Asian citrus psyllid management and current findings of recent surveys

Xavier Martini
Objectives

• Learn to recognize Asian citrus psyllid and Huanglongbing symptoms

• Learn how to sample for psyllids

• Know what to do if you find psyllids in your grove
The Asian citrus psyllid

- *Diaphorina citri*, the Asian citrus psyllid. First found in Florida June 1998

- Vector of *Candidatus Liberibacter asiaticus* (CLas) pathogen responsible for Huanglongbing (HLB)

*Candidatus Liberibacter asiaticus*
The Asian citrus psyllid: Life Cycle

- **Eggs**: 3 to 4 days
- **Nymph stage**: Up to 800 eggs during lifetime
- **Adult stage**: 10-15 days
The Asian citrus psyllid

- Adults jump when approached
- They sit in a vertical position with abdomen up in the air

Black coloration at the end of the wings

1/10 to 1/6 inches

45°
• Nymphs are always found on new emerging leaves.
• Can be confused with scale insects, but scale insects do not move and do not produce white honeydew.

Flat yellow body

White Honeydew

Leaf distortion
HLB symptoms

Citrus tree in Carabelle, FL. Note the leaf mottle and shape and color of the fruit.

Citrus plant in Carabelle, FL. Note the asymmetrical chlorosis on the leaves.
Leaves can become thicker, with veins enlarged and corky in appearance.

Leaf vein corking symptom.

*Citrus hystrich* tree showing severe vein corking symptom.
Fruit is usually small, poorly colored, lopsided and may have lack of coloration at the stylar end.

Infected fruits have stylar end “lack of coloration”.

Fruit taste may be bitter, medicinal and sour.

Infected trees may not show symptoms for several years (1 to 5 years or more).

Asymmetrical “lopsided” sweet orange fruit from São Paulo, Brazil.
Economic impact of HLB in Florida

- Death of citrus trees only a few years after infection
- Undesirable organoleptic properties
- All known commercial citrus species are susceptible to HLB infection
- Citrus yield decreased from 133.6 millions of boxes in 2012-2013 to 81.4 millions of boxes in 2015-2016
- HLB infection rate in Florida is approximately 80%
Distribution of HLB in Florida

Sections (TRS) Positive for Huanglongbing (HLB, Citrus Greening) in Florida

Legend
- HLB positive counties
- US highways
- Main Cities

37 Positive Counties
4012 Positive Sections

Legend
- Florida Counties
- HLB Positive Counties

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Prepared By: Matthew Albrittan
Records of Asian Citrus psyllid in the Northwest district

HLB trees
Asian citrus psyllids reported (Since March 2017)
No psyllid

First case of HLB in Franklin County
Records of Asian Citrus psyllid in the Northwest district

Where did we found these psyllids?

Infestation of Asian citrus psyllid start with backyard citrus and isolated citrus.
Population dynamic of the Asian citrus psyllid in Franklin county

Nymph population peaks between September to November
Population dynamic of the Asian citrus psyllid in Franklin county

Adult population peaks between June and October
Survival of the Asian citrus psyllid in Franklin county during 2018 winter

Asian citrus psyllid adults

Number of Asian citrus psyllid adult per tree

Date


Asian citrus psyllids survived 2018 winter
Survival of the Asian citrus psyllid in Franklin county during 2018 winter

Cage experiments:
- 20 adults cages on citrus branches in November 2017 & 2018 – Counted survivor in March 2018 & 2019
- Count the number of psyllid nymphs in November 2017 & 2018 – Counted survivor in March 2018 & 2019

18% of psyllid survived winter 2018 in Franklin County
16.25% of adult psyllids survived winter 2019 in Franklin County
Overwintering capabilities

50% mortality 0° C (32° F) for 2 days

95% mortality for 7 hours at -4.5° C (23.9° F) to 2 hours at -9.2° C (15.4° F)
Percentage of Psyllids carrying HLB pathogen

- 83.3% Winter Garden
- 64.6% Lake Alfred
- 85.4% Ona
- 100% Lake Placid
- 37.5% Port St. Lucie
- 41.7% La Belle
Percentage of Psyllids carrying HLB pathogen

- Apalachicola: 5%
- Carrabelle: 35%
- Bristol: 0%
- Live Oak: 0%
- Panama City: 0%
- Valdosta: 0%
Dispersion potential of *D. citri*

- Collection site
- Abandoned grove

1.5 miles

1 km
Flight mill apparatus

- Psyllids between 4 to 15 days old
- Allowed 10 min to fly
- Flight recorded until psyllid stopped to fly for > 5 min
Temperature influence flight capability of *D. citri*

Dispersal capabilities of psyllids increase with temperature.
Assessment of wind direction in the field
Assessment of wind direction in the field

Asian citrus psyllid tend to move upwind
Presence of windbreaks

Windbreaks are erected to protect orchards from extreme weather to manage citrus canker

Effect on *D. citri* populations?
Presence of windbreak

5 Groves
2 months of sampling
Use a vacuum insect sampler

GLMM on pooled data:
\[ \chi = 1141.9, P < 0.001 \]

Martini X. et al. 2015. Agriculture, Ecosystem, and the Environment
Psyllid sampling methods

**Flush examination:** observing and counting during approximately 40 s psyllid adults found in tree canopy

**Sticky traps**
www.alphascents.com
www.iscatech.com

**Tapping:** Tap a randomly selected branch three times with a stick (PVC pipe). Psyllid adults are counted as they fell on a clipboard above.
When to sample?

June from October is the period with the highest risk of psyllid infestation in North Florida and Georgia.
Final thoughts

- Psyllids move—long distances
- ACP is intimately associated with the HLB pathogen
- ACP likely had been spreading disease for many years before HLB was first detected in Florida and before we began controlling it
Final thoughts

- Psyllids survived winter in North Florida. They are likely to stay in the area in the future.

- Psyllids have not been found in any citrus grove in Florida panhandle so far, only in dooryard citrus.

- The period with the highest risk of psyllid infestation for north Florida and Georgia is between June and October.

- If trees are treated in due time, chances that the disease will be transmitted are reduced.
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CRDF

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