-grown fresh citrus by inspecting for the insect often.

### 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. >



See [www.CaliforniaCitrusThreat.org](http://www.CaliforniaCitrusThreat.org)  
See [www.peligrancitricosencalifornia.com](http://www.peligrancitricosencalifornia.com)

Foreign  
Language  
Resources

Languages:

English

Spanish

Chinese

Hmong

Vietnamese

Lao

Khmer

Punjabi

## No more California citrus?

That's what is at stake if the Asian citrus psyllid and the disease it carries establishes here!

With your help it can be stopped - before it's too late.



### The Dangerous Pest: Asian citrus psyllid (ACP)

- A small insect, about the size of an aphid.
- Feeds on leaves and stems of citrus and close relatives of citrus.
- Eggs are laid on young "flush growth" of citrus, where small yellowish orange nymphs (larvae) feed and develop.
- The psyllid is a carrier of the deadly plant disease, Huanglongbing.
- This insect has spread from Mexico into southern California.
- Limiting the spread of the psyllid will limit the spread of the disease.

### The Disease: Huanglongbing (HLB)

- Also called greening disease and yellow shoot disease.
- Causes irregular yellowing of leaves.
- Produces bitter, inedible, deformed fruit.
- It kills citrus trees.
- This disease has not yet been found in California, but it is infecting citrus in nearby states and in Mexico.



### The Solution: We All Play a Critical Role

- Be prepared - learn to recognize the pest and disease and teach others what you know.
- Inspect your citrus trees each month.
- Be sure to plant only California-grown certified trees that are known to be free of disease.
- Remind everyone that it is illegal to bring citrus trees or cuttings into California from other states or countries because they can carry the insect or be infected with HLB.
- If you live in a quarantine area, help prevent the spread of psyllids to other areas:
  - Don't move plants out of the quarantined area that may harbor the psyllid.
  - Dry out plant clippings for two weeks before putting them in green waste recycle bins or double-bag clippings.
- If you suspect your tree has the psyllid or disease, act fast! **Call your County Agricultural Commissioner or the CDFA hotline at 800-491-1899.**



To learn about the Asian citrus psyllid and HLB disease, visit  
**CaliforniaCitrusThreat.org**

*Printed materials in English, Spanish, Hmong and Chinese are downloadable from this Web site.*