

What's New at the CDFA Plant Pest Diagnostics Lab?

Cheryl Blomquist

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CDFA Plant Pest Diagnostics Center (PPDC)

- **State Regulatory Lab with 5 disciplines**

- Plant Pathology
- Nematology
- Entomology
- Botany
- Seed

- **Regulatory Programs**

- Huanglongbing (HLB)
- Sudden Oak Death (SOD)
- Plum Pox Virus (PPV)
- Sweet Orange Scab (SOS)
- Phytosanitary Quarantine (PQ)

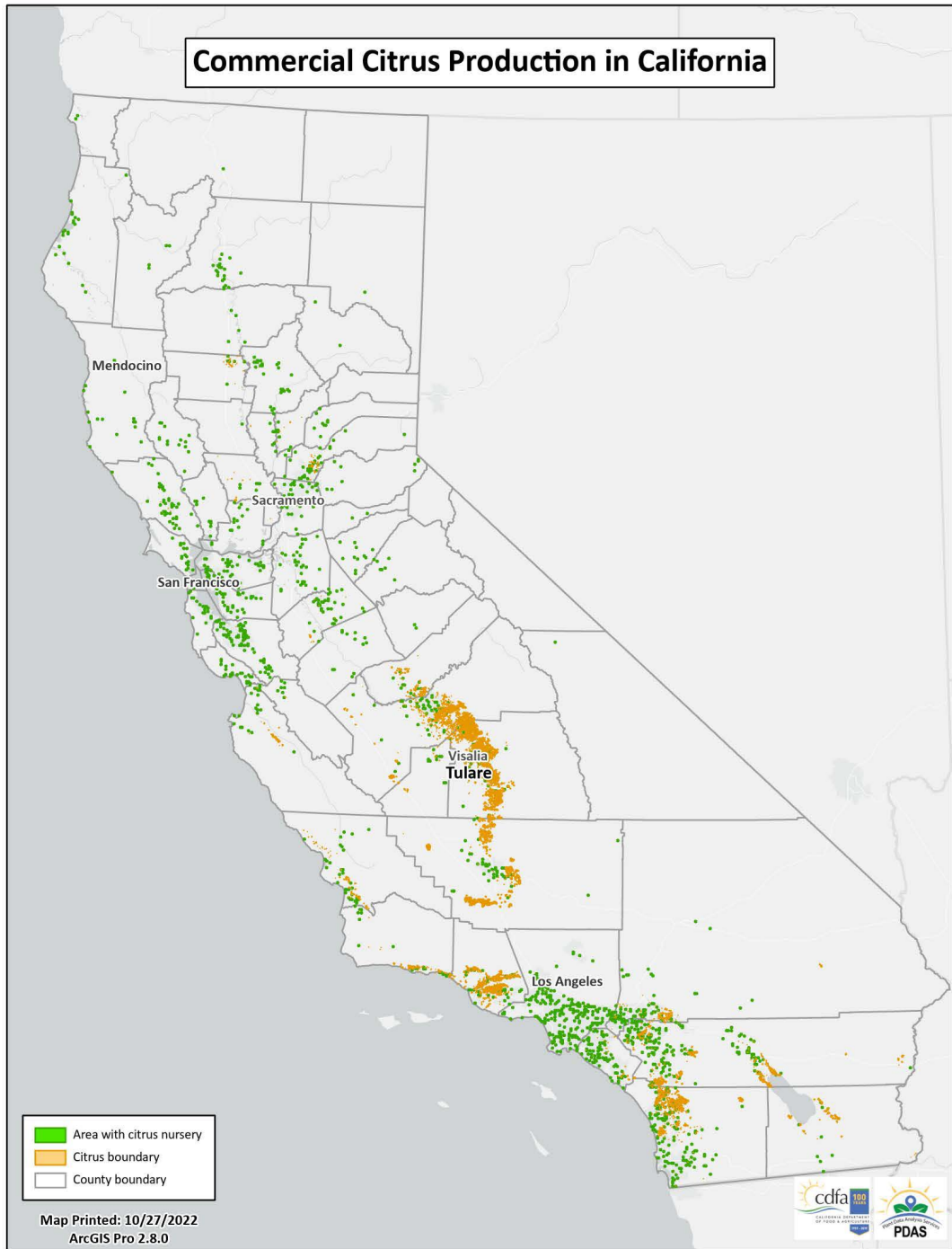
Value of Citrus Production in California

- 3.63 billion (2020-2021 Marketing year)
- Citrus industry added 1.9 billion to California's GDP (2021)

Babcock, B. A. (2022). Economic Impact of California's Citrus Industry in 2020. *Journal of Citrus Pathology*, 9. <http://dx.doi.org/10.5070/C49156433>



Commercial Citrus Production in California



2022 Citrus Survey

- Citrus yellow mosaic virus
- Citrus yellow vein clearing virus
- Citrus leprosis disease (C1,C2, N, orchid fleck virus)
- Citrus canker (*Xanthomonas citri*)
- CVC (*Xylella fastidiosa* subsp. pauca)
- Sweet orange scab *Elsinoe australis*
- Citrus black spot *Phyllosticta citricarpa* syn=*Guignardia citricarpa*
- Huanglongbing (HLB)



Xylella fastidiosa
subsp. pauca



Xylella fastidiosa
subsp. pauca



Elsinoe
australis
M. Soriano



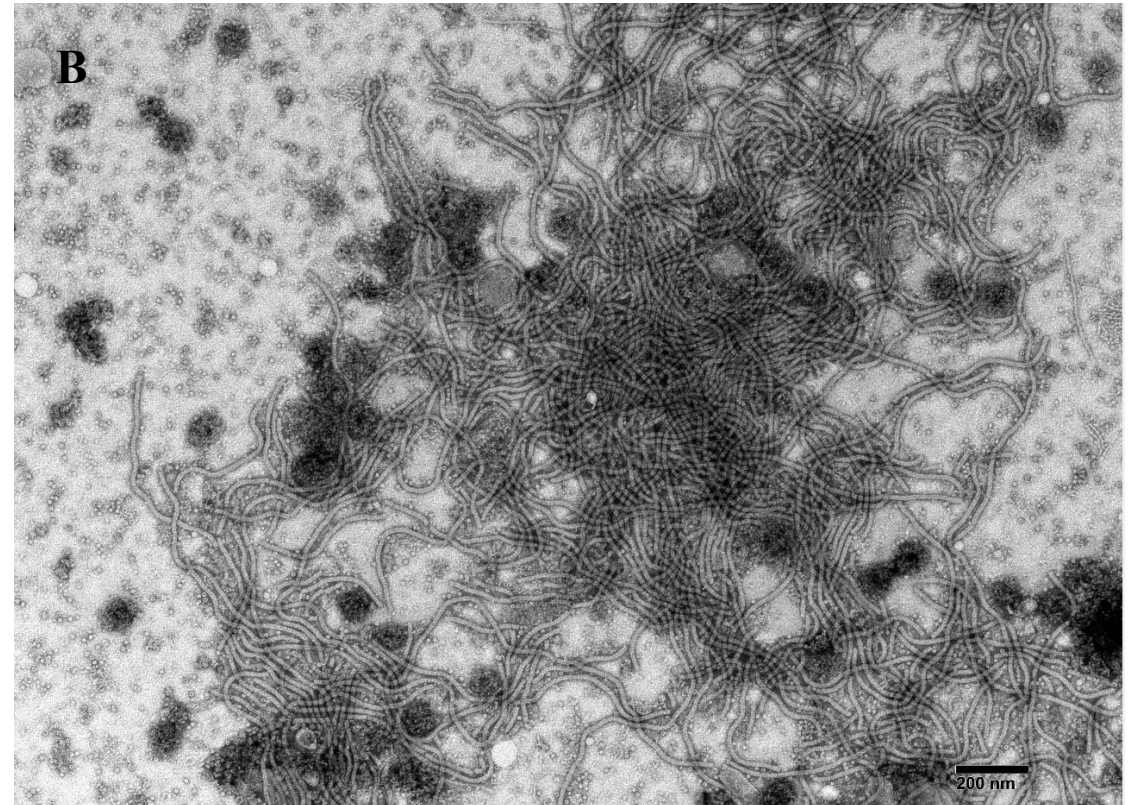
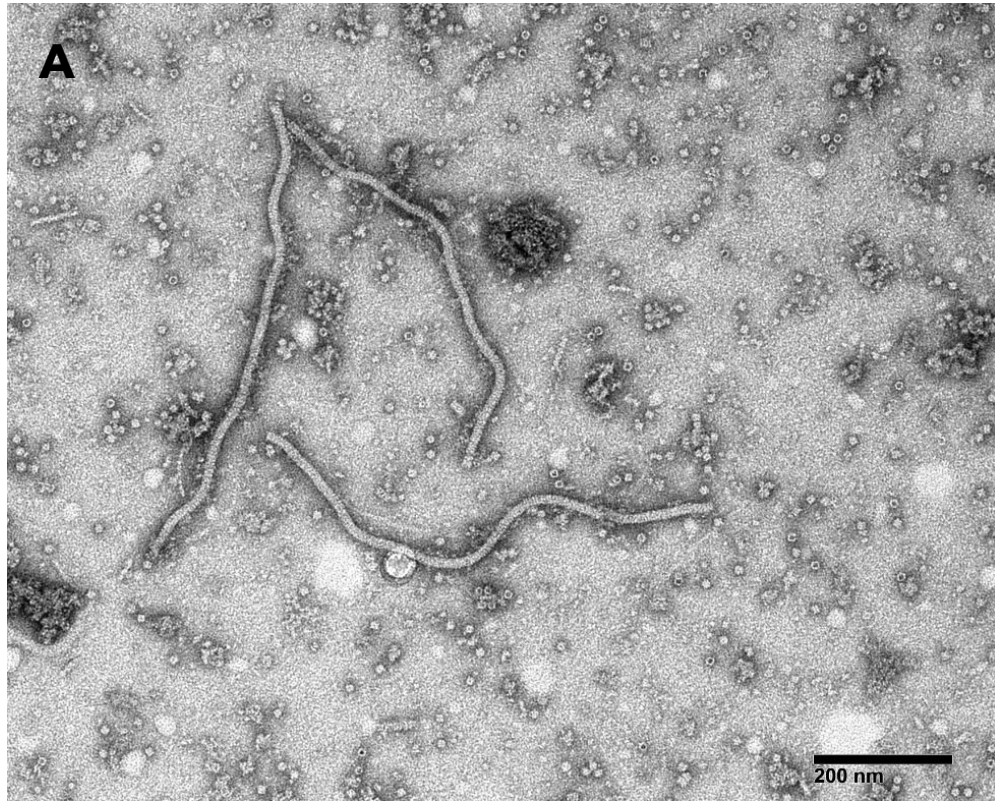
Xanthomonas citri
UFL photo



Virology Team: Tongyan Tian, Katie Posis, Ying Yi Guo, Doris Yu

Suspicious Sample from Tulare California





Tongyan Tian, CDFA

A: Partial purified virions of citrus yellow vein clearing virus (CYVCV). **B:** Aggregate of CYVCV virions. Bars = 200 nm.

CYVCV

Symptoms variable.

Does not usually kill trees. In China, yield losses of about 20 percent have been reported in lemon.

CYVCV has been found in India, Turkey, Pakistan, China, and Iran.

Most citrus susceptible



Lemon tree infected with CYVCV
(Source: Tim Riley, APHIS-PPQ)



CYVCV-Disease Spread

- Spread through grafting, infected propagative materials and rootstocks and contaminated tools and equipment.
- Not transmitted by seed
- Insect transmitted

Insect Transmission of CYVCoV

- Citrus whitefly (*Dialeurodes citri*) and three species of aphids—green citrus, melon or cotton, and cowpea (*Aphis spiraecola*, *A. gossypii*, and *A. craccivora*); all four reported vectors are in California.
- Insect transmission is probably the main transmission pathway



Dialeurodes citri
Lyle Buss, UFL



A. gossypii Melon aphid

http://aphid.aphidnet.org/Aphis_craccivora.phpgreencitrus aphid Jensen 2011



Results of CYVCoV Testing To Date

- 586/2,237 survey near Tulare tested positive by RT-qPCR, conventional PCR. 584 in City of Tulare.
- Many different citrus species and varieties, most with no symptoms.
- 0/68 including *Vitis* sp., *Malva* sp., *Phaseolus* sp., *Brassica* sp.



Peter Abrahamian,
USDA ARS

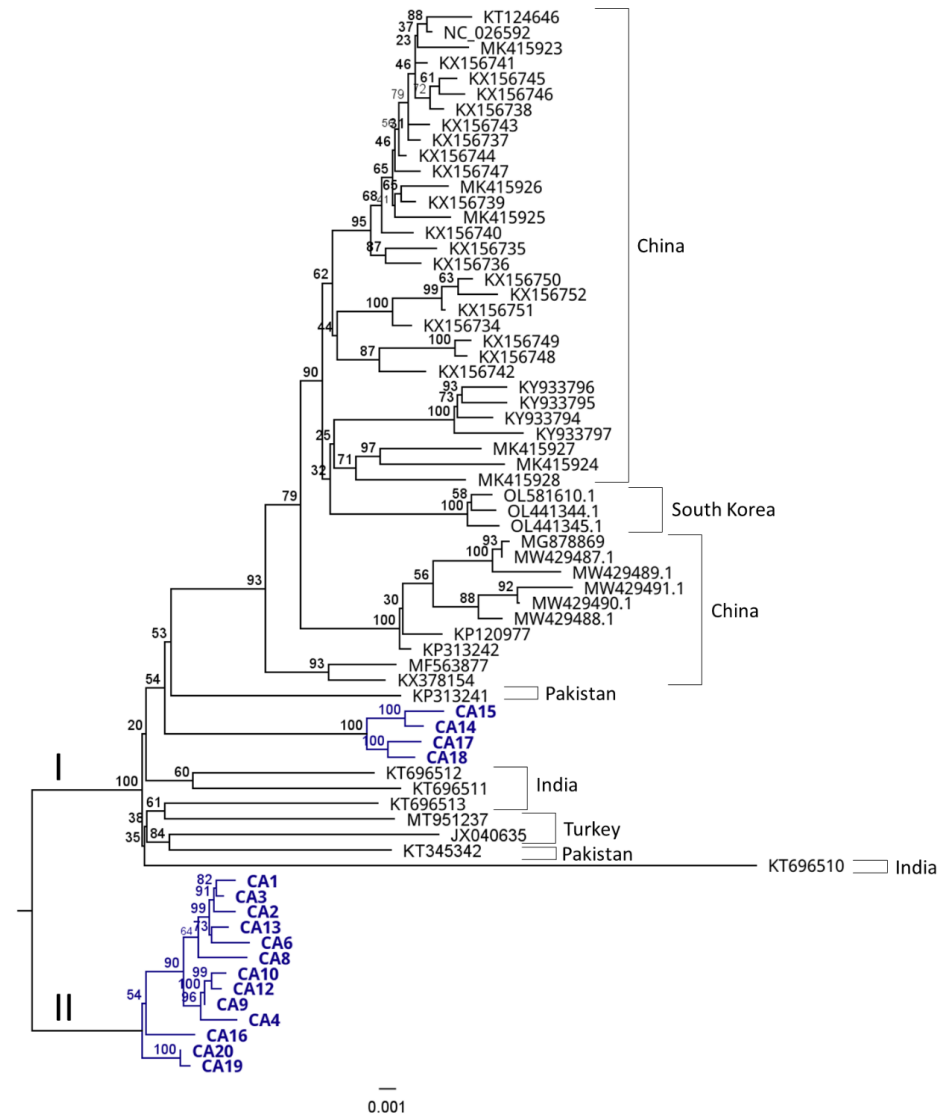
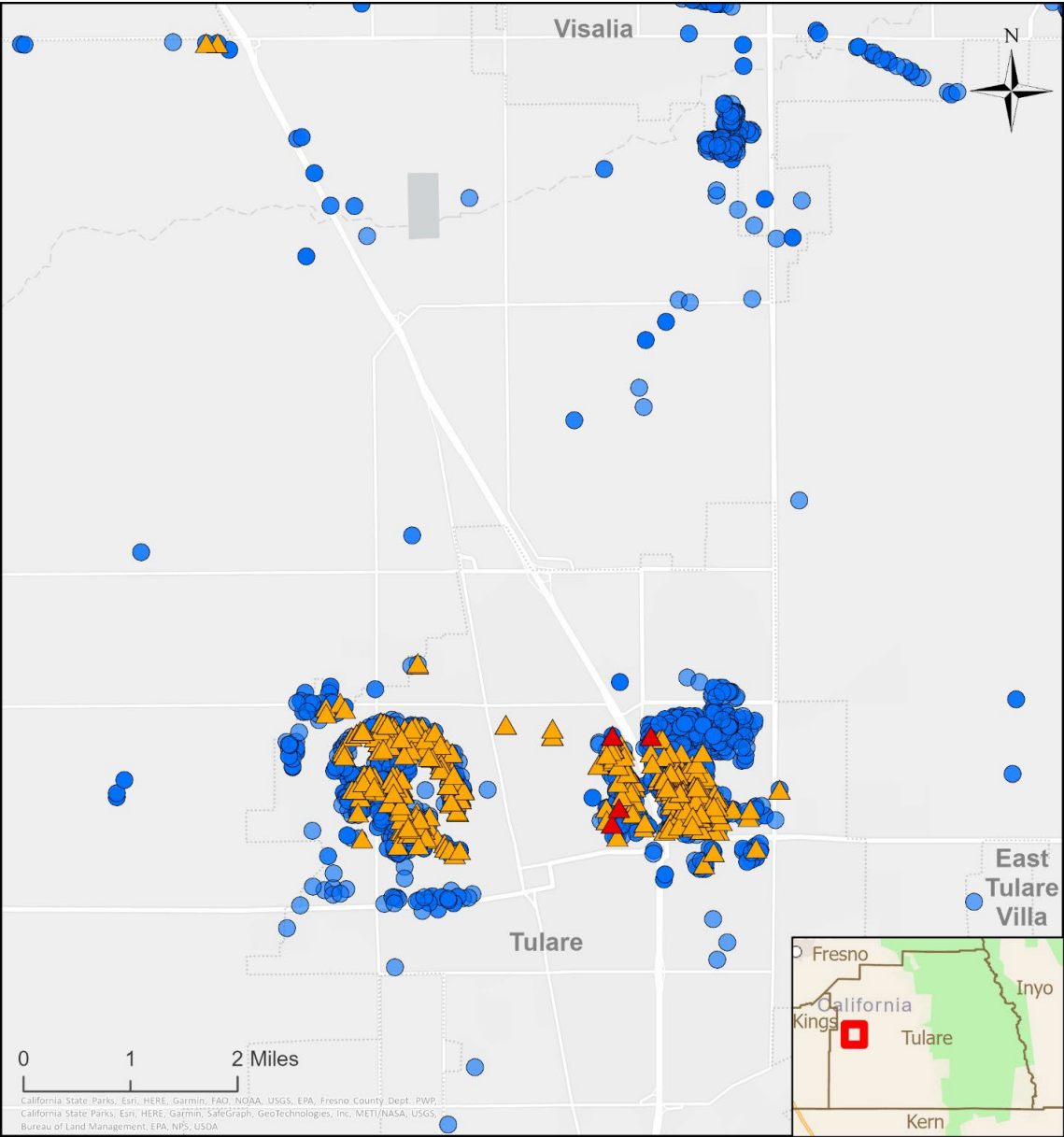


Figure 4. Maximum likelihood tree of 69 citrus yellow vein clearing virus genomes. Phylogroups I and II are indicated on the two major clades.

CYVCV: Tulare, California





CYVCV Infected Lemon



CYVCV Infected Meyer Lemon on Sour Orange Rootstock



CYVCV Infected Sour Orange



CYVCV

- All citrus plants on hold in Tulare
- Disease monitoring
- Nursery monitoring

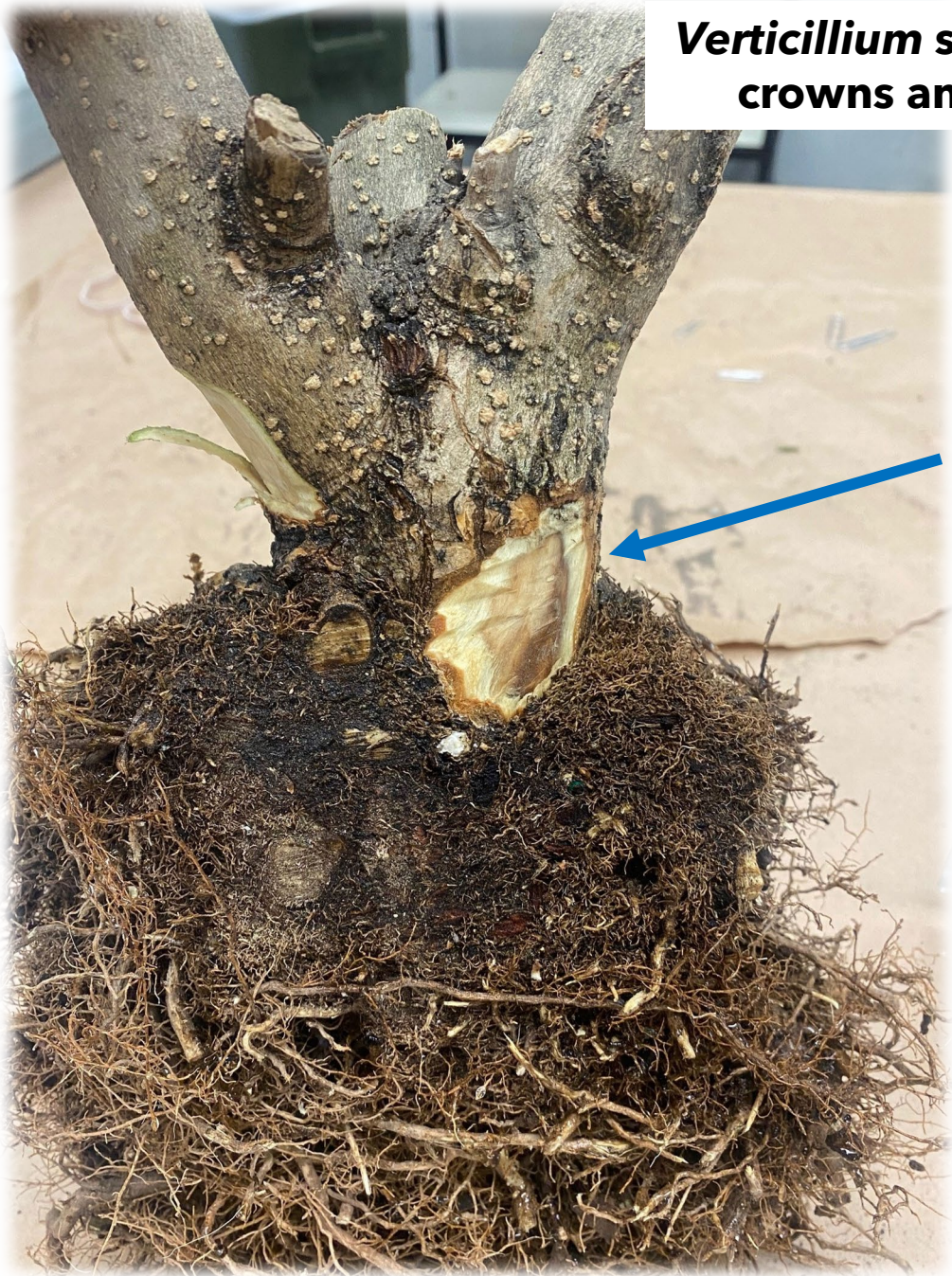


Wax Leaf Privet
***Lingustrum japonicum* 'Texanum'**

Landscapes in LA and Marin Co.



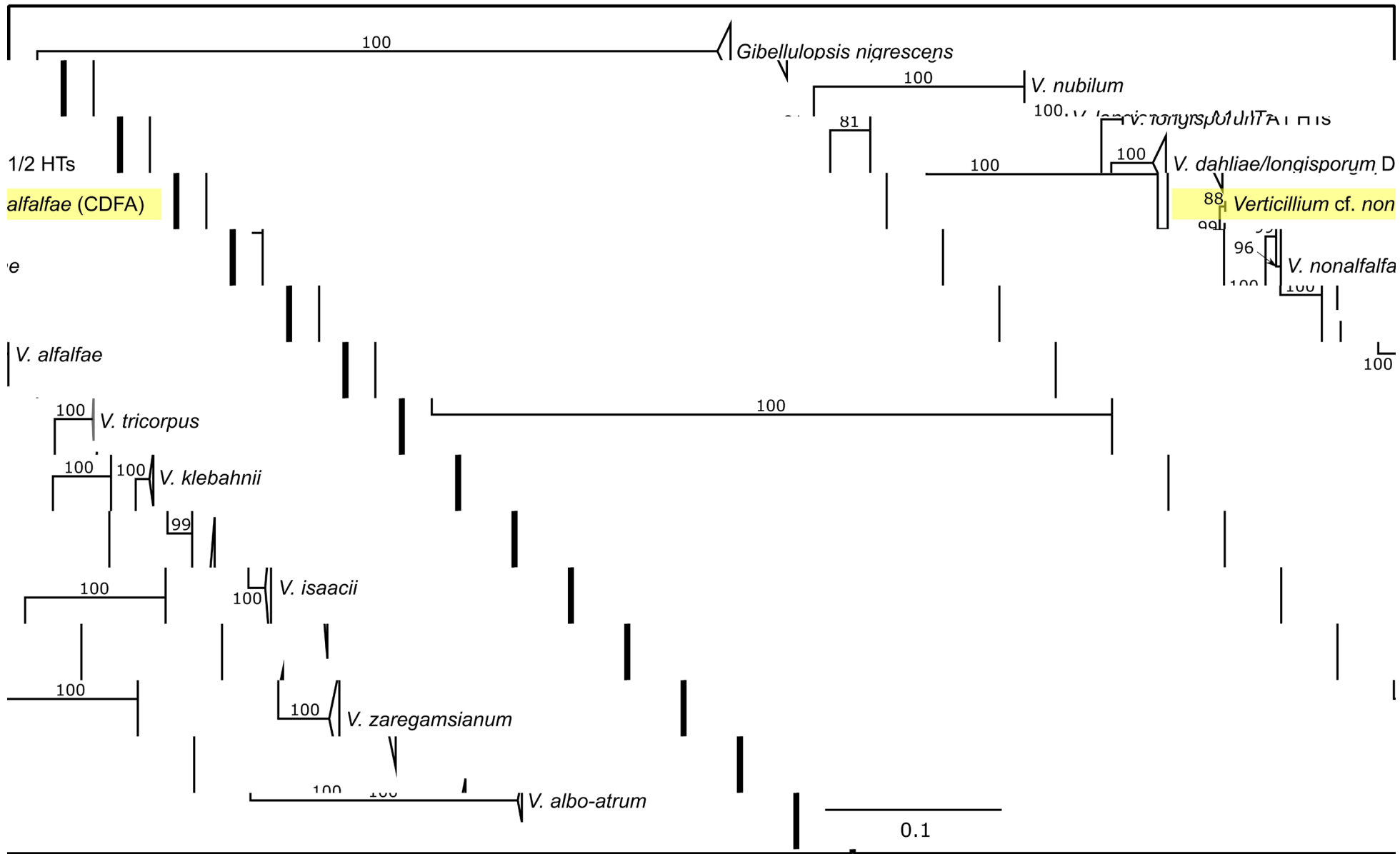
Verticillium sp. was detected from roots, crowns and lower trunks in culture



Suzanne Latham







Verticillium nonalfalfae

Inderbitzin *et al.* 2011 Plos One

Hops, kiwifruit, spinach, solanaceous plants (eggplant, potatoes) and tree of heaven (*Ailanthus altissima*)

* Combined ACT, EF, GPD and TS Tree Phylogenetic analysis from Sebastian Albu





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