



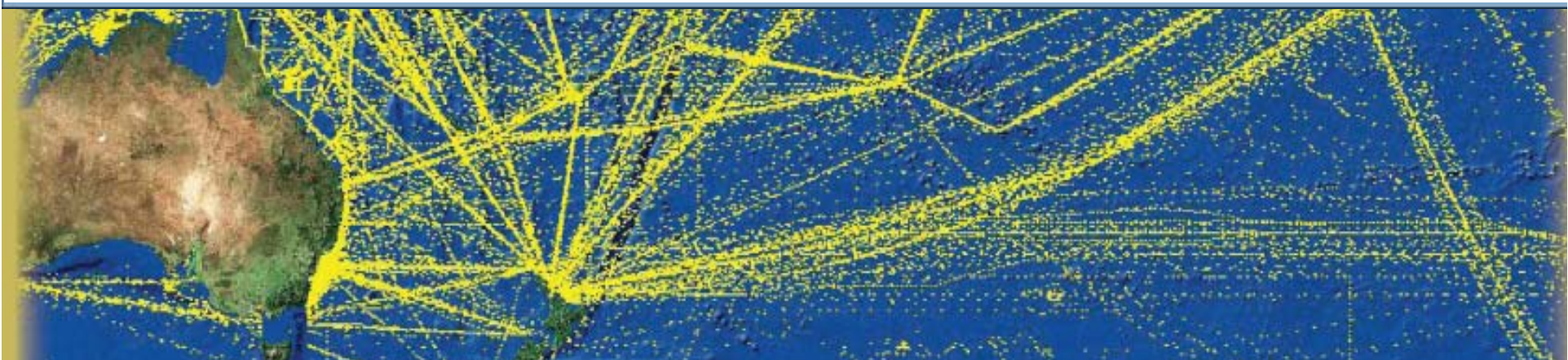
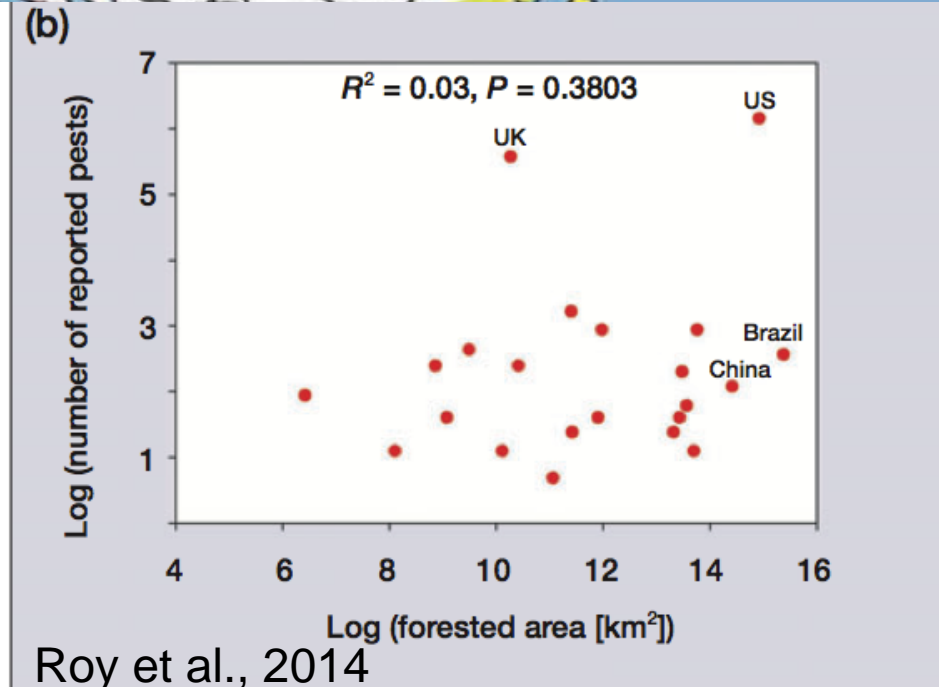
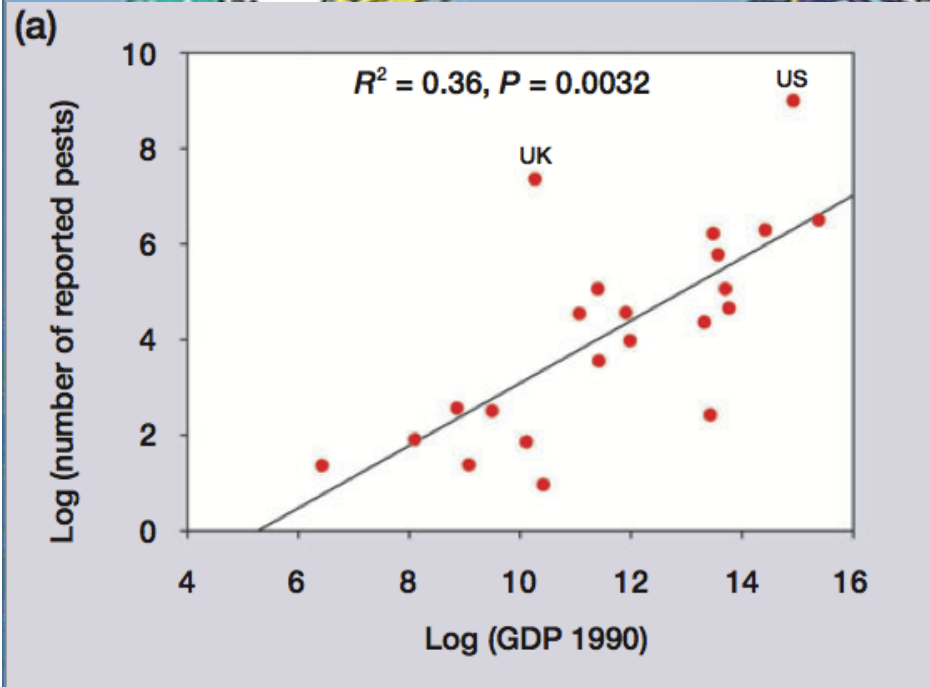
# Laurel wilt: An update on biology and management...*and Implications for the Everglades*



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*Xyleborus glabratus* – redbay ambrosia beetle

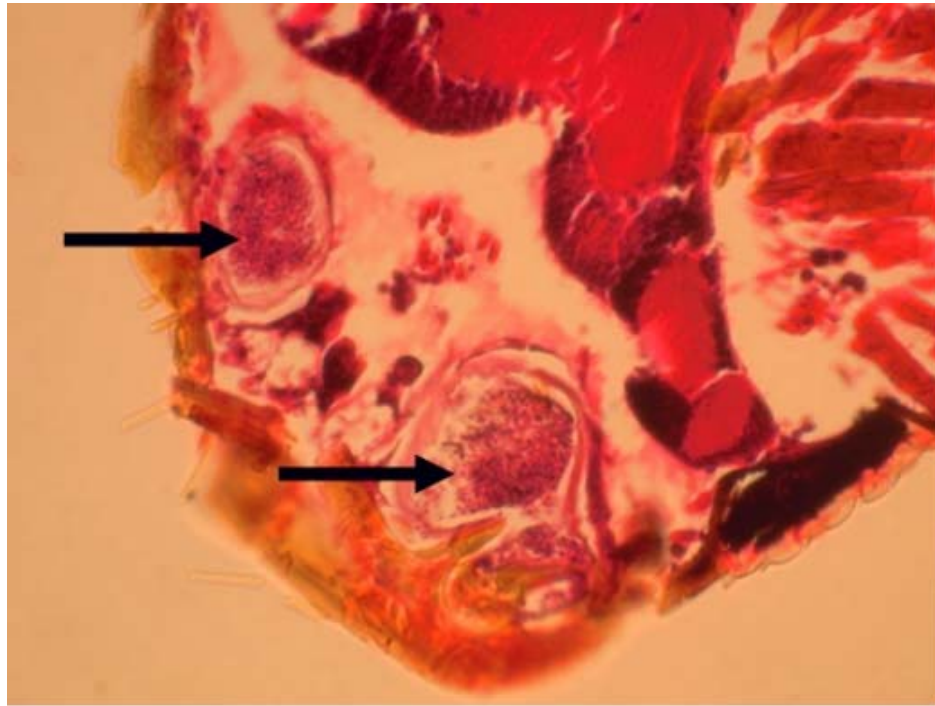


**Clonal symbiosis!**

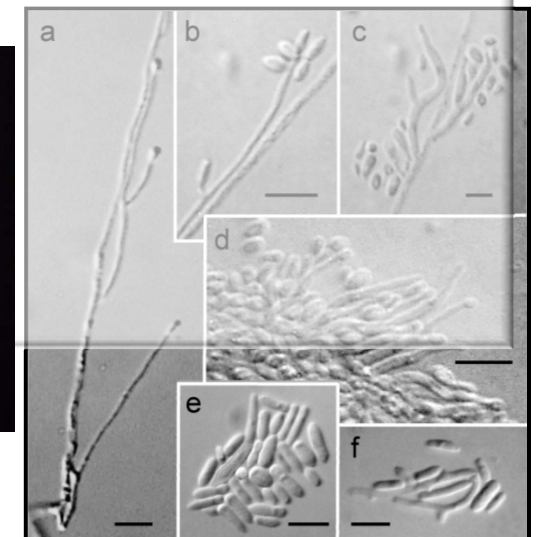
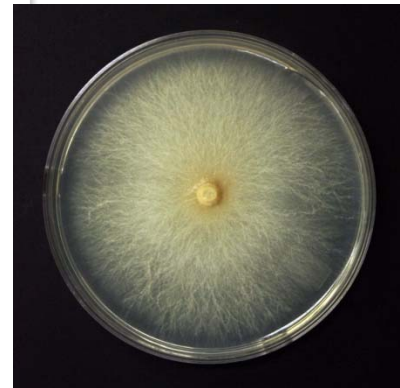
*Raffaelea lauricola* - Ophiostomatales



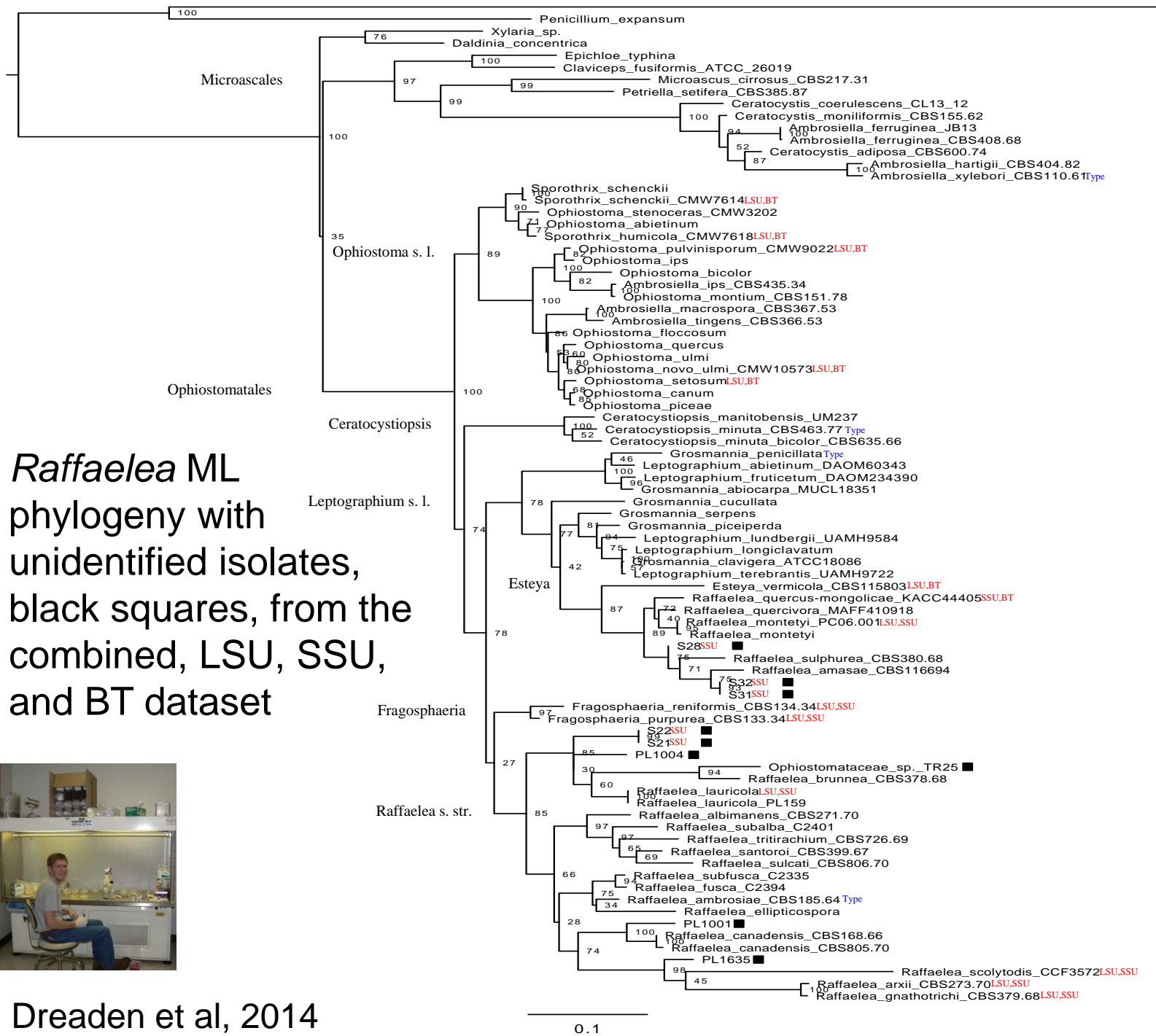
# *Raffaelea lauricola*



- Primary fungal symbiont
- Ophiostomatales
- 1<sup>st</sup> known ambrosia beetle symbiont to cause a systemic vascular wilt



Photographs by: Fraedrich et al. 2008, Harrington et al. 2008



*Raffaelea* ML  
 phylogeny with  
 unidentified isolates,  
 black squares, from the  
 combined, LSU, SSU,  
 and BT dataset

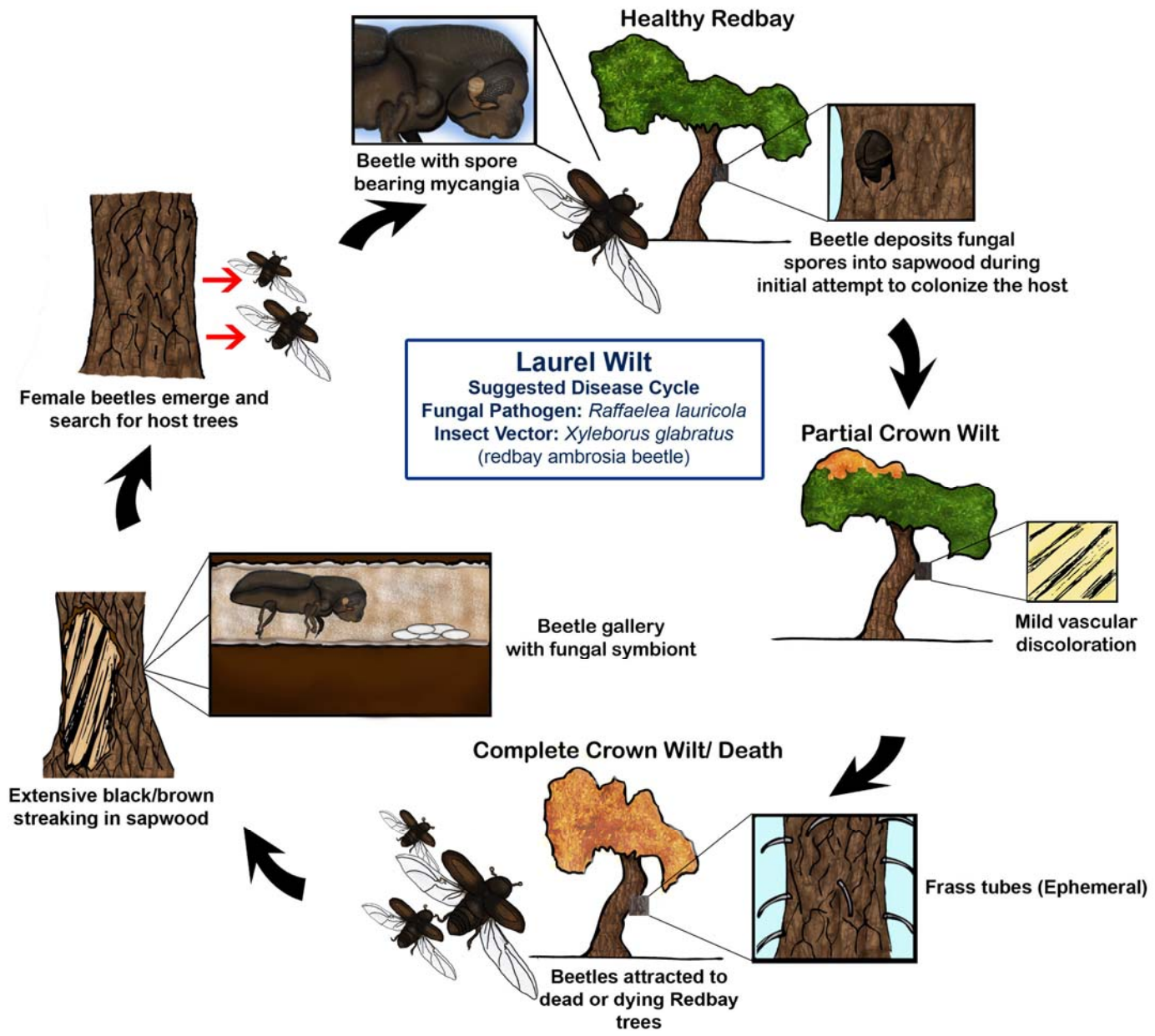




Ambrosia beetles are typically harmless





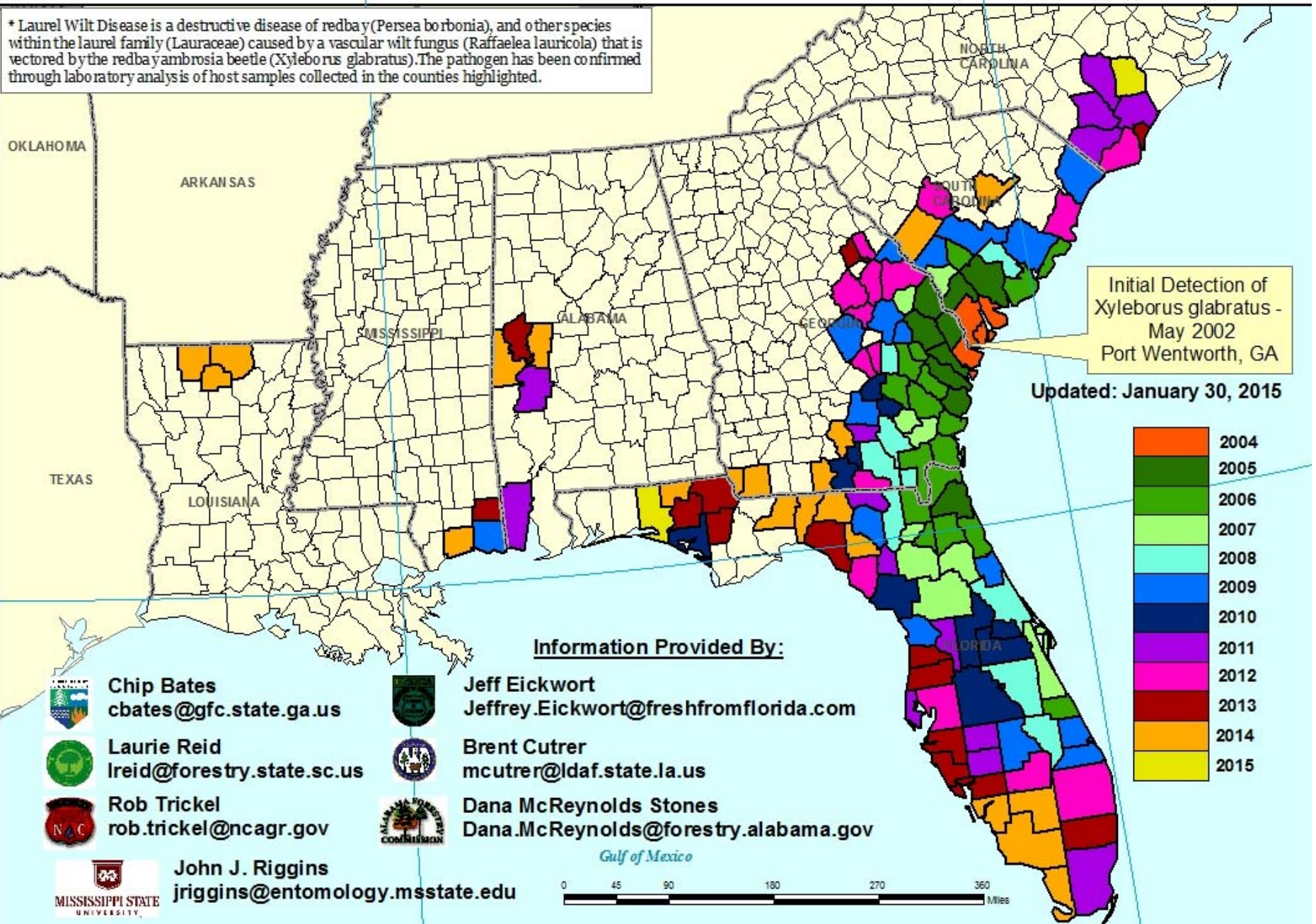


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Last Revised 10/2014

# Distribution of Counties with Laurel Wilt Disease\* by year of Initial Detection

\* Laurel Wilt Disease is a destructive disease of redbay (*Persea borbonia*), and other species within the laurel family (Lauraceae) caused by a vascular wilt fungus (*Raffaelea lauricola*) that is vectored by the redbay ambrosia beetle (*Xyleborus glabratus*). The pathogen has been confirmed through laboratory analysis of host samples collected in the counties highlighted.



# Known hosts in the USA

*Persea palustris* – Swamp bay

*Persea humilis* - Silkbay

*Persea americana* - Avocado

*Persea indica*\*

*Cinnamomum camphora* - Camphortree

*Sassafras albidum* - Sassafras

*Umbellularia californica* – California bay laurel\*

*Laurus nobilis* – European bay laurel

*Lindera benzoin* - Northern spicebush

*Lindera melissifolia* - Pondberry

*Litsea aestivalis* - Pondspice

*Licaria triandra*\* - Gulf licaria

*Ocotea coriacea*\* - Lancewood

\* = Artificial inoculation



**Many more hosts may remain!**

# Lateral transfer to additional vectors



*Xyleborus glabratus*



*Xyleborus affinis*



*Xyleborus volvulus*



*Xyleborus ferrugineus*



*Xyleborinus gracilis*



*Xyleborinus saxeseni*



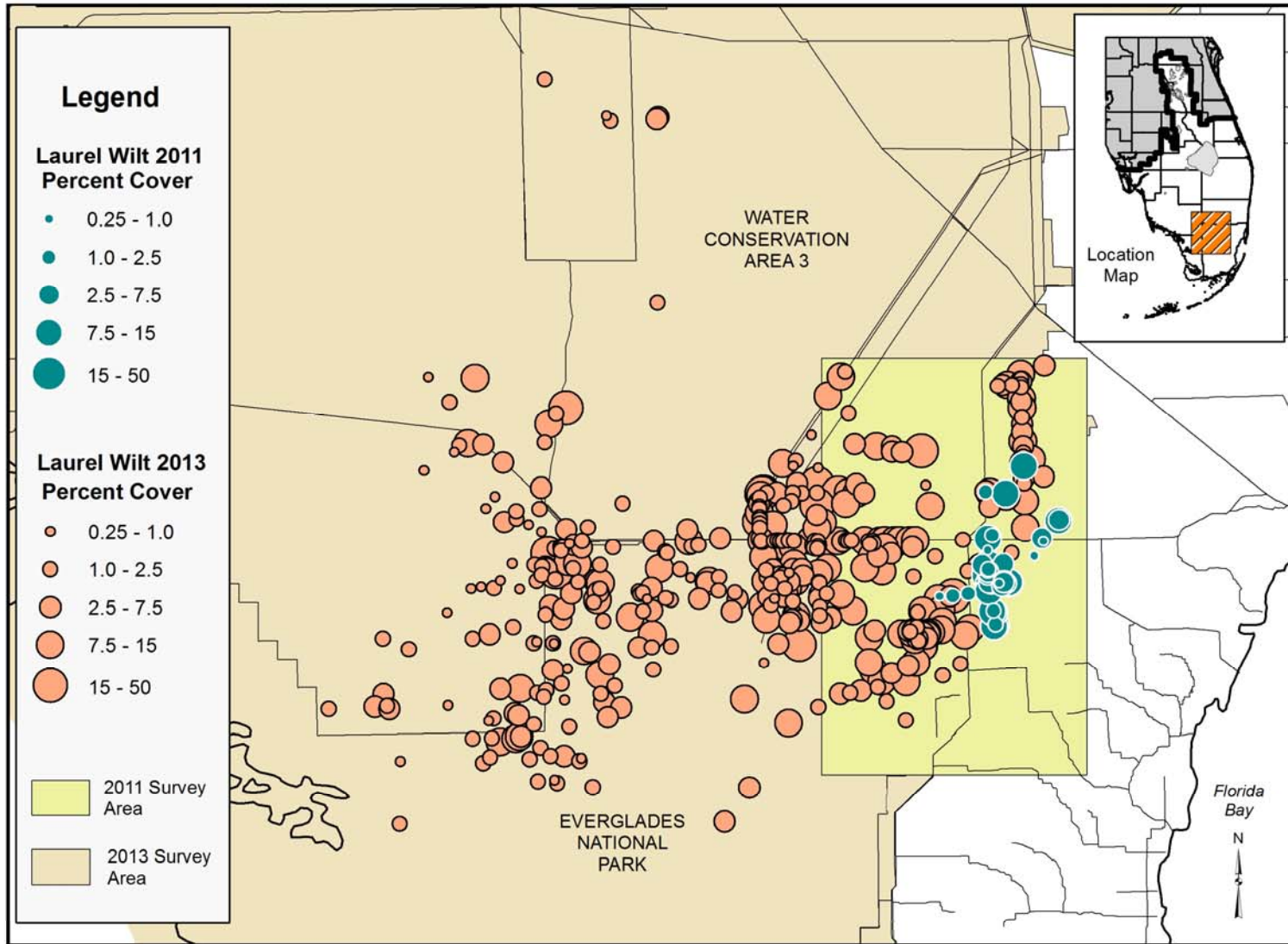
*Xylosandrus crassiusculus*

**Transfer to at least 8 additional species complicates management and regulatory control.**

Ploetz et al.



***426,988,027.....  
and counting!!!***



4,925 to 133,740 ha in 26 months  
 Rogers et al., 2014



Photo: LeRoy Rodgers

# Laurel wilt is devastating tree islands in the Everglades

- ❑ Everglades are globally significant ecosystem
- ❑ Tree islands are critical to ecosystem function
- ❑ Laurel wilt is killing up to 90% of tree canopies
- ❑ Invasion of disturbed areas by invasive species is highly likely
- ❑ Selection of resistant trees for restoration is underway

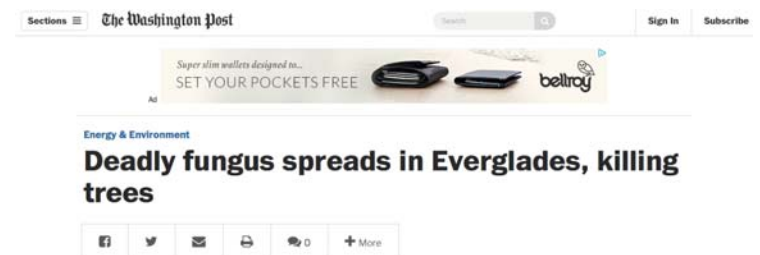
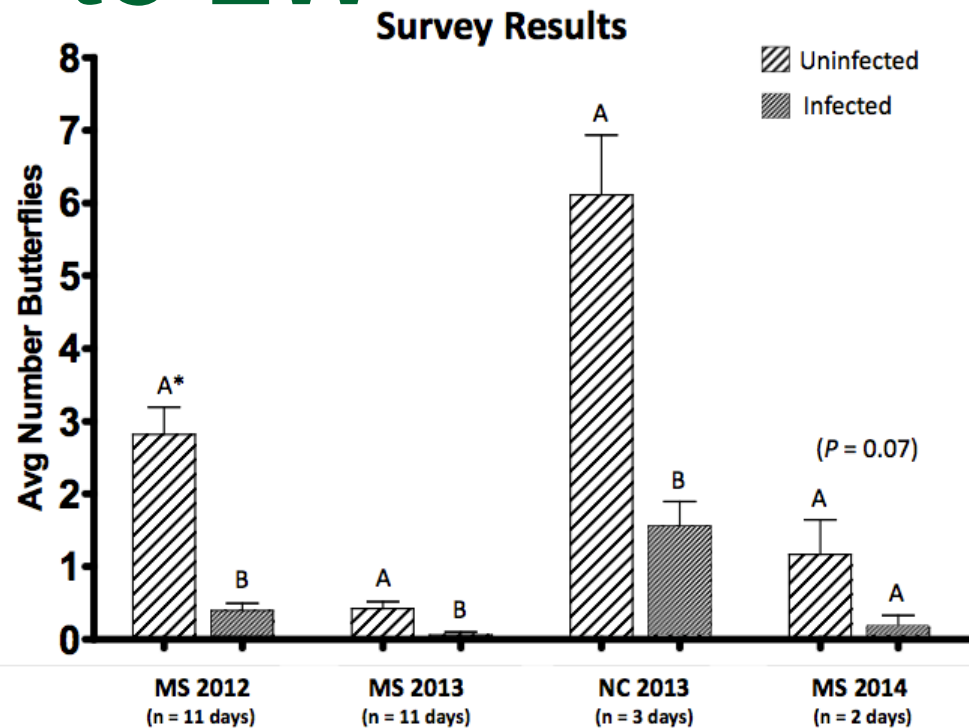




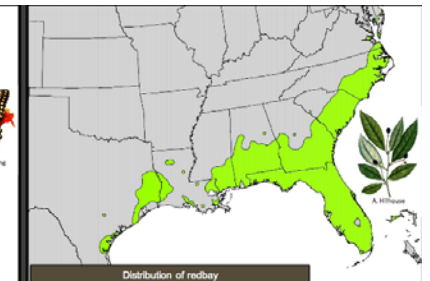
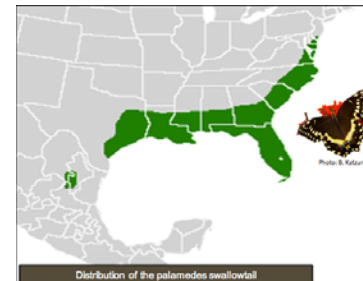


Photo: Randy Ploetz

# Palamedes swallowtail (*Palamedes papillio*) populations are declining due to LW



Formby et al., in review



# Beetles killing our 'Tu lee' must be stopped

on FEBRUARY 26, 2014



**By James E. Billie**

My grandparents and their forefathers on my mother's side of the family were practitioners and users of traditional indigenous medicine.

As a child I would go along with Grandmother to collect medicine plants for the Medicine Maker.

On many occasions one particular plant or tree was selected. A carefully chosen branch full of leaves would be snapped and taken.

*Tu lee* (redbay) was one of those trees. The leaves have many uses such as repelling evil spirits or easing the pain of arthritis. And the list goes on and on.

Since moving to Brighton Seminole Reservation, I reacquainted myself with the landscape of the geographic areas. One of the first plants I sought was *Tu lee*. Traveling north on County Road 721 from the Brighton Reservation to State Road 70, then taking a left (west), you start seeing an abundance of *Tu lee* on both sides of the road.

*The Seminole Tribune*

# National Impact to Tribes

## California bay laurel

October 2008, Volume 92, Number 10  
Page 1469  
<http://dx.doi.org/10.1094/PDIS-92-10-1469A>

### Disease Notes

#### California Laurel Is Susceptible to Disease Caused by *Raffaelea lauricola*

**S. W. Fraedrich**, Southern Research Station, USDA  
Athens, GA 30602



## Sassafras

October 2009, Volume 93, Number 10  
Page 1079  
<http://dx.doi.org/10.1094/PDIS-93-10-1079B>

### Disease Notes

#### First Report of Laurel Wilt Disease Caused by *Raffaelea lauricola* on Sassafras in Florida and South Carolina

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Commission, Forest Health Specialist, Southeast Georgia, Statesboro  
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# What's being done?

- Propagation of tribal trees to preserve germplasm
- Coppice management study
- Outreach and awareness
- Funding from Farm Bill and USDA-FS, R8

