

The background of the slide is a photograph of tree branches. On the left side, there are vibrant green leaves, while on the right side, the leaves are brown and appear to be withered or dead, illustrating the concept of 'wilt'.

Redbay and Laurel Wilt: The search for resistant trees

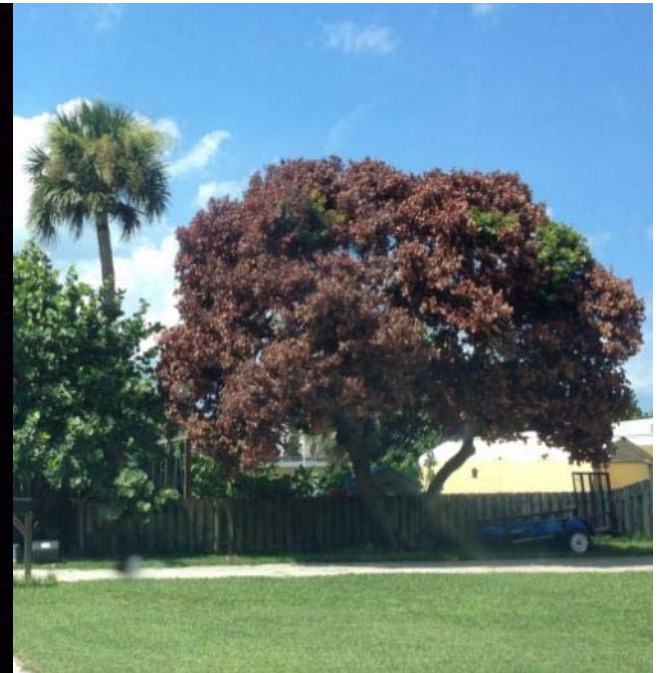
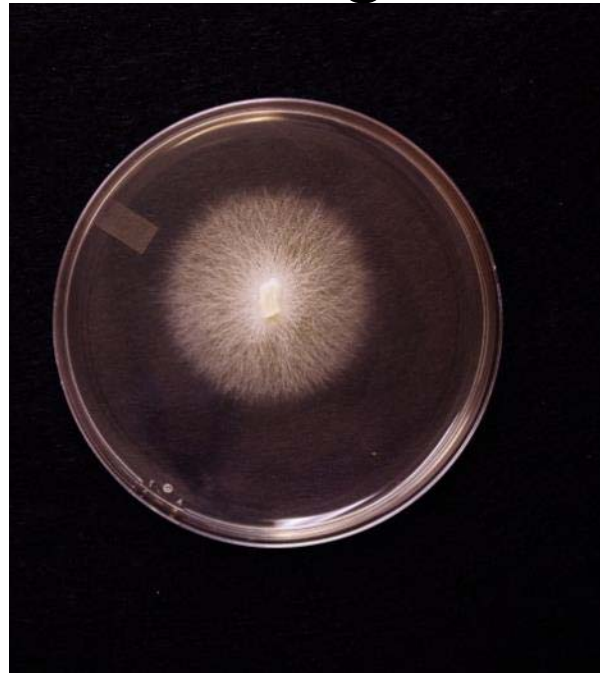
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Laurel Wilt

Vector

Pathogen

Host



**Redbay Ambrosia
Beetle**
Xyleborus glabratus
(exotic)

Raffaelea lauricola
(exotic)

Lauraceae
Swamp bay, redbay,, silkbay, avocado,
sassafras, pondspice, pondberry, spicebush,
camphor, bay laurel, gulf licaria.....



Redbay (*Persea borbonia*) trees with laurel wilt symptoms; wilted canopy with attached brown leaves

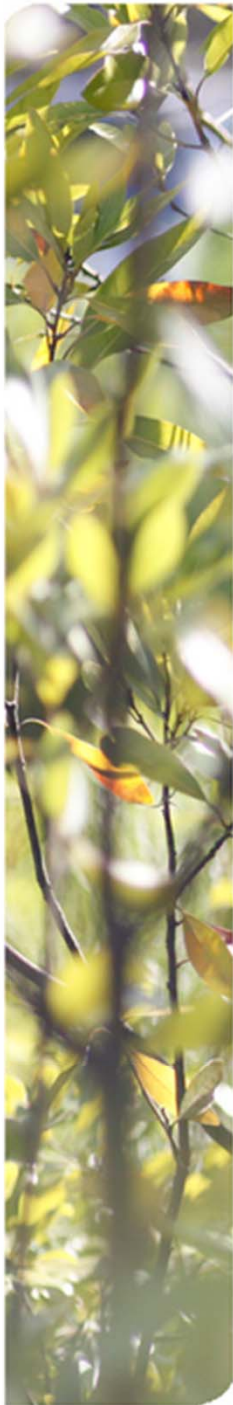
Daytona Beach, FL

Photo: Don Spence



Georgia

Photo: Chip Bates



IMPACTS OF LAUREL WILT

Raffaelea lauricola

A case of unprecedented damage and radiating effects for a single-strain pathogen.



500 MILLION TREES KILLED

Florida avocado production is already affected by laurel wilt

AVOCADO MORTALITY

red bay (*Persea* spp.) used in 95% of tribal medicines

CULTURAL IMPLICATIONS
Miccosukee & Seminole cultural heritage lost

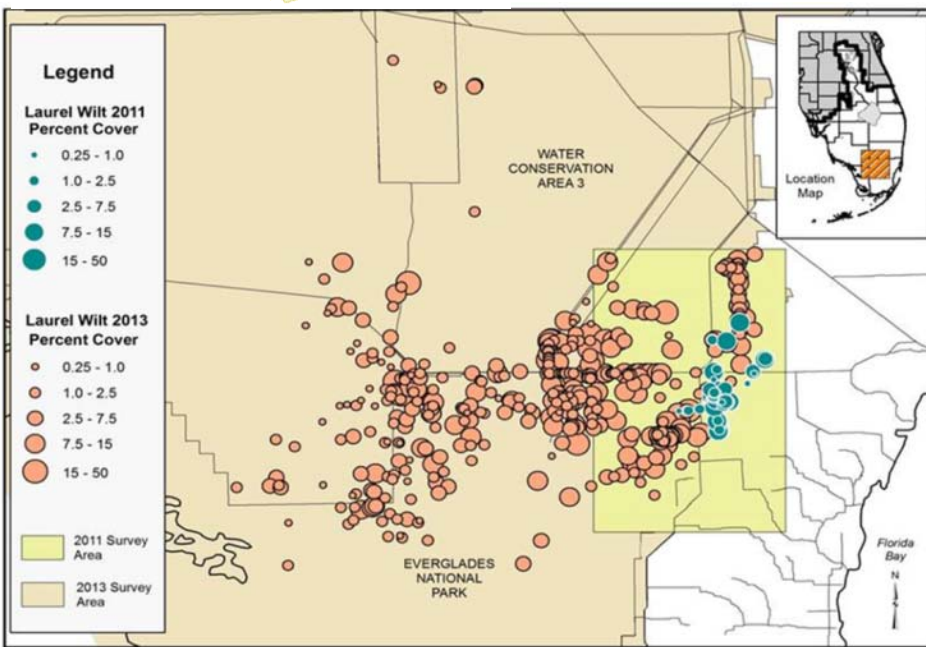
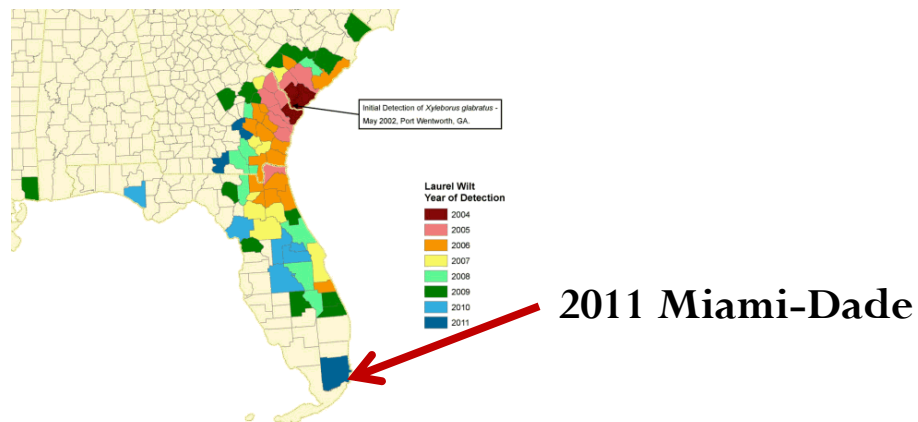
RARE SPECIES IMPACTED
Palamedes papillio dependent on red bay trees
...orchid species depend on butterflies

EVERGLADES THREATENED
laurel wilt devastating tree islands killing up to 90% of canopies
invasive species may fill gaps left by dead trees

AT RISK FOR THE FUTURE

1. other native host species
2. known host species globally
3. unknown ripple effects!

Laurel Wilt in the Everglades



Aerial surveys for symptomatic trees

- 2011 range: 4,925 ha
- 2013 range: 133,740 ha
- Expansion rate: 26.6 km/yr
- Maximum nearest neighbor distance: 11.8 km

Scientific Notes

1247

EXPANSION AND IMPACT OF LAUREL WILT IN THE FLORIDA EVERGLADES

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Photos: (top) USDA Forest Service (bottom) Rodgers et al. 2014

Laurel Wilt Resistance Screening Program

Objectives:

- Identify surviving redbay germplasm
- Assess fungal genetic diversity
- Optimize inoculation procedures
- Resistance screening trials



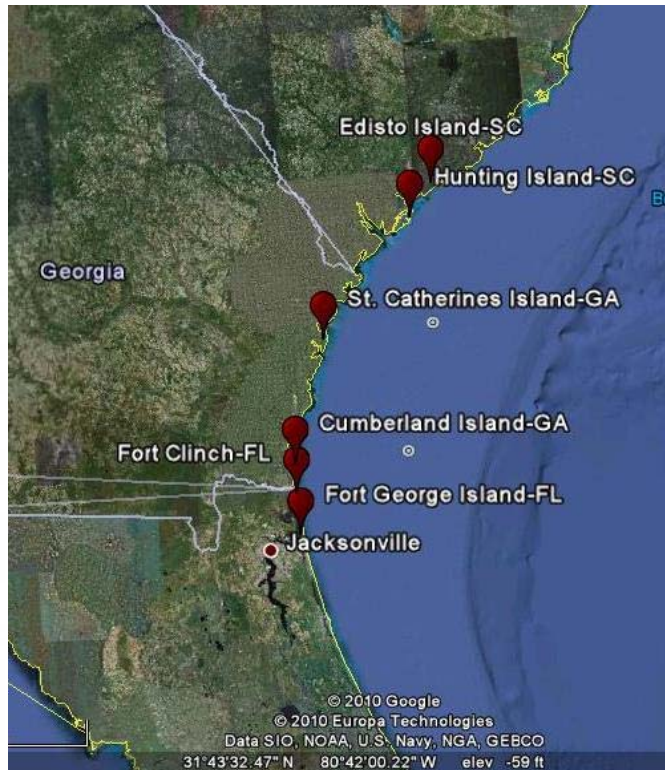
Identification and Propagation

REFEREED RESEARCH

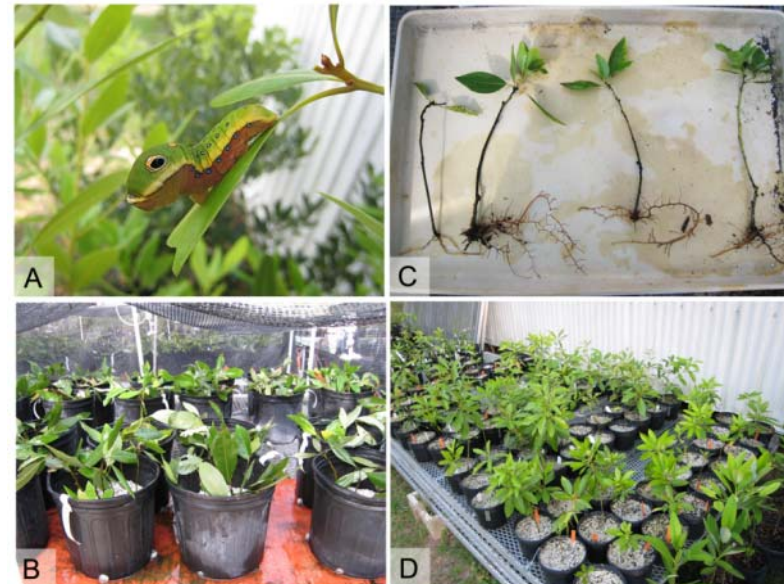
Vegetative propagation of putatively laurel wilt-resistant redbay (*Persea borbonia*)

Marc A Hughes and Jason A Smith

Native Plants Journal 2014, vol. 15, no. 1

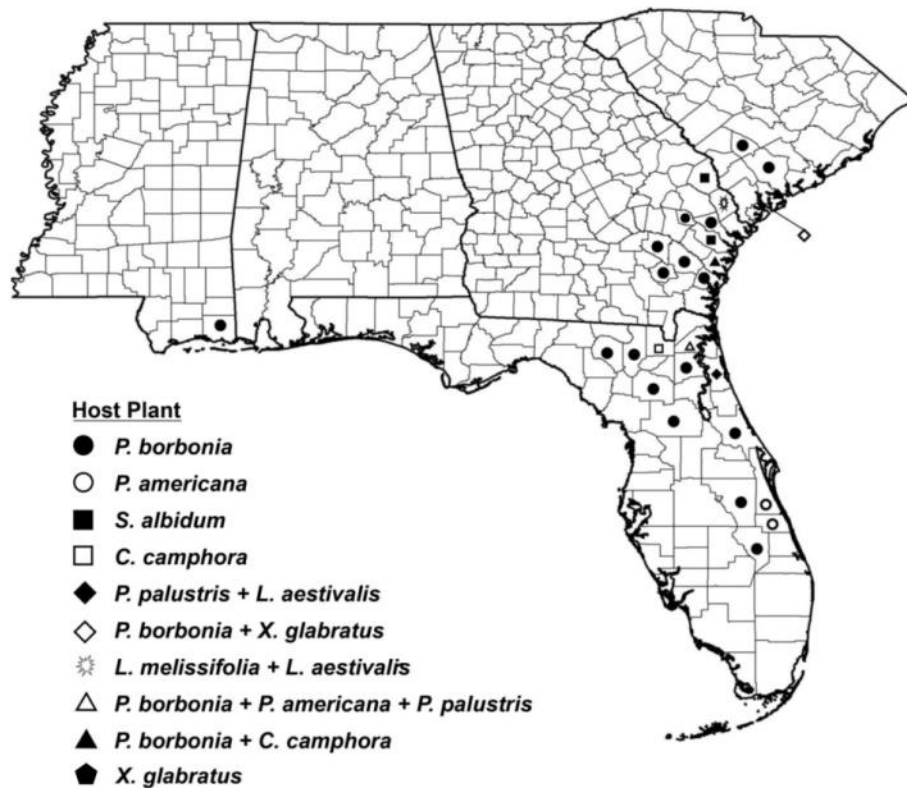


- Sites with high mortality
- Asymptomatic survivors
- Sampled \approx 100 Trees



Genetic Diversity

Local *R. lauricola* diversity AFLP markers (218)



Results

- Population \approx 99% identical
- Likely 1 importation event
- Single dominant isolate (clonal in USA)

Inoculation Protocols

Forest Pathology



For. Path.
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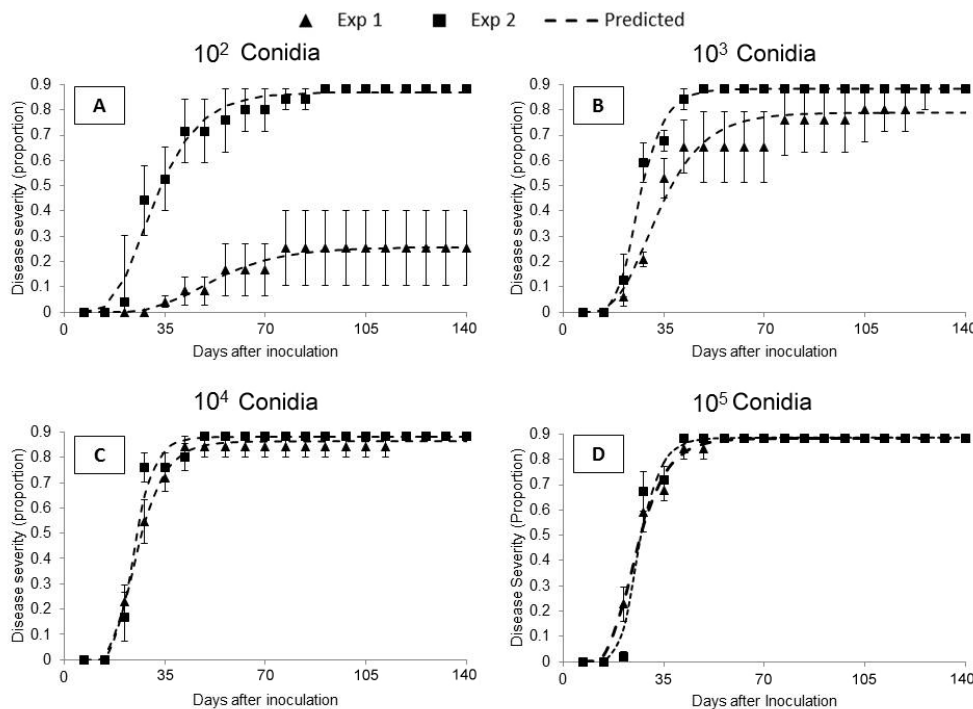
doi: 10.1111/efp.12134

Responses of swamp bay, *Persea palustris*, and avocado, *Persea americana*, to various concentrations of the laurel wilt pathogen, *Raffaelea lauricola*

By M. A. Hughes^{1,5}, S. A. Inch², R. C. Ploetz³, H. L. Er⁴, A. H. C. van Bruggen⁴ and J. A. Smith¹

Test host response to differing inoculum concentrations

- 100 fungal spores can be lethal to swamp bay (threshold level)
- Consistent killer ($10^3 - 10^5$ conidia)



Inoculation Trials

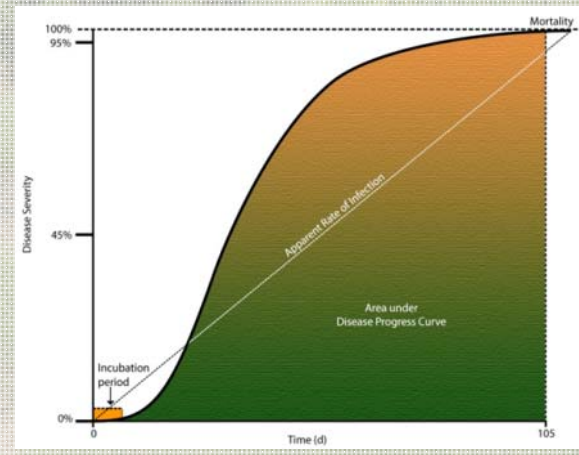


Inoculation Trials

- Field grown plants (Citra FL)
- Inoculum: 3,000 *R. lauricola* spores
- Water inoculated controls
- 60 genotypes screened

Disease Parameters

- Incubation period
- Rate
- Severity
- Mortality
- And more....



3 Weeks Post Inoculation (2012)



Results

- **Most genotypes highly susceptible (95% severity)**
- **3 Tolerant genotypes!**
 - longer to show symptoms
 - slower rate of disease development
 - symptoms less severe
 - 100% survival (2 yrs later)



2014 Trial



Conclusions

- **Survivor trees yielded tolerant germplasm**
- **Basis for restoration plantings and breeding**
- **More genotypes to screen**
- **Potential to add Everglades swamp bay germplasm**



GEER 2015

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- **USDA/APHIS Farm Bill 2014**
- Jason Smith (UF), Randy Ploetz (UF), Albert Mayfield III (USDA Forest Service)
- Forest Pathology Lab (UF)

For questions contact:

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Please join us for a more detailed discussion

Conference on Laurel Wilt Disease and Natural Ecosystems:
Impacts, Mitigation and the Future
June 16-18, 2015 | Coral Springs, Florida

UF | IFAS
UNIVERSITY of FLORIDA

