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AVOCADO INSECTS AND MITES

THE MOST COMMON AVOCADO PESTS

- Avocado Brown Mite
- Persea Mites
- Avocado Thrips
- Avocado Worms (amorbia and loopers)
- Whiteflies
- Avocado Lace Bugs
- And now Polyphagous Shothole Borer

SYMPTOM: LIGHT GREEN OR YELLOW AREAS ON UPPER LEAF WHICH LATER TURN BROWN OR BRONZE IF SEVERE, LEAVES MAY DROP

- Diagnosis: Avocado Brown Mites
- Tiny mites about the size of a period in a sentence. On top side of leaves.
- Usually good biological control by Stethorus beetles
- No need to treat with chemicals

AVOCADO BROWN MITE DAMAGE

AVOCADO BROWN MITE DESTROYER (STETHORUS BEETLE)

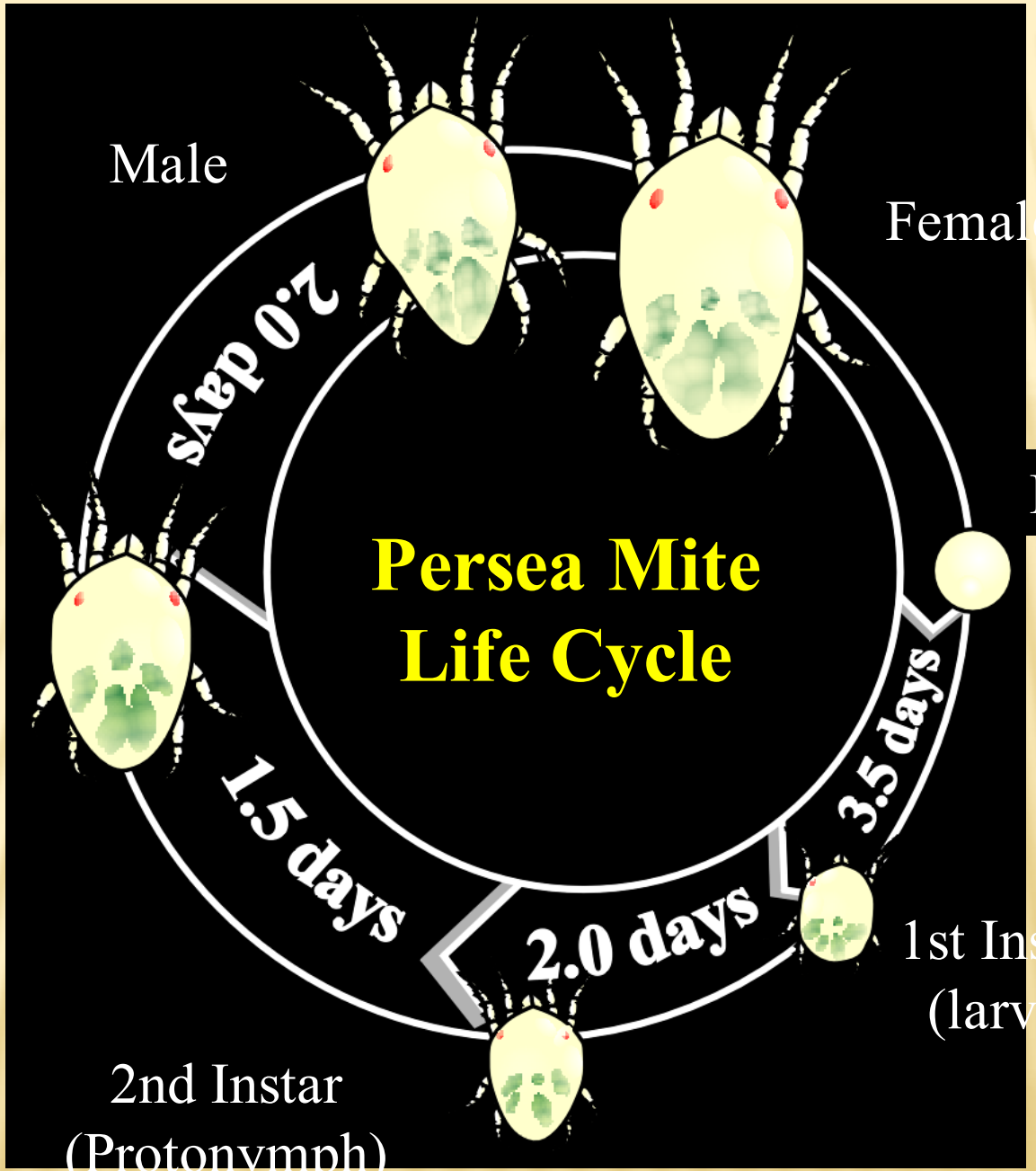
PERSEA MITE, *OLIGONYCHUS PERSEAE* (ACARI: TETRANYCHIDAE)

- Native to Mexico. Described in 1976 from specimens found on smuggled avocados intercepted in Texas
- First discovered in CA in 1991 near the Port of San Diego
- Feeding damage causes partial or total defoliation
- Broad host range: thistles, eucalyptus, carob, bamboo, grapes, peaches

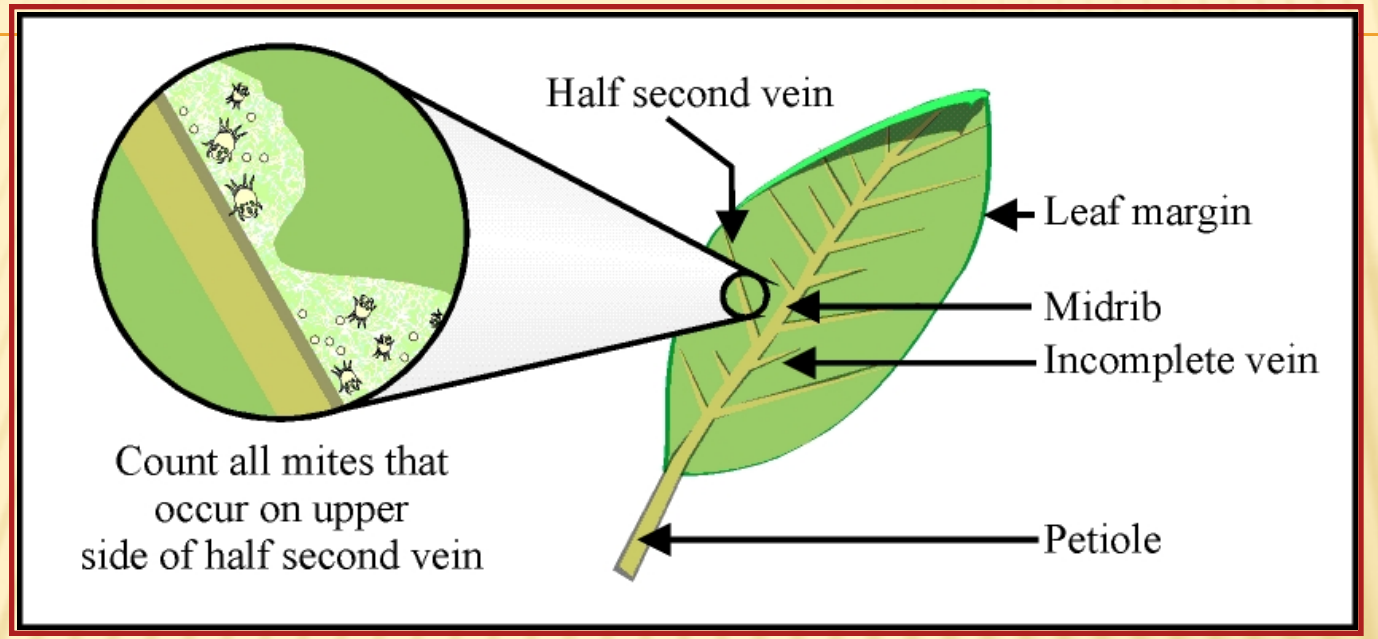
PERSEA MITE FEEDING DAMAGE

When mite feeding damages ~ 10% of the leaf surface the probability of leaf drop increases significantly

COLONY OF PERSEA MITES (WEBBING REMOVED)


Male
Female
Egg
1st Instar
(larva)
2nd Instar
(Protonymph)
3rd Instar
(Deutonymph)
Persea Mite
Life Cycle
2.0 days
3.5 days
2.0 days
1.5 days

Quick Sampling Method for Persea Mite



1) Choose 10 leaves at random.

2) Average the number of persea mites counted on the top side of the second half vein of the 10 selected leaves.

3) Multiply this 10 leaf average by 12 (a correlation factor) to get the average number of persea mites per leaf in the orchard.

See: Dave Machlitt. 1998. Persea mite on avocados: quick field counting method. Subtropical Fruit News 6: 1-4.

SELECTING NATURAL ENEMIES FOR PERSEA MITE CONTROL

Galendromus annectens

✓ *Galendromus helveolus*

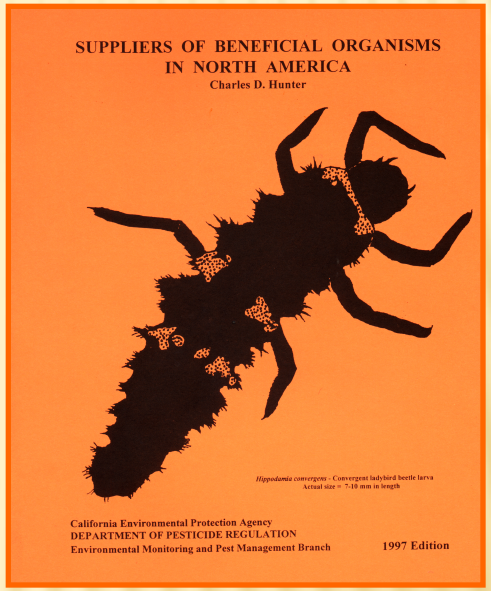
Galendromus occidentalis

Galendromus pilosus

✓ *Neoseiulus californicus*

Neoseiulus fallacis

Typhlodromus rickeri



G. helveolus

N. californicus

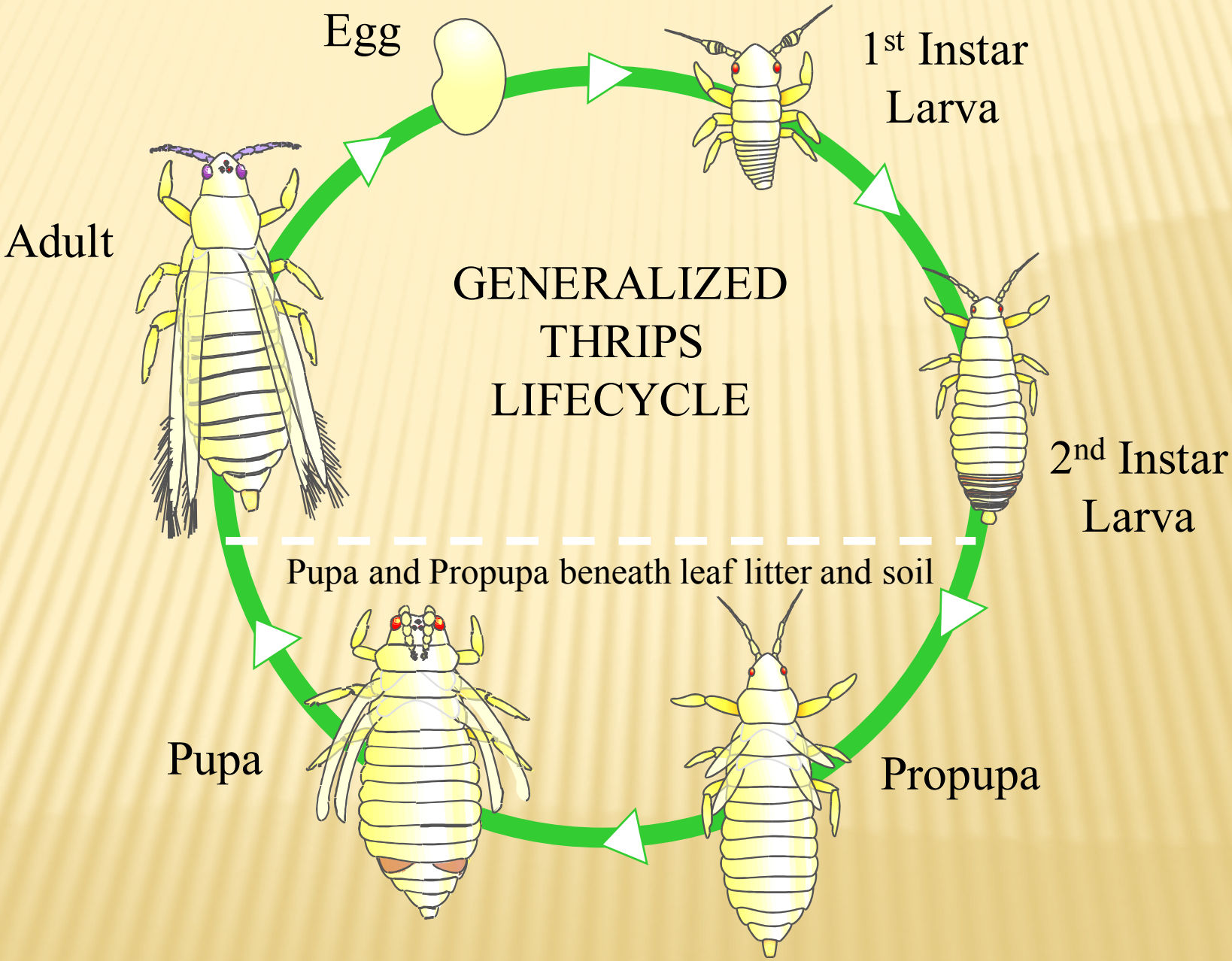
IF YOU NEED TO TREAT

- Agri-Mek SC with oil is applied if leaf drop is significant
- This will control mites for at least 3 weeks, up to 6 weeks
- But only use this once every 3 years to reduce pesticide resistance
- There are other pesticides available

- However, it is doubtful that you will need to treat with a pesticide since out biological controls are doing a good job

Avocado Thrips *Scirtothrips perseae* Nakahara (Thysanoptera: Thripidae)

- First discovered in CA in 1996 near Port Hueneme in Ventura Co.
- Similar to a specimen found on smuggled avocados from Oaxaca at the Port of San Diego in 1971
- Undescribed species when first discovered. Officially named in 1997
- Appears to be monophagous in CA and native to Latin America


Egg
1st Instar Larva
2nd Instar Larva
Propupa
Pupa
Adult
GENERALIZED THRIPS LIFECYCLE
Pupa and Propupa beneath leaf litter and soil

AVOCADO THRIPS FEEDING DAMAGE

Leaf scarring

"Alligator Skin" on small fruit

Elongate scarring on maturing fruit

NATURAL ENEMIES ASSOCIATED WITH AVOCADO THRIPS

USING INSECTICIDES

- Six insecticides have been used successfully to control avocado thrips in CA
  - **Sabadilla (Veratran-D) with sugar**
  - **Abamectin (Agri-Mek) with 1% NR 415 oil**
  - **Spinosad (Success) with 1% NR 415 oil**
  - **Delegate**
  - **Movento**
  - **Danitol**
- Spray decisions should be based on monitoring results, fruit size, and consultation with a PCA

INSECTICIDES AND NATURAL ENEMIES

- Spinosad and abamectin caused declines in natural enemy populations
- Natural enemy populations recovered after 14-17 days
- Suffocation with oil or consumption of poisoned thrips may kill natural enemies
- Labels limit use of insecticides while bees are working flowers in orchards

RESISTANCE MANAGEMENT

- Avocado thrips tolerance to sabadilla has increased
- Rotating use of sabadilla, spinosad, and abamectin may delay the onset of insecticide resistance to these compounds
- Applications should be made based on label recommendations and after consultation with a local PCA familiar with avocado pest management in the local area

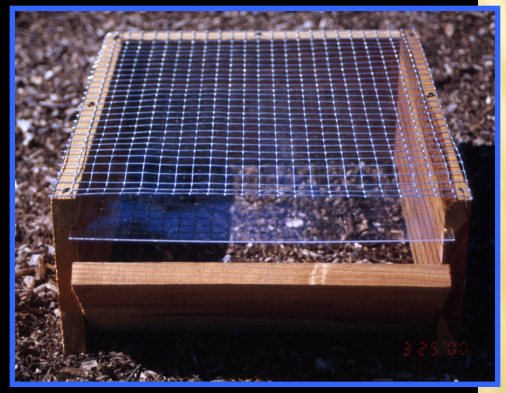
MULCHES FOR AVOCADO THRIPS CONTROL

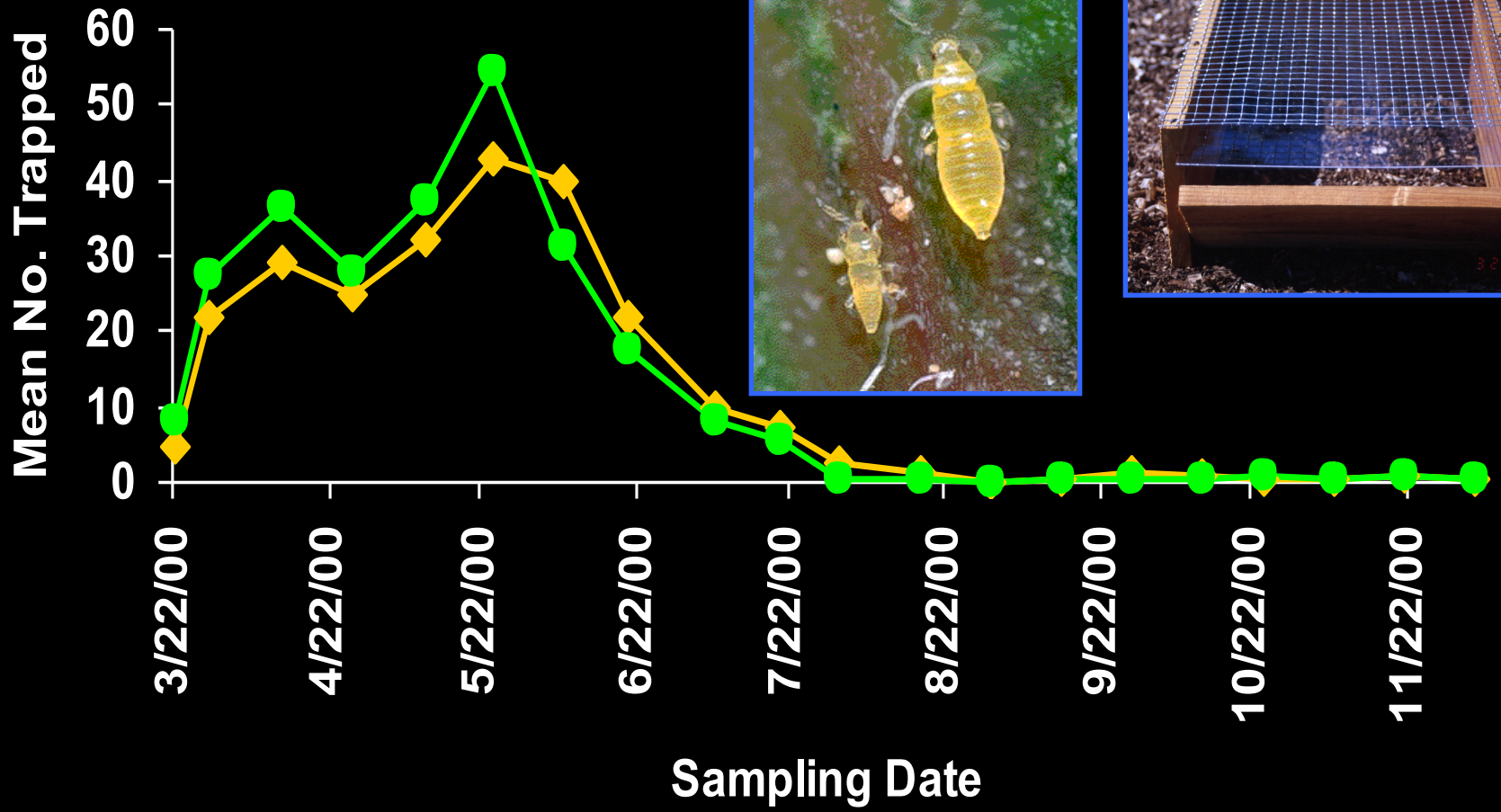
- Composted organic yard waste
  - Root rot control
  - Water retention
  - Improved soil fertility
  - Weed suppression
  - Improved plant growth
  - **Thrips control????**

Mulched Plot

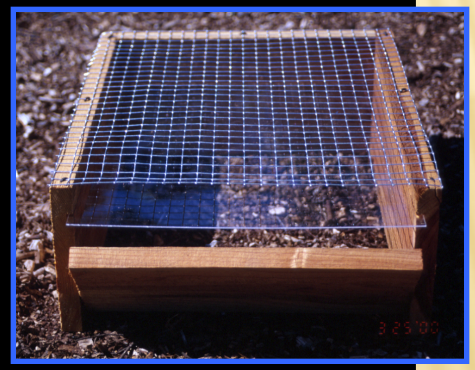
Unmulched Plot

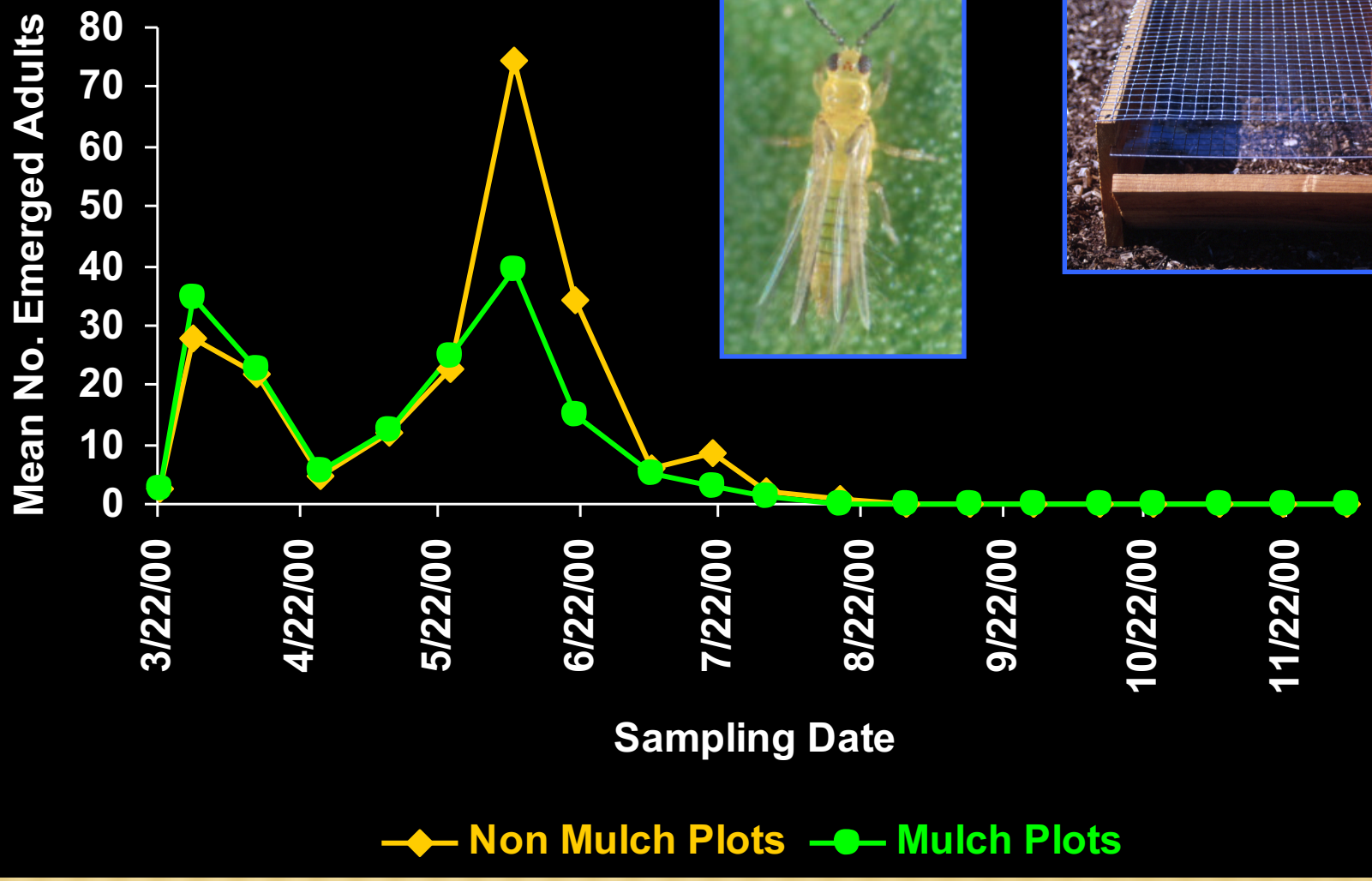
Avocado Thrips Larvae Trapped on Tops of Traps





Adult Avocado Thrips Trapped on Bottom of Traps

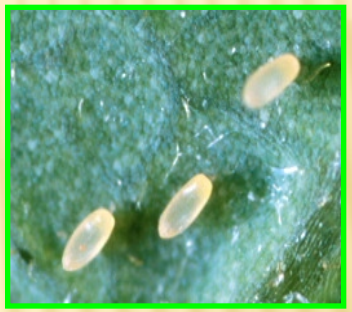




RED BANDED WHITEFLY - *TETRALEURODES PERSEAE* NAKAHARA

- First discovered in San Diego in 1982
- Undescribed species at time of discovery
- Native to Latin America
- Controlled by *Cales noacki* - a whitefly parasitoid

Adult



Eggs

Pupa

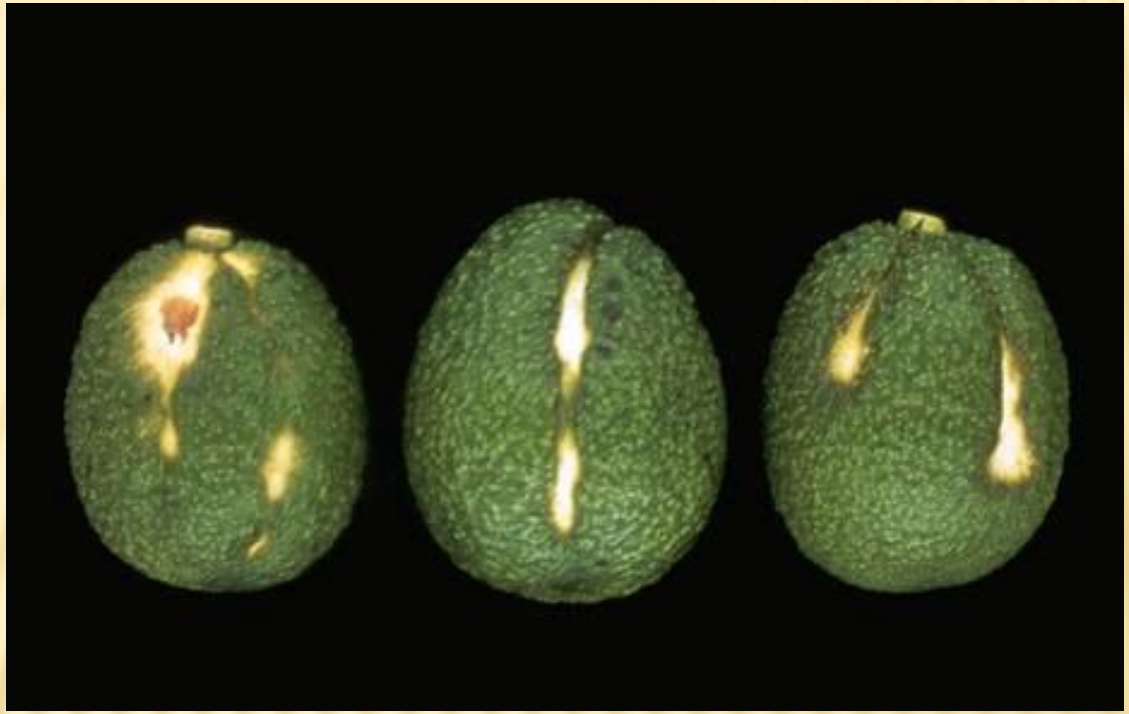
Nymph

WHAT DID THIS?

WHAT DID THIS?

WHAT DID THIS?

WHAT DID THIS?



WHAT DID THIS?

WHAT IS SHE DOING?

WHAT IS CAUSING THIS?

WHAT CAUSED THIS?

POLYPHAGOUS SHOTHOLE BORER

KUROSHIO SHOTHOLE BORER (SAN DIEGO COUNTY)

AND THE FUSARIUM DIEBACK COMPLEX

What a pain in the neck!

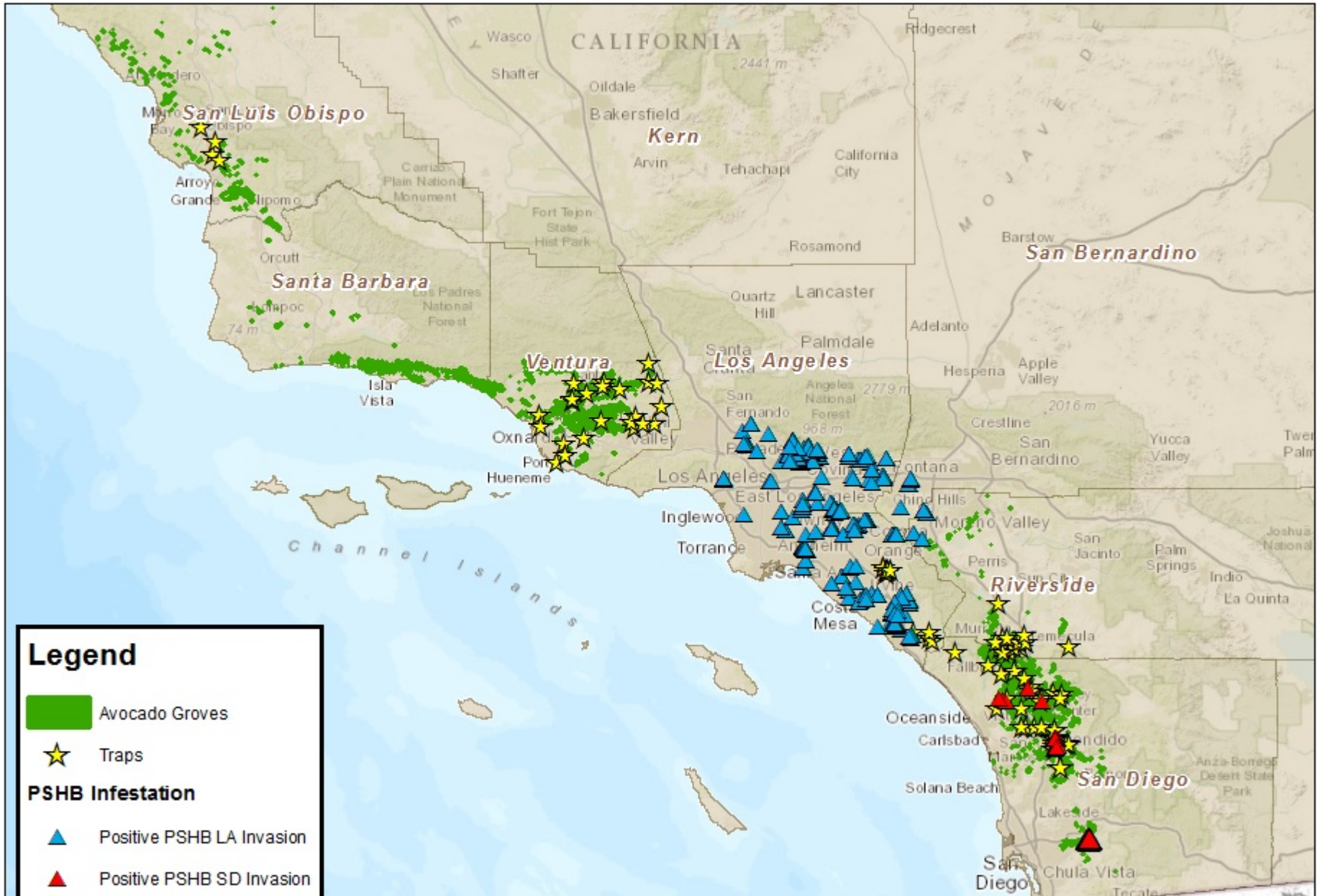
- PSHB was discovered in 2003 in Long Beach, they were associated with box elder street trees that were dying. But this type of ambrosia beetle went undescribed until it was found spreading a *Fusarium* fungus that was killing avocado trees in La Habra Heights.
- Dr. Akif Eskalen, UC Cooperative Extension plant pathologist, discovered this complex and surveyed the trees at the Los Angeles Arboretum and the Huntington Library
- He found over 200 different species of trees in these collections that were being attacked by this new beetle.
- 137 of these can be attacked by the fungus that was carried by the beetle, the disease can stop the flow of water and nutrients and lead to tree death.

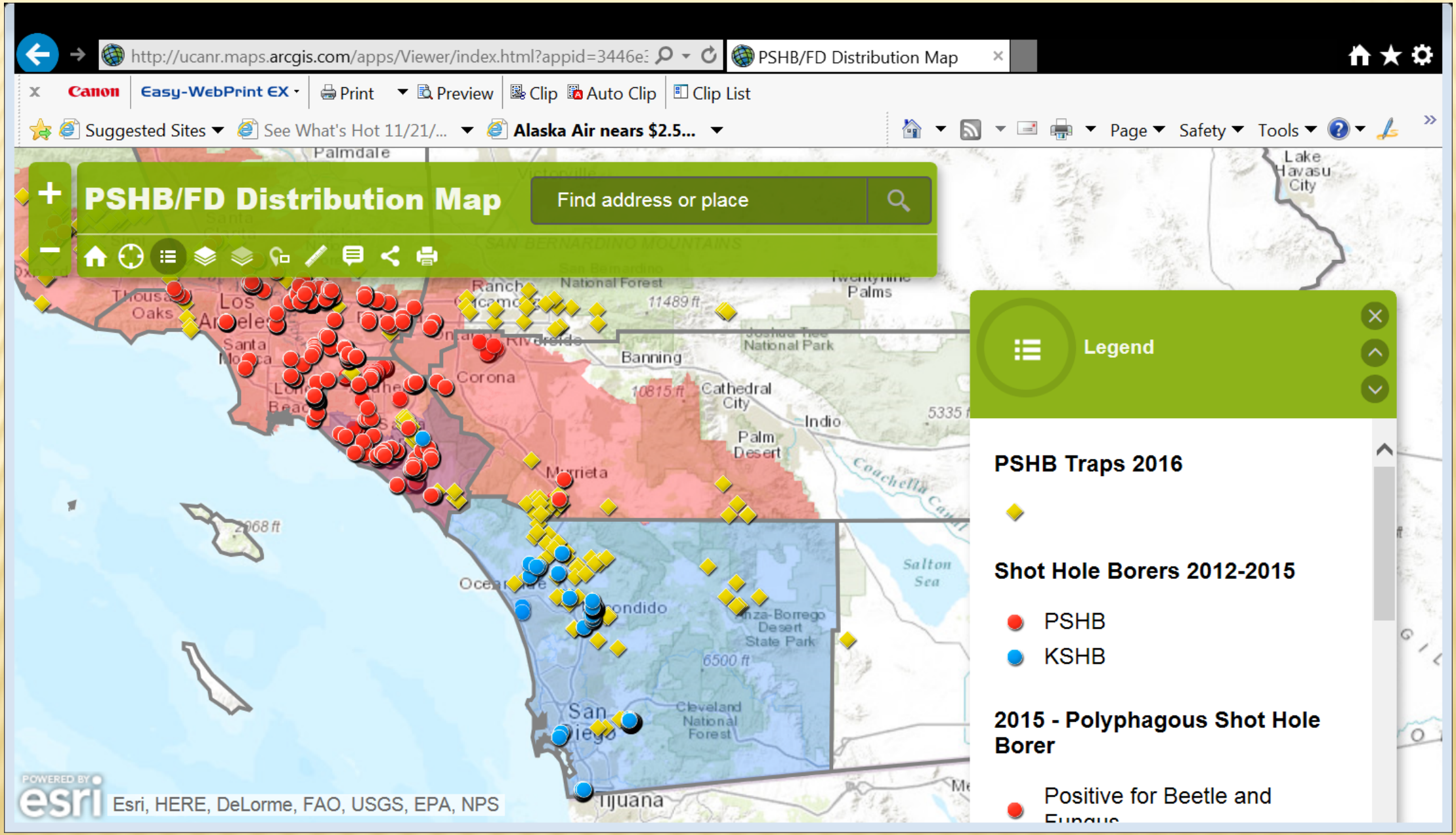
Polyphagous Shot hole borer (*Euwallacea* sp.)

PSHB ON AVOCADO

UC RIVERSIDE UNIVERSITY OF CALIFORNIA

Polyphagous shot hole borer / Fusarium Dieback distribution map (February 2015)




http://ucanr.maps.arcgis.com/apps/Viewer/index.html?appid=3446e
PSHB/FD Distribution Map
Canon
Easy-WebPrint EX
Print
Preview
Clip
Auto Clip
Clip List
Suggested Sites
See What's Hot 11/21/...
Alaska Air nears $2.5...
Page
Safety
Tools
PSHB/FD Distribution Map
Find address or place
Legend
PSHB Traps 2016
Shot Hole Borers 2012-2015
PSHB
KSHB
2015 - Polyphagous Shot Hole Borer
Positive for Beetle and
Palmdale
Lake Havasu City
Los Angeles
Santa Monica
Long Beach
Riverside
Corona
Banning
Cathedral City
Indio
Palm Desert
Murrieta
Twentynine Palms
Joshua Tree National Park
San Bernardino National Forest
Salton Sea
Anza-Borrego Desert State Park
Cleveland National Forest
San Diego
Tijuana
11489 ft
10815 ft
6500 ft
5335 ft
2068 ft
POWERED BY esri
Esri, HERE, DeLorme, FAO, USGS, EPA, NPS

- PSHB females drill into the trees, lay eggs and inoculate the tunnels with the fungus. The larvae feed on the fungus. They become adults in a month. The larvae mate with each other in the tunnel.
- The adults are less than a tenth of an inch, the tunnels are about a tenth of an inch in diameter.
- Avocados and box elders emit a “sugar volcano” around the holes

HOSTS FOR THE BEETLE AND THE FUNGUS

MANAGEMENT

- Prune off branches that show symptoms, you may save the tree!
- Don’t move firewood around!!!
- Remove trees if the trunks are infected
- Chip to smaller than 1”
- Sterilize pruning tools to avoid spreading the fungus
- Solarize wood piles for at least 6 months
- Remove castor beans from around grove
- Traps being deployed in groves around known infested areas (CAC program and UCR research)

HEALTHY TREES

- Keep them well watered and fertilized
- Systemic chemicals are probably poor because the xylem is probably plugged up, but this is being investigated

CASTOR BEAN

SOLARIZING

BIOLOGICAL CONTROL

- The ultimate solution, they found a tiny parasitic wasp in Southeast Asia
- USDA is considering importing it, if it doesn’t cause harm to native California insects.