

Ambrosia beetles associated with laurel wilt in avocado



**Carrillo, Ploetz, Crane (TREC) – Cave (IRREC) – Kendra, Rooney (USDA-ARS) -
UF/IFAS Extension Miami-Dade County - Florida Administrative Avocado Committee**

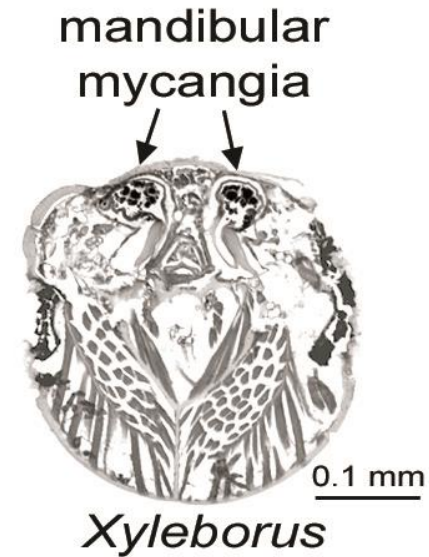


Ambrosia beetles = fungal farmers



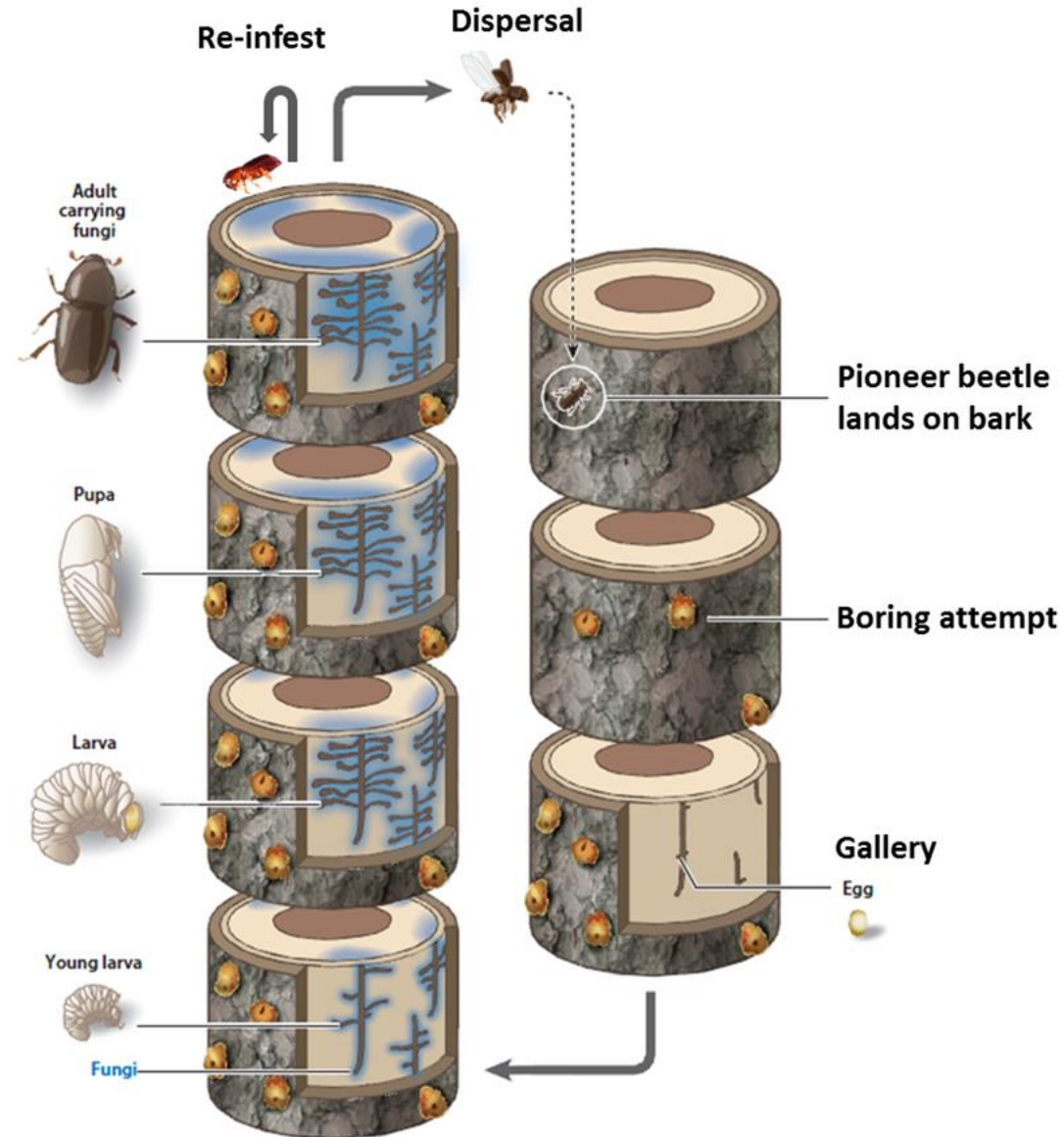
Mycangia

- specialized saclike organ
- selectively maintain and transport fungi during dispersal



Images by Jiri Hulcr, UF-SFRC

Generalized Life-cycle of Ambrosia Beetles



Modified form Six et al. 2011





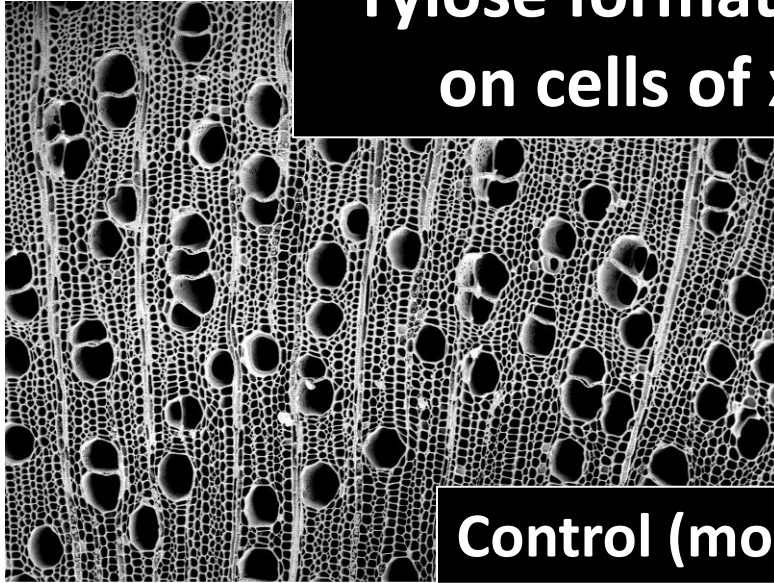


Causal agent : *Raffaelea lauricola*

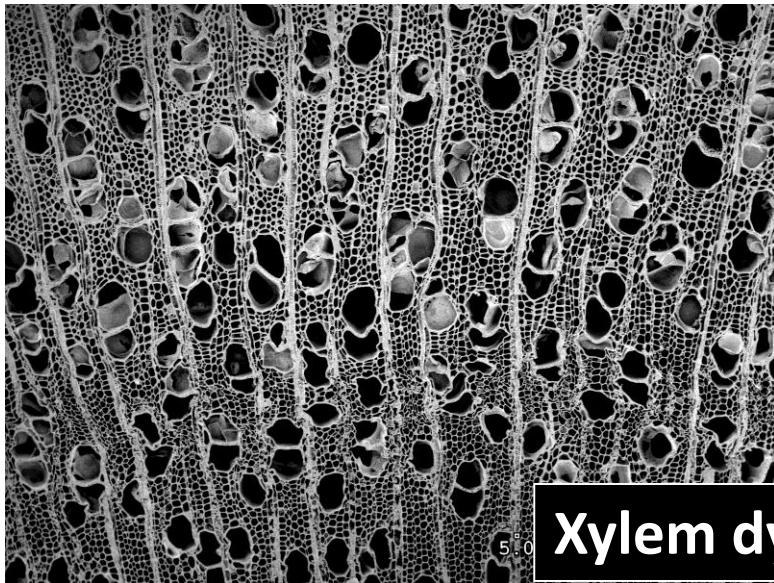
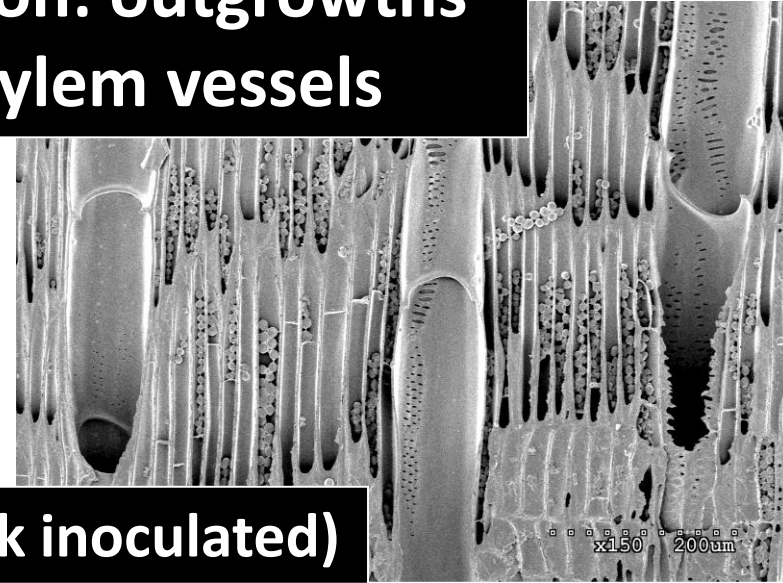


Moves systematically within the host (Lauraceae) and causes vascular wilt

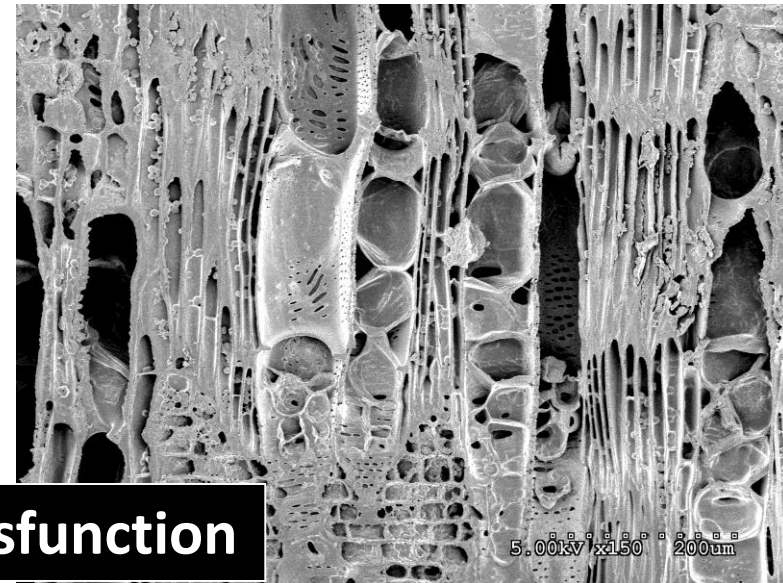
Tylose formation: outgrowths on cells of xylem vessels



Control (mock inoculated)



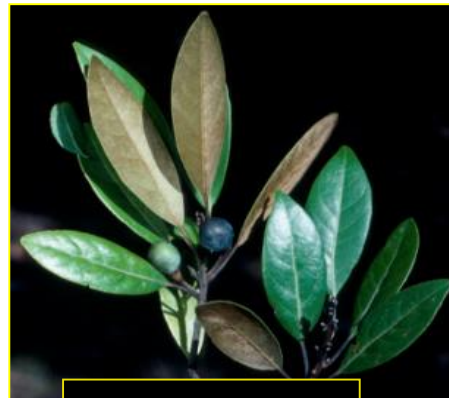
Xylem dysfunction



Xyleborus glabratus, Redbay Ambrosia Beetle (RAB)



- infected ~ 0.5 billion native lauraceous trees with *R. lauricola* in the southeastern U.S.



Persea humilis
Silk bay



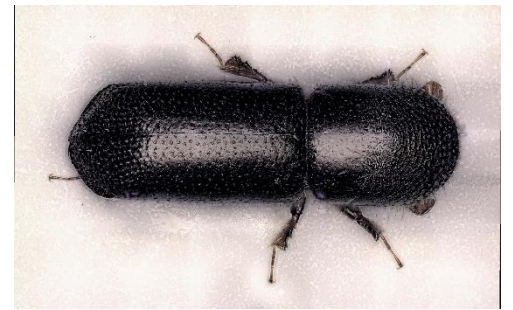
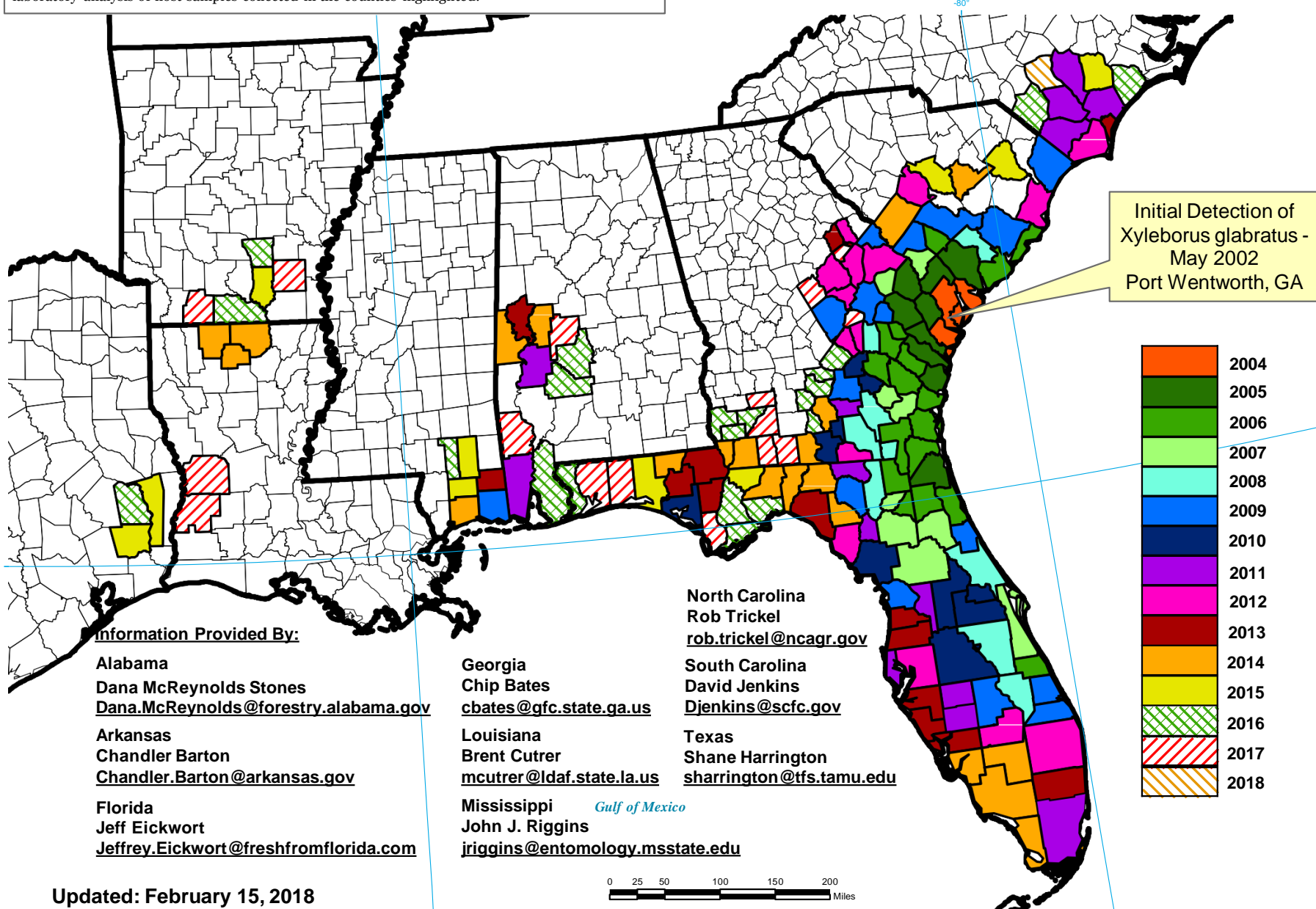
Sassafras albidum



Persea palustris
Swamp bay

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.



Native to Taiwan, Japan & South East Asia

Symptoms



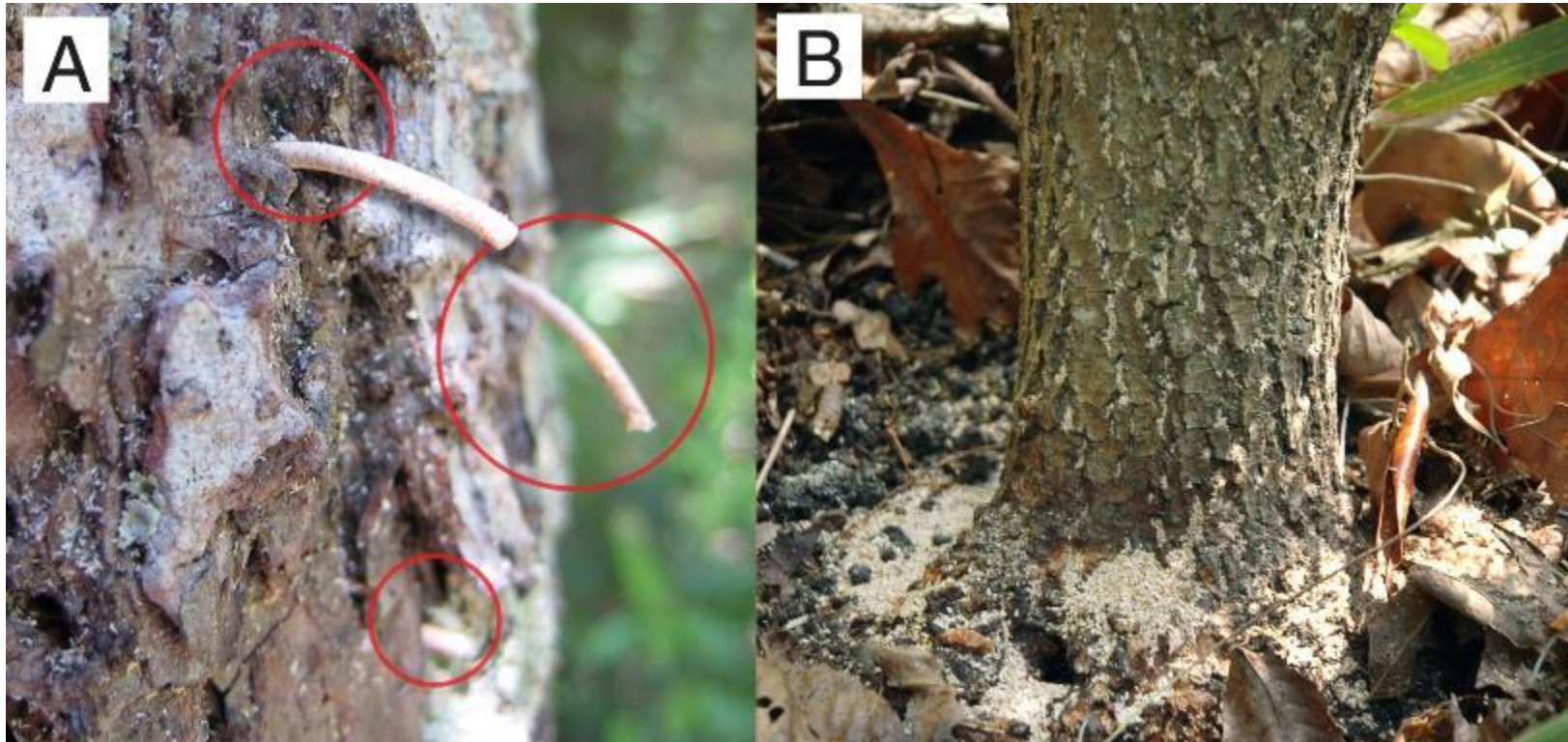
A. wilt in upper crown



B. Complete wilt of canopy



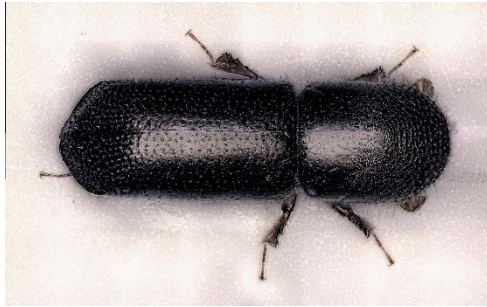
Ambrosia Beetle Boring



A. Frass “toothpicks” or “tubes”

B. Accumulated frass at tree base

Avocado (Persea americana)



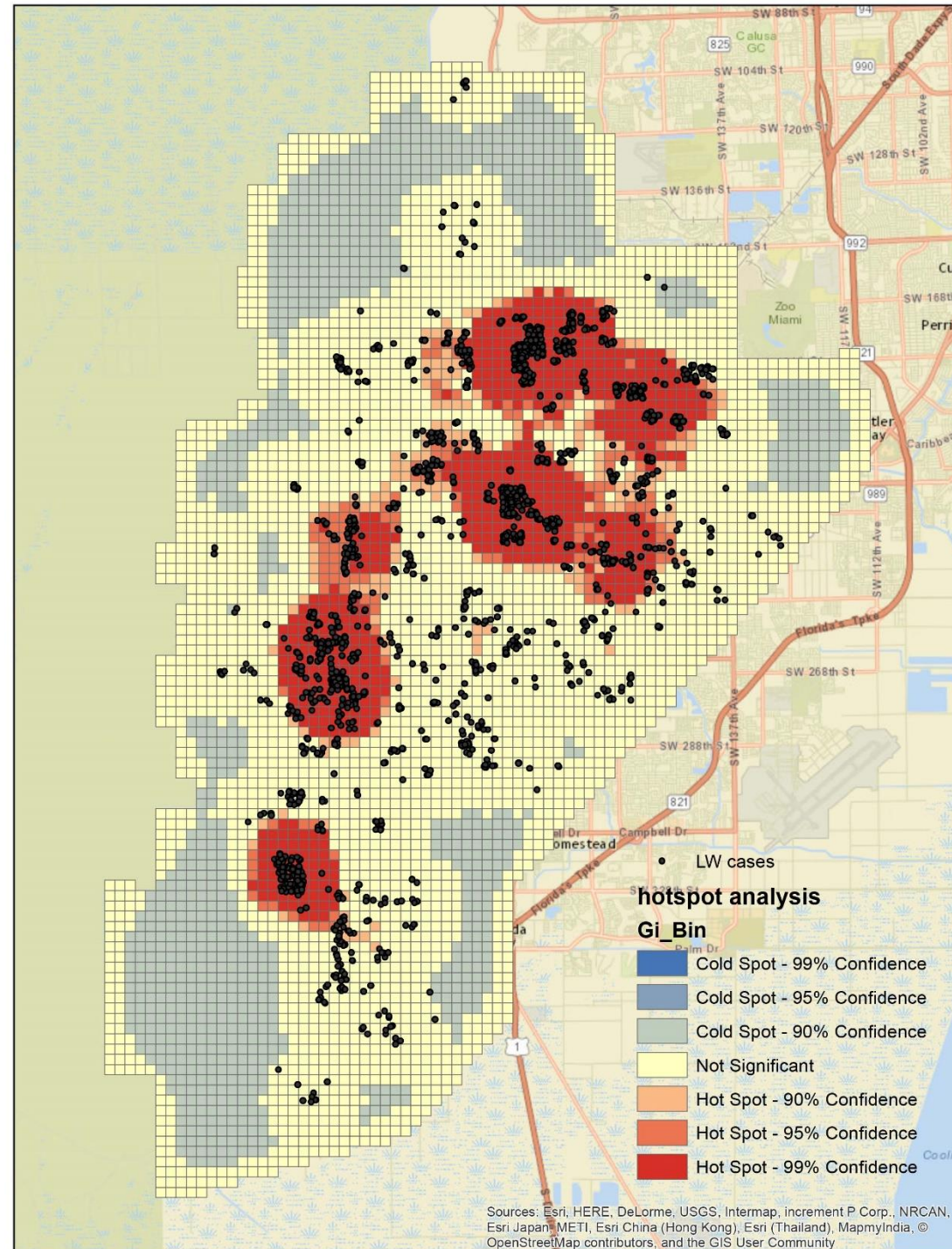
**Avocado is not a good host for
*Xyleborus glabratus***



~200,000 lost to LW

Pathogen spreading in the
apparent absence of *X.
glabratus*

Alternative vectors?



Several species of AB can carry *R. lauricola*



Lateral transfer of a phytopathogenic symbiont among native and exotic ambrosia beetles

D. Carrillo*, R. E. Duncan, J. N. Ploetz, A. F. Campbell, R. C. Ploetz and J. E. Peña

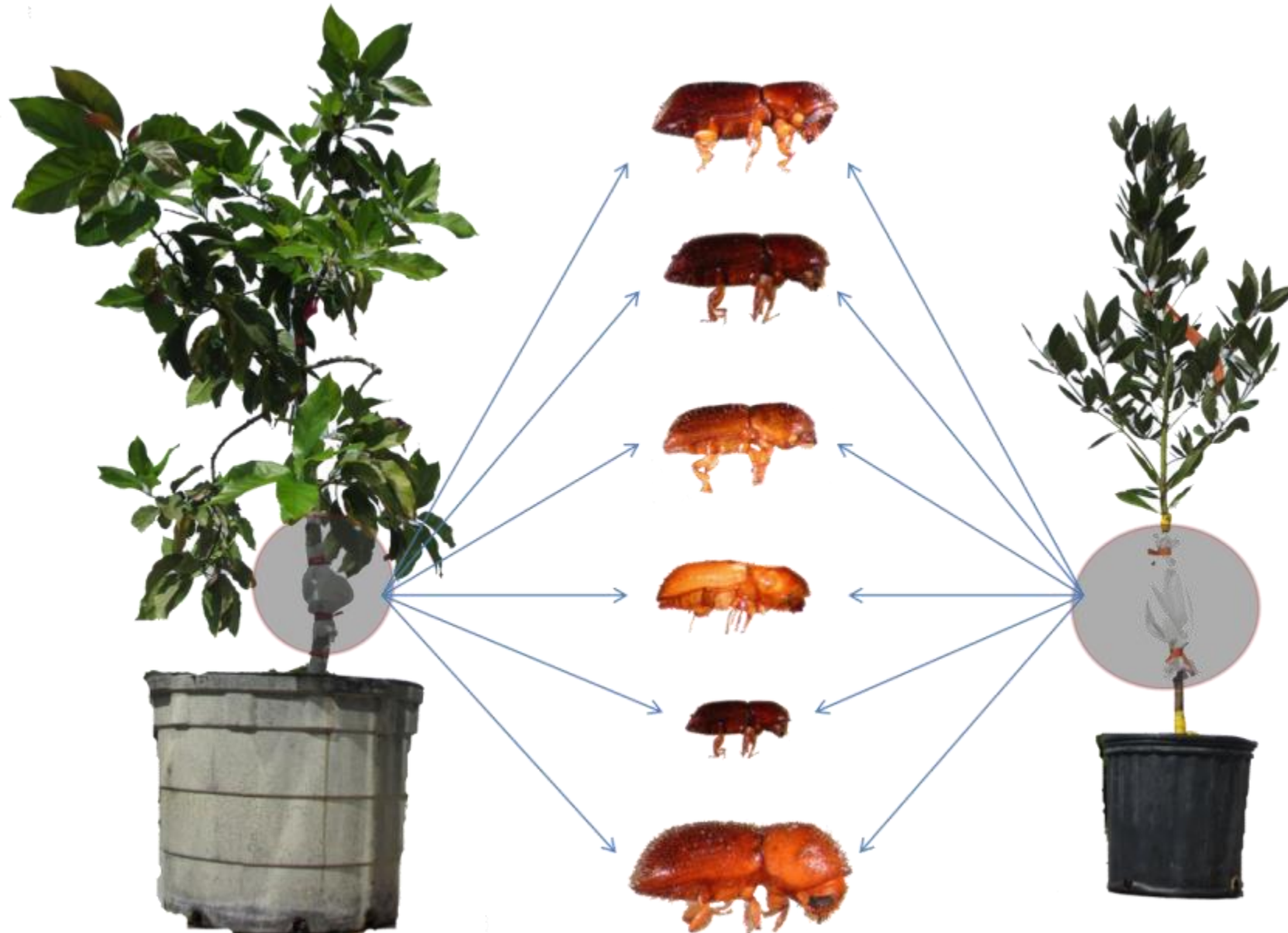
Tropical Research & Education Center, University of Florida, 18905 SW 280 Street, Homestead, FL, 33031-3314, USA

species	n=	No. beetles carrying <i>R. lauricola</i>	probability of a beetle carrying <i>R. lauricola</i>	CFUs Mean \pm SEM	CFU Range
<i>Xyleborus glabratus</i>	50	43	0.86 a	2783.3 \pm 281.9 a	0 - 7800
<i>Xyleborus affinis</i>	41	5	0.12 c	1 \pm 0.6 c	0 - 20
<i>Xyleborus volvulus</i>	39	20	0.51 b	28.4 \pm 10.6 b	0 - 100
<i>Xyleborus ferrugineus</i>	118	70	0.59 b	33 \pm 7.4 b	0 - 118
<i>Xyleborinus gracilis</i>	52	26	0.50 b	100.6 \pm 34 b	0 - 1240
<i>Xyleborinus saxeseni</i>	68	2	0.03 c	1.5 \pm 1 c	0 - 60
<i>Xylosandrus crassiusculus</i>	39	1	0.03 c	2.6 \pm 2.6 c	0 - 100
<i>Ambrosiodmus devexus</i>	25	0	-	-	-
<i>Ambrosiodmus lecontei</i>	41	0	-	-	-



Raffaelea lauricola

Two can transmit *R. lauricola* to avocado



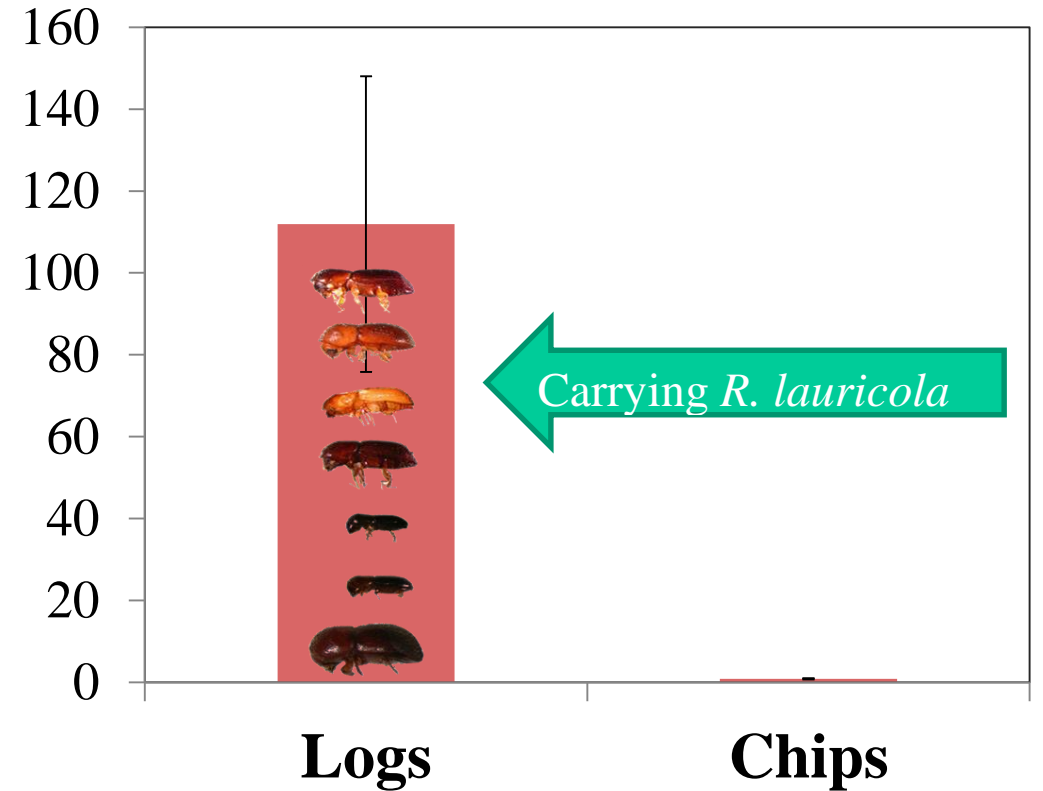
Notoriously difficult to control

- Feed on fungi not on plants
- >99% of time hidden inside the tree
- No management options other than sanitation control beetles inside trees






Monitoring- Scouting

Early detection and rapid removal



 Chipping wood is an effective way of killing beetles inside the trees

Insecticides have very limited use:

-  Do not kill ambrosia beetles that are inside the tree.**
-  Broadcast sprays do not suppress ambrosia beetle populations.**
-  Low persistence - estimated efficacy 2-3 weeks when applied with a sticker.**

Fungicides

- Alamo and Tilt
(propiconazole)
- Macro-infusion process
- Requires professional help



Biological Control

Entomopathogenic Fungi



Augment beetle pathogens
and increase beetle mortality

August 2011



Sep 2012



Feb 2014



Aug 2014





Thank you! Questions?



Florida Department of
Agriculture and Consumer Services
Adam H. Putnam, Commissioner

