



**Pesticide Residues and the
Glassy-winged Sharpshooter**

Rick Redak

Department of Entomology

University of California,

Riverside

Eggs

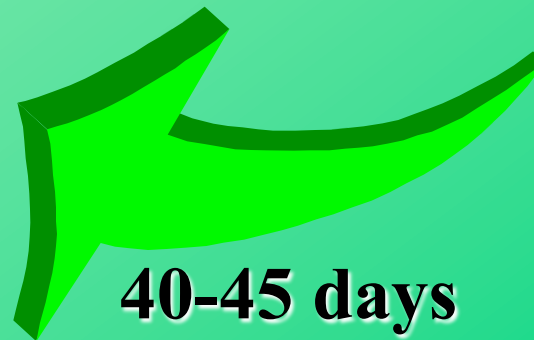


**10-12
days**



**Five Nymphal
Instars**

**Two Generations
Per year**



40-45 days



Adult GWSS

**Weeks to
months**

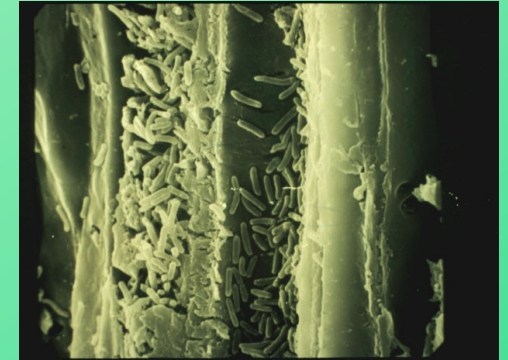


Xylella fastidiosa biology

Xylem-limited bacterium

Wide host range

- crops, native, ornamental, weedy plants
- disease severity differs among hosts



Substantial genetic variation

- host-specific strains
- pathogenicity varies among strains

Transmitted by xylem-sap feeders

- leafhopper, esp. sharpshooters, are the most important vectors
- many sources of variation



No cure



almond



pecan



oleander



olive



oak



coffee



plum



elm



sweet gum

phony peach



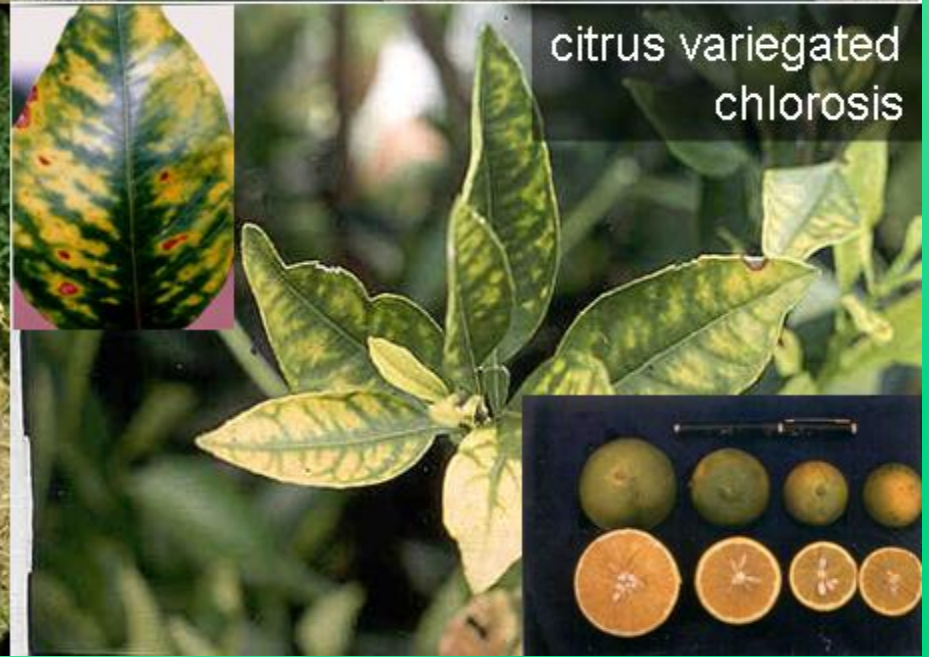
periwinkle wilt



alfalfa dwarf



citrus variegated chlorosis

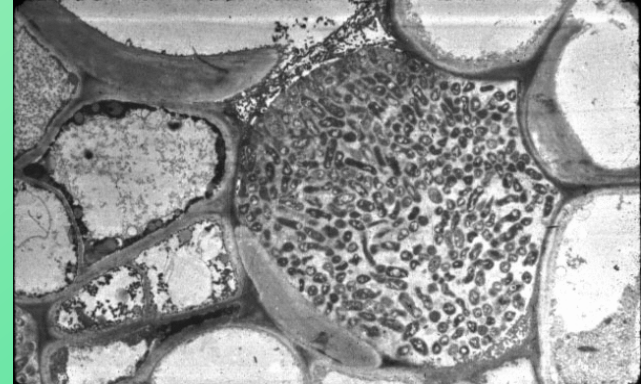


Currently, the greatest threat is to grapes

Pierce's Disease



***Xylella* in hundreds of plants**



GWSS feeds on hundreds of plants

Why Care about Sharpshooters in Nurseries?

- Not really a severe nursery pest
- High potential of movement of insect to areas without GWSS populations and triggering a PD outbreak.



CDFA Program Elements

- **Contain the Spread:** Prevent the spread of the GWSS to new areas of the state by regulating shipments of host plants and plant materials.
- **Statewide Survey and Detection:** Find and monitor GWSS infestations and populations through trapping and visual survey.
- **Rapid Response:** Respond quickly to detections of GWSS in new areas by intensively surveying the area and applying treatments if necessary.
- **Outreach:** Raise awareness about Pierce's disease and its vectors while responding to the concerns of growers and the general public.
- **Research:** Develop solutions to Pierce's disease and its vectors.

1. Areawide Treatment Programs:

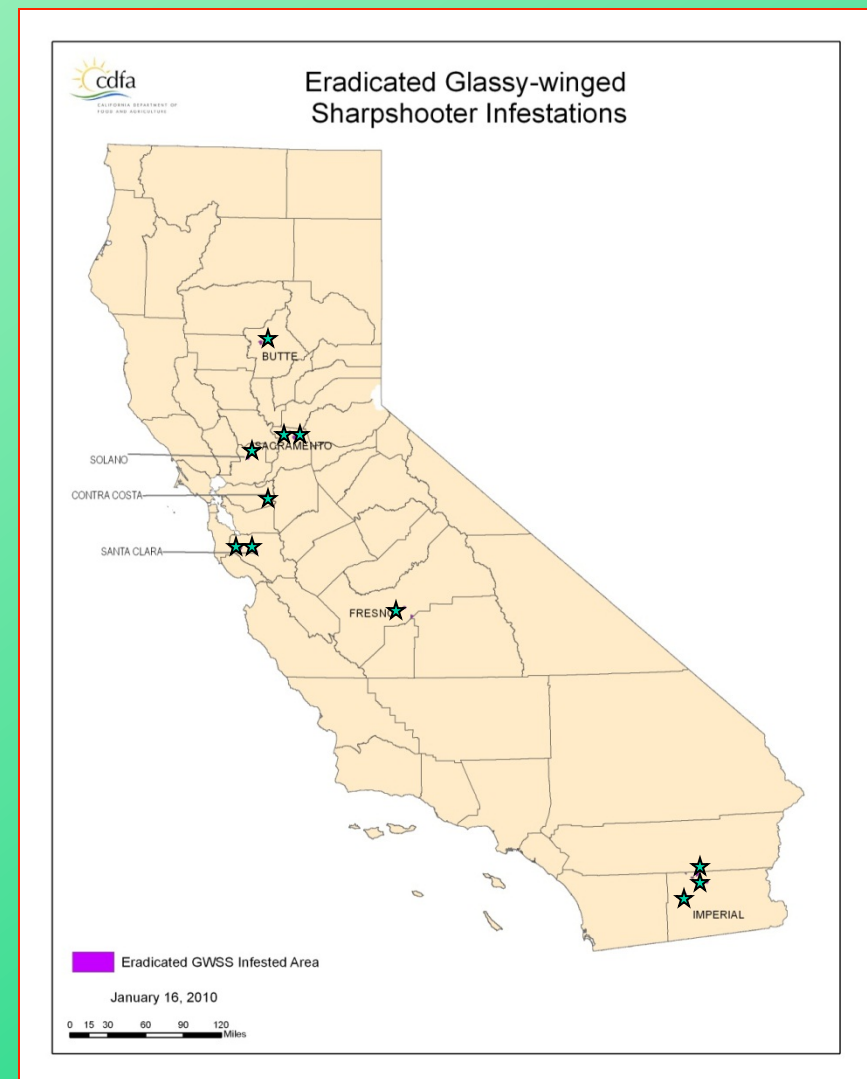
The coordination of chemical treatments in commercial citrus blocks and urban areas along with releases of biological control agents in the following counties:

Fresno, Kern, Madera, Riverside (Coachella and Temecula Valleys), Tulare

2. Eradication Programs:

New and emerging new populations of GWSS outside of Southern California are quickly detected and eradicated.

To date: 14 areas statewide



3. Contain the Spread: Nursery Quarantine



Nursery Quarantine

Issues are not biological

- No other approach besides insecticides is suitable:
Quarantine requires 100% control of all life stages.
- Effective monitoring at origin and destination:
Expensive and time consuming inspections
- Effective application: Growers must apply material correctly.
- Comfort levels: Growers (of grapes/almonds) in uninfested counties must rely on others for control.
- Contradictory demands by the State: CDPR vs. CDFA

Nursery Quarantine

State Regulations related to movement

Regulate shipments of Nursery Stock



Nursery Quarantine

CDFA Pierce's Disease Control Program and County Restrictions on the Glassy-winged Sharp Shooter Nursery Compliance Requirements

- Intensive surveys
- Establish **GWSS-free** staging area for shipments
- Ship plants **free from** all viable life stages of GWSS (= *inspections*)
- Ensure blue-tag system.

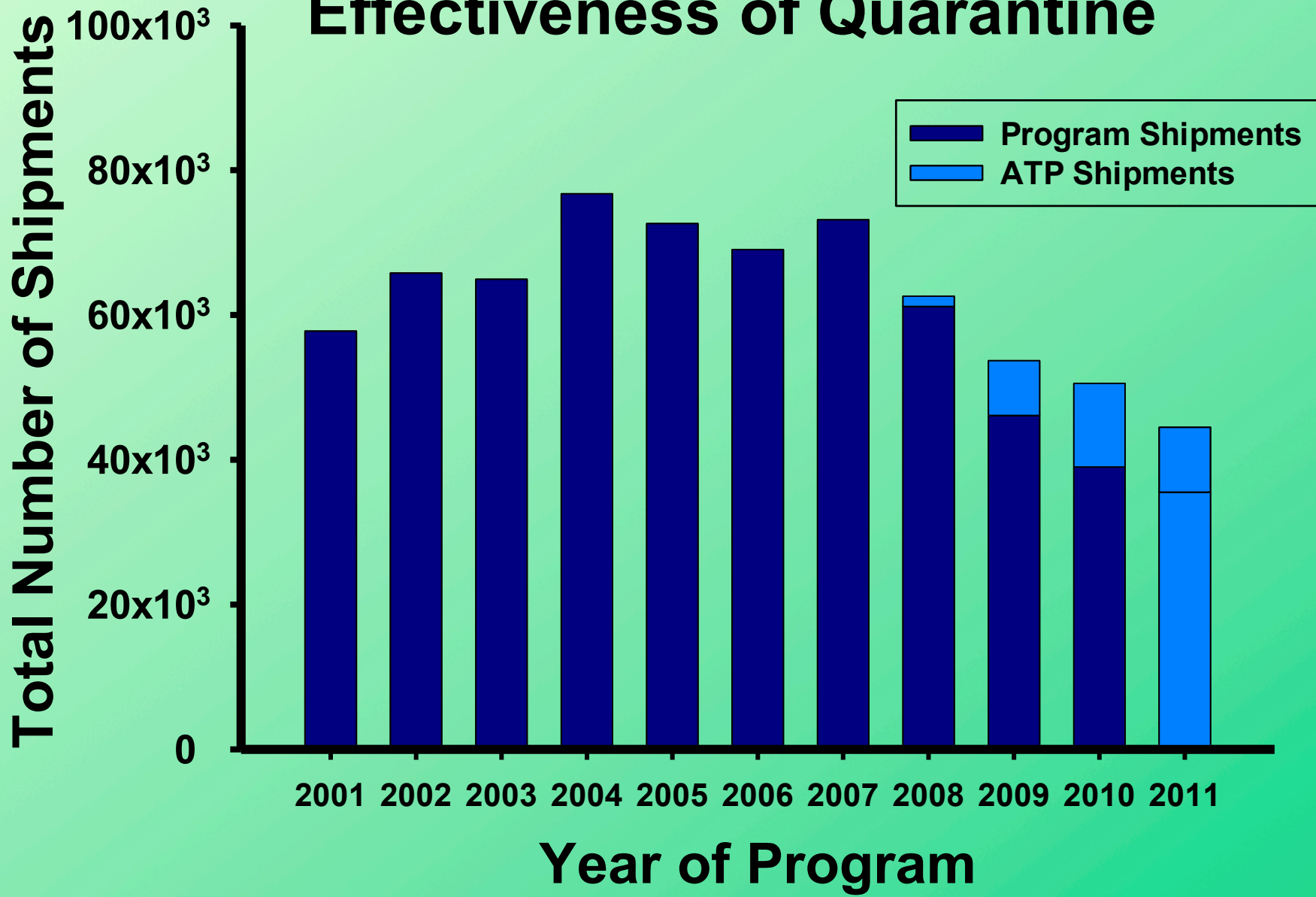


**Yellow
Sticky Traps**



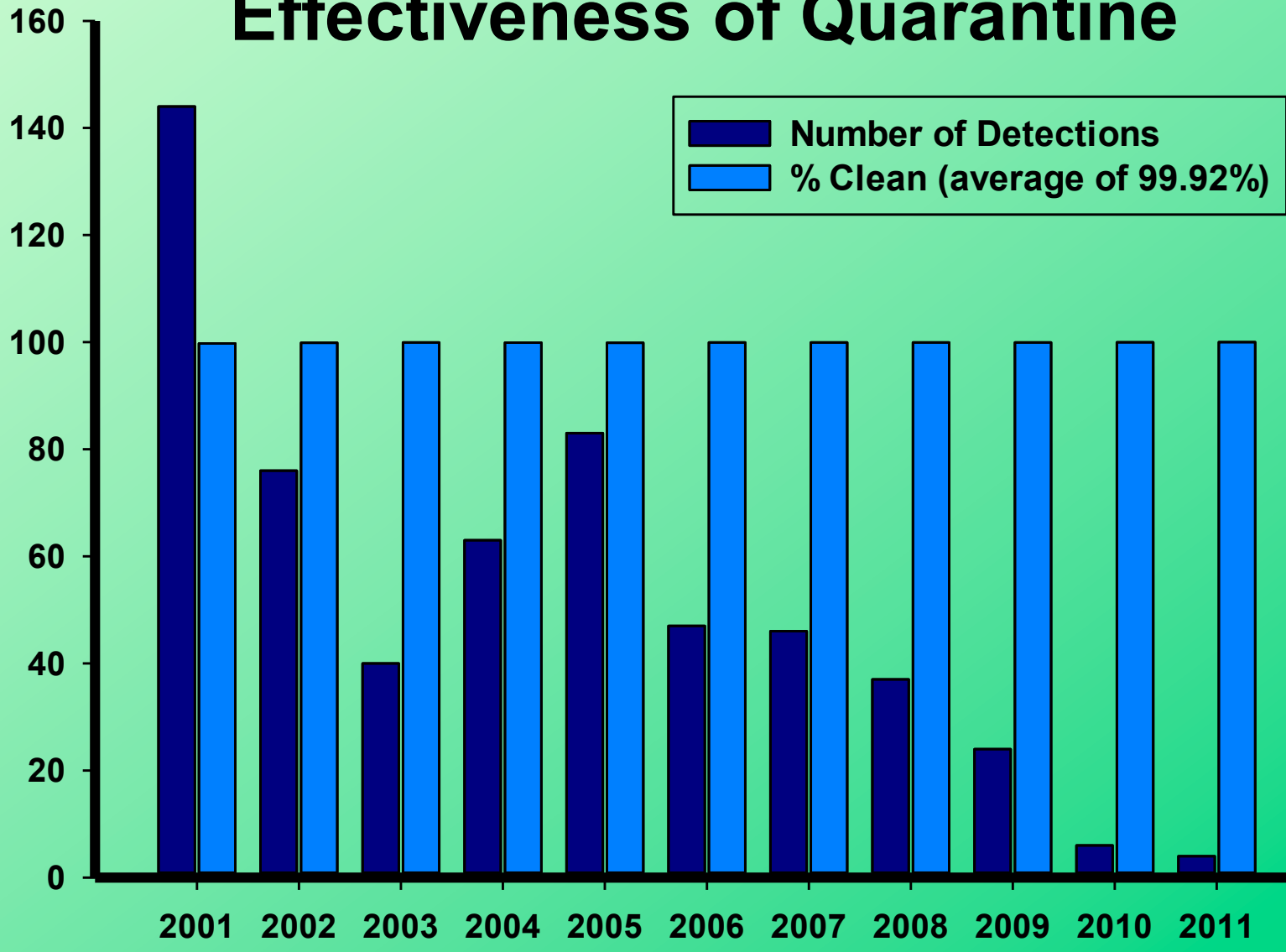
**Visual
Inspections**

Effectiveness of Quarantine



Effectiveness of Quarantine

Percent Clean or Number of Detections

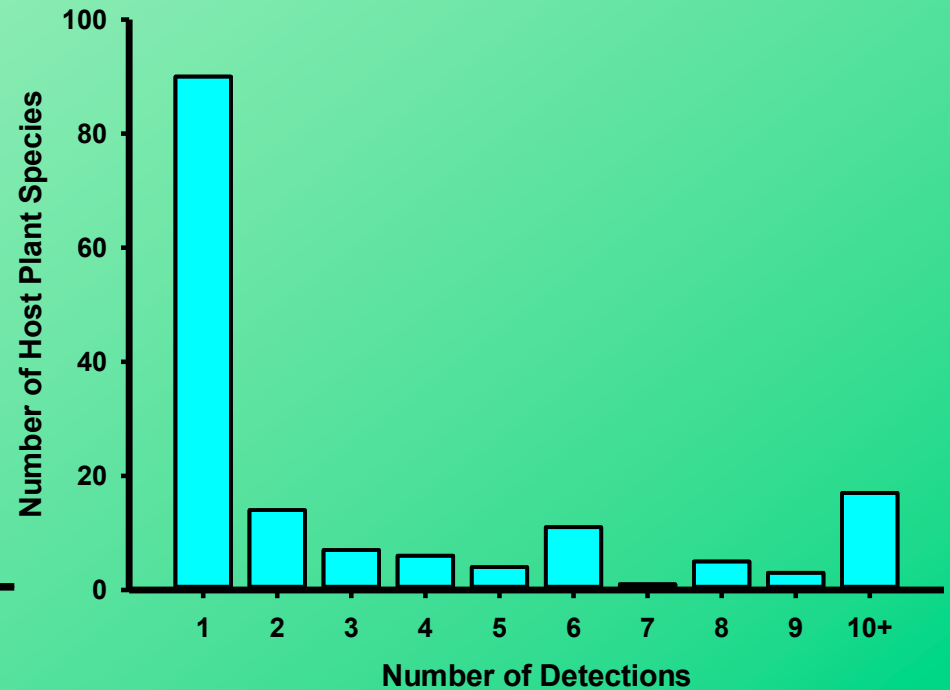
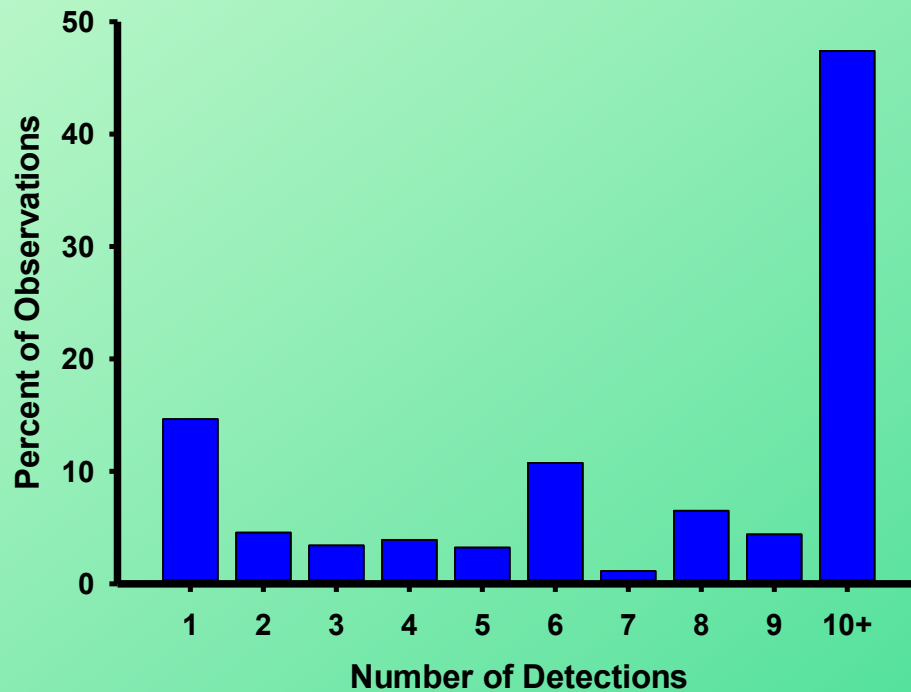


Year

Interesting Findings

The majority of infested observations have >10 detections

Many species have one detection. A few species have many detections



Top 10: Lagerstromia, Ligustrum, Pittosporum, Photinia, Rhamphiolepis, Hedera, Rosa, Nandina, Prunus, Vinca.

Costs of Quarantine

- **CDFR estimates of direct costs to the California nursery industry to be ~\$10 million/year (in excess of \$120 million since 2001). **Value is low****
- **The Nursery Industry estimates the costs to be ~ \$0.30-\$25.00+ per container of product.**
- **This includes trapping, treatment, monitoring, safeguarding, and inspection.**
- **It does not include costs of rejections, lost sales, lost markets**
- **Without controlling for eggs, there is a small but detectable number of egg masses moving through quarantine.**

There was a tremendous need for...

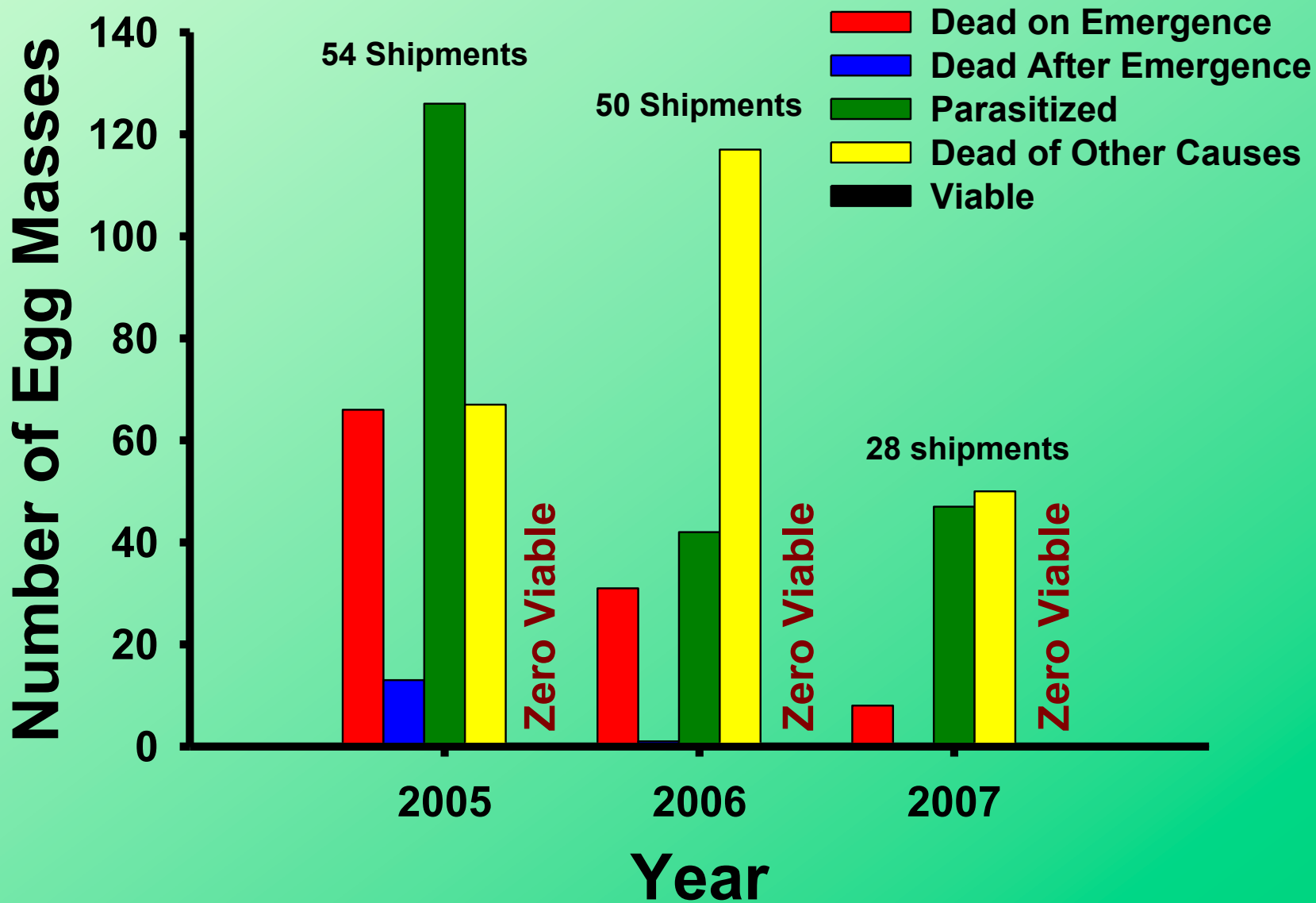
- **A state-approved, standardized, disinfestation protocol for the prevention and elimination of glassy-winged sharpshooters within nursery crops.**
- **The goal is to reduce costs of quarantine by implementing a standard prophylactic disinfestation procedure and eliminating inspections.**
- **The sticking point with quarantine has always been the elimination of viable egg masses.**



2005-2007: CDFA GWSS Pilot Program

- The quarantine and inspection protocols *could not be sustained economically.*
- Three nurseries volunteered to follow GWSS Control Program *plus* treat plant material with either carbaryl or fenprothrin immediately before shipment. **NO INSPECTIONS!**
- Shipped north, held and inspected for GWSS.

Pilot Program: Fate of Egg Masses



At the end of 2007

1. On-going quarantine practices resulted in shipment of material that is 99.91% free from GWSS.
2. The dominant stage slipping through quarantine was still the egg.
3. Prophylactic treatment protocols evaluated in Pilot Program were 100% effective, without inspections at origins.
4. 2008: Established the Approved Treatment Program (ATP).

Approved Treatment Program

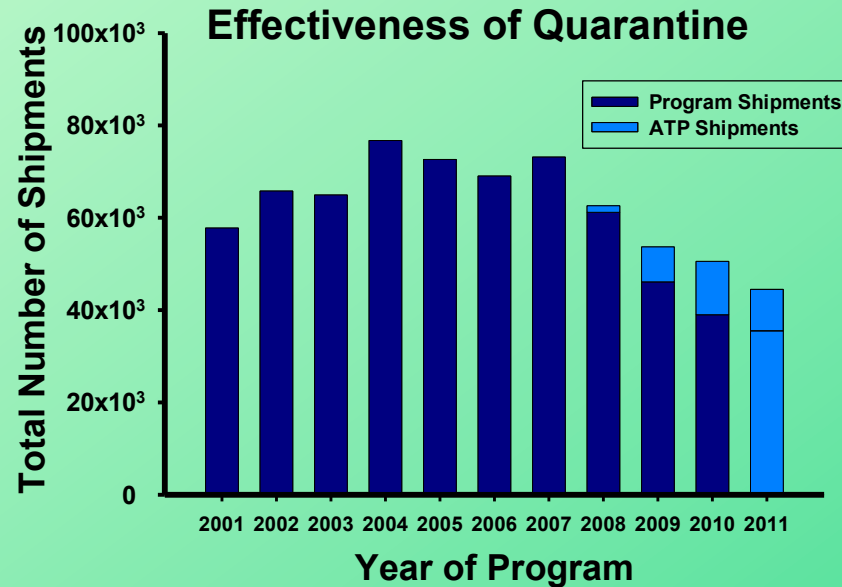
- Participating nurseries are under a special compliance agreement and must implement and maintain BMPs
- Trapping at 4 traps per acre
- Threshold: 10 GWSS trapped in a single yellow panel trap within a two-week period
- Treatments of Sevin SL or Tame witnessed by licensed inspector
- Treatment (Certificate of Quarantine Compliance) expires in five days
- <http://www.cdfa.ca.gov/pdcp/Guidelines.html#Nursery>

Approved Treatment Program

Participating nurseries *are not required* to conduct an outgoing inspection of plant material. Therefore, an acceptable level of GWSS egg masses may be present on plant material under the ATP.



Approved Treatment Protocol

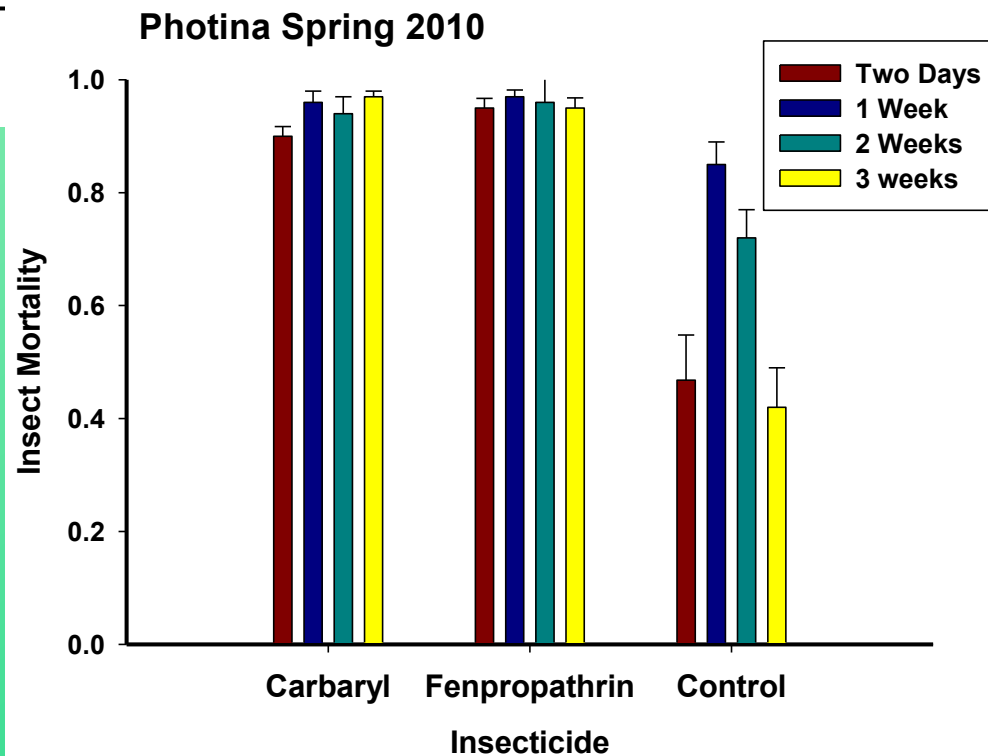
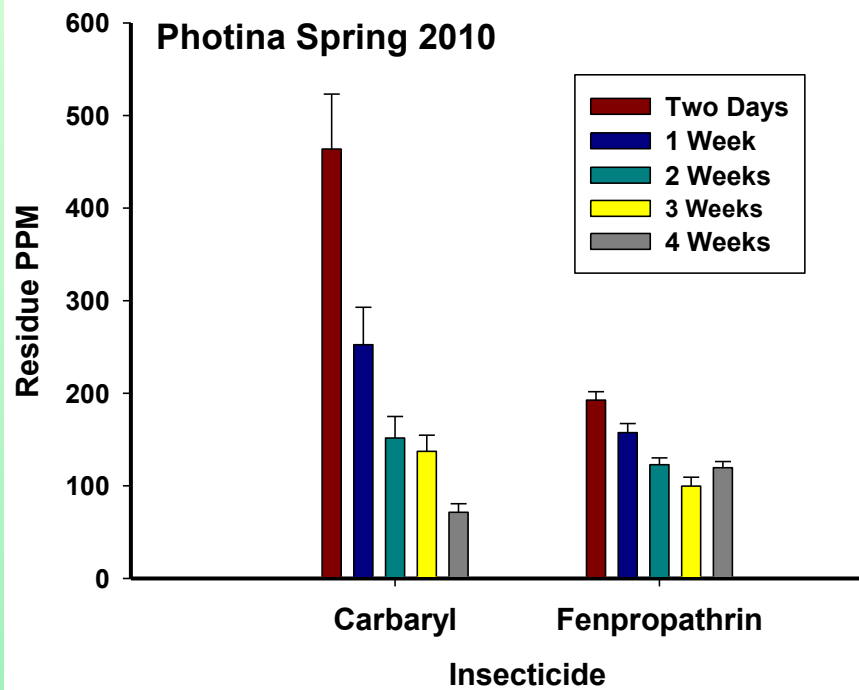


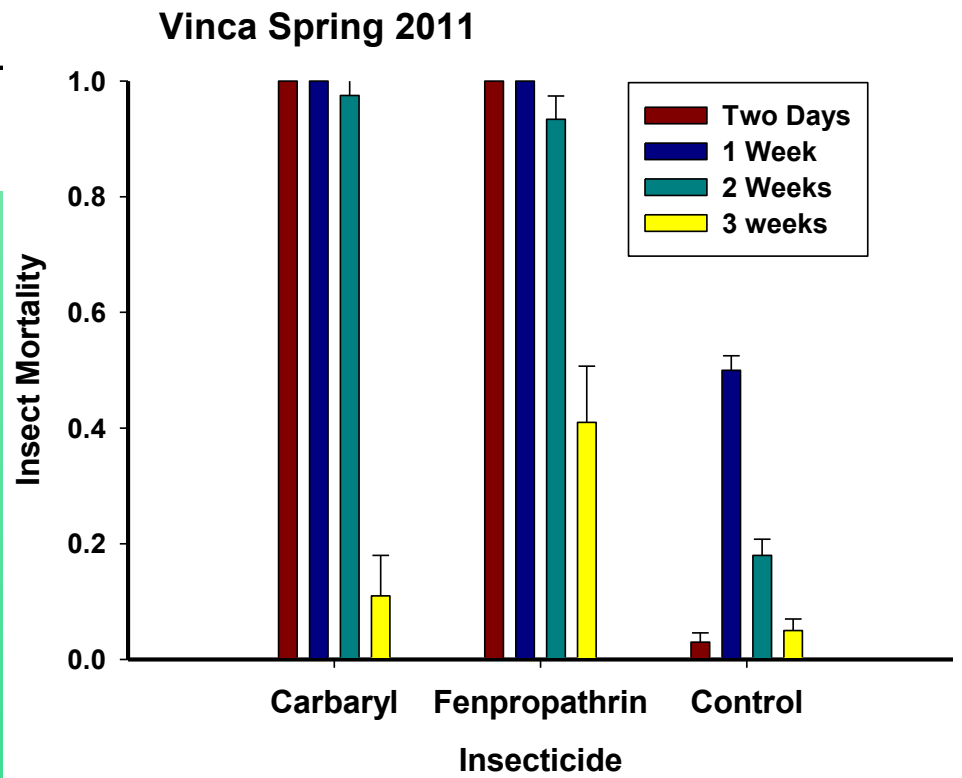
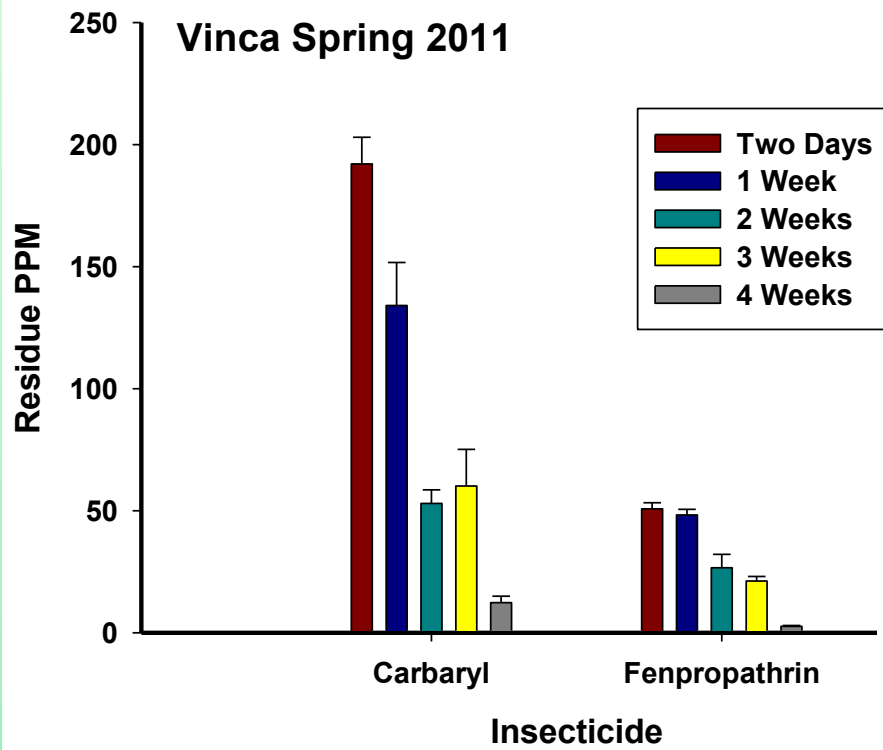
Year	# Rejections	# Shipments	~ # Plants
2008	0	1,410	0.49 million
2009	1 (violation by grower)	7,939	2.3 million
2010	0	11,499	3.9 million
2011	0	8,974	2.9 million

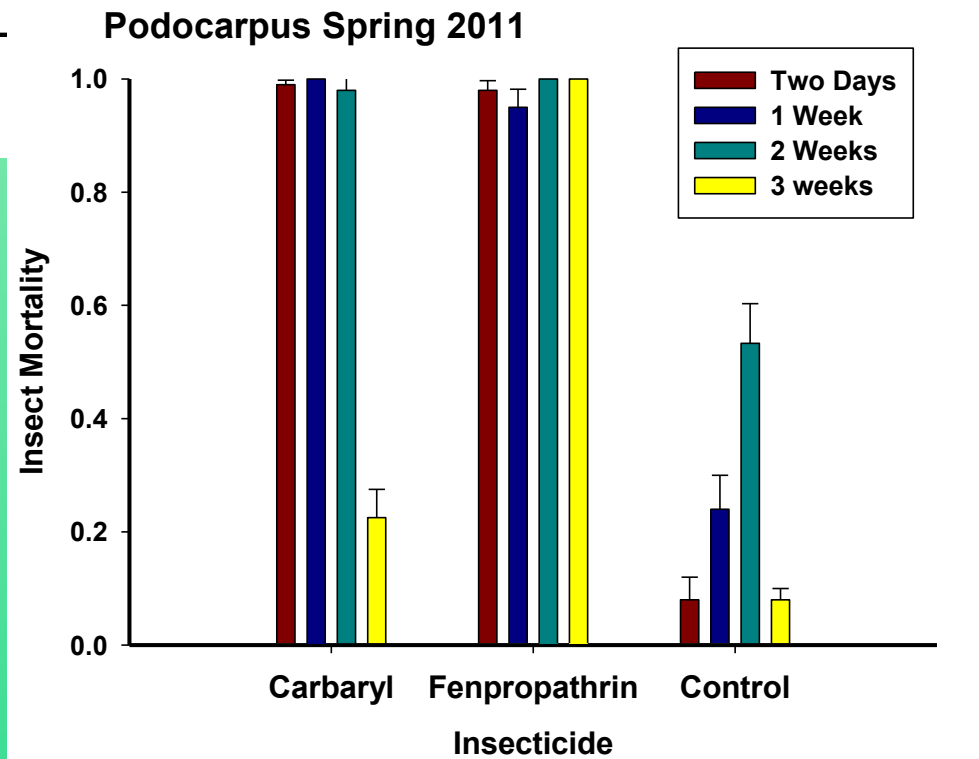
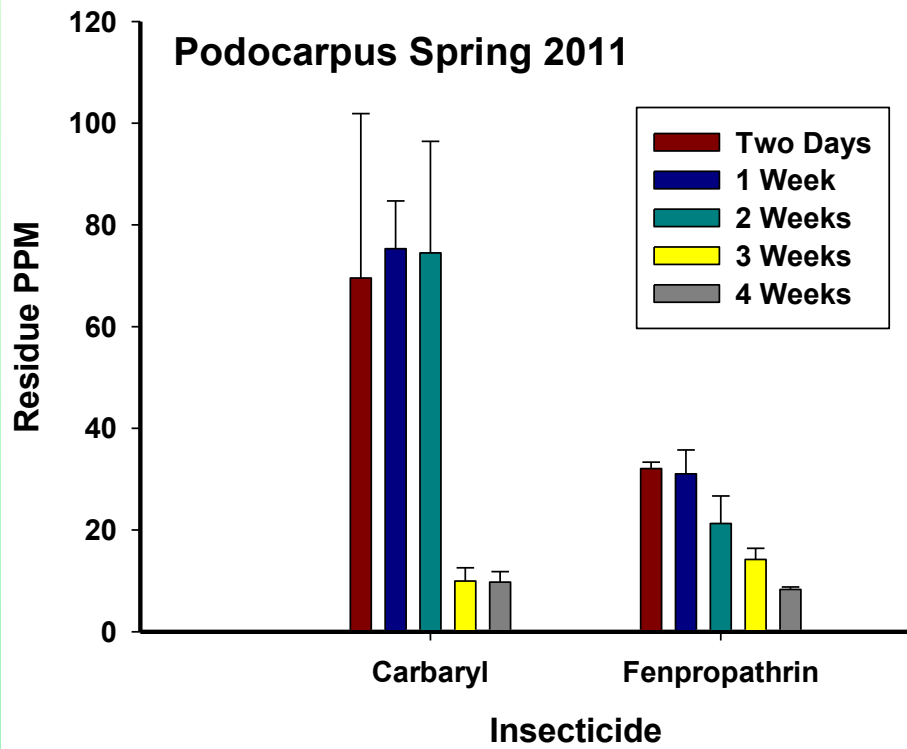
But.....

How does one *really know* the
plants have been treated
adequately?

Answer: Insecticide residue values







Residue Suggestions

- The following values are recommended as initial minimum values of use for determining whether or not foliage has been treated.
 - For Shrubs (e.g. Photinia): **50 ppm of carbaryl, 25 ppm fenpropathrin.**
 - For Trees (e.g. Lagerstromia, Podocarpus): **65 ppm carbaryl, 25 ppm fenpropathrin**
 - For Bedding plants (e.g. Vinca): **50 ppm carbaryl, 20 ppm fenpropathrin.**
- In most cases adequately treated plants will have larger values than above, but due to a variety of factors (time since treatment, thickness of leaves, adequacy of coverage, quantity of non-treated material in a sample, etc) it would not be unreasonable to detect somewhat lower concentrations on adequately treated foliage.

CDFA Websites of Note

<http://www.cdfa.ca.gov/pdcp/>

<http://www.cdfa.ca.gov/pdcp/Guidelines.html#Nursery>

CA.GOV CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Search This Site California

[CDFA Home](#) [PDCP Home](#) [Advisory Groups](#) [Biological Control](#) [Guidelines](#) [Regulations](#) [Research](#) [Maps](#)

[E-mail PDCP](#) [County Ag Contacts](#) [County Users](#) [Plant Health Division](#)

pdcp protects
AGAINST THE SPREAD OF PIERCE'S DISEASE

[CDFA Home](#) > [Pierce's Disease Control Program](#)

PIERCE'S DISEASE CONTROL PROGRAM
2014 Capitol Avenue, Ste. 203, Sacramento, CA 95811 • 916-322-3400 • pdcpinfo@cdfa.ca.gov

The mission of the Pierce's Disease Control Program (PDCP) is to minimize the statewide impact of Pierce's disease and its vectors in California.

GENERAL INFO

- [E-mail PDCP](#)
- [E-mail CDFA](#)
- [Plant Health Division](#)
- [County Ag Contacts](#)

ACKNOWLEDGEMENTS

- **Altman's Plants**
- **Bordier's Nursery**
- **Hines Nursery**
- **Monrovia Nursery**
- **Norman's Nursery**
- **Pardees Nursery**
- **Valley Crest Nursery**
- **Village Nursery**
- **Weidner's Gardens**
- **Staff of CDFFA**
- **Funding from CDFFA**
- **Funding from CANGC**