



Invasive Ambrosia Beetle Conference
The Situation in California
August 12 - 14, 2012

Meeting sponsored by:

The Hofshi Foundation

University of California, Riverside

UC Center for Invasive Pest Research

The Huntington Botanical Gardens

The Los Angeles Arboretum



Invasive Ambrosia Beetle Conference
The Situation in California
August 12 - 14, 2012

Session 3
Biology of the Beetles

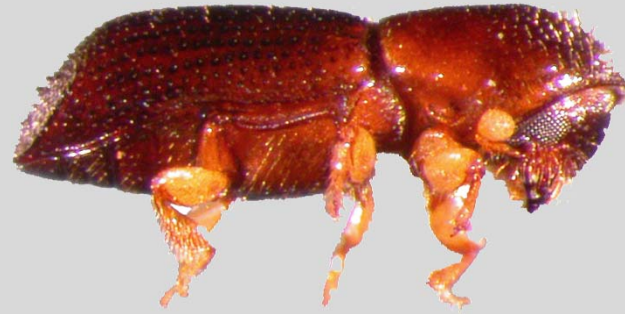


Ambrosia beetles that breed in laurel wilt-affected trees can carry *Raffaelea lauricola* and transmit it to healthy avocado and redbay trees

Carrillo D, Duncan R, Ploetz J, Campbell A , Ploetz R, Peña JE



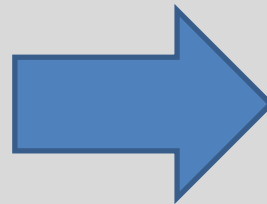
Tropical Research and Education Center



Xyleborus glabratus Eichhoff
(Coleoptera: Curculionidae: Scolytinae)



Raffaelea lauricola T.C. Harr.



AMBROSIA BEETLES (COLEOPTERA: CURCULIONIDAE: SCOLYTINAE) THAT BREED IN AVOCADO WOOD IN FLORIDA

DANIEL CARRILLO*, RITA E. DUNCAN AND JORGE E. PEÑA

¹University of Florida, Tropical Research and Education Center, Homestead, FL 33031





17
Scolytinae
spp.

1*	2*	3*	4*	5	6	7	8	9	10	11*
----	----	----	----	---	---	---	---	---	----	-----

Beetle species

n = 38 n = 3663 n = 117 n = 363 n = 2903 n = 944 n = 201 n = 211 n = 2940 n = 92 n = 6730

<i>Euwallacea fornicatus</i>	-	-	-	-	-	-	0.5	-	-	-	0.06
<i>Xyleborus glabratus</i>	2.6	-	8.4	-	-	-	-	-	-	-	-
<i>Xyleborus affinis</i>	-	8.4	10.1	16.3	71.5	20.6	-	1.9	70.6	-	0.5
<i>Xyleborus volvulus</i>	-	2.3	3.3	12.1	11.9	50.2	13.4	71.6	11.7	44.6	2.8
<i>Xyleborus ferrugineus</i>	5.3	0.5	-	54.6	5.1	0.6	1.5	1.4	5.0	-	-
<i>Xyleborinus gracilis</i>	5.3	-	-	-	4.1	2.0	-	-	4.0	-	-
<i>Xyleborinus saxeseni</i>	76.3	28.3	79.8	12.8	6.1	18.5	44.8	11.8	6.0	2.2	84
<i>Xylosandrus crassiusculus</i>	10.5	35.9	6.8	-	-	6.7	26.4	5.2	-	33.7	12.02
<i>Ambrosiodmus devexulus</i>	-	-	-	-	-	-	-	-	0.5	-	-
<i>Ambrosiodmus lecontei</i>	-	-	-	-	-	0.3	0.5	-	-	2.2	-



Euwallacea fornicatus

1. First USA record royal poinciana *Delonix regia* (2002)
2. Avocado (one wilted tree) (2009)
3. Two avocado groves (wilted trees, wide spread) (2012)



X. glabratus low populations or not recovered from most avocados affected by LW.



2011 – Large infestation (swampbays) close to avocado commercial areas



2012 - 1st Avocado tree diagnosed with LW in a commercial avocado grove



?



Harrington et al. 2008
X. saxeseni* + *R. lauricola

Can these beetles carry *R. lauricola* by and transmit it to healthy avocado and redbay plants?

9 Xyleborini spp.



Xyleborus glabratus



Xyleborus affinis



Xyleborus volvulus



Xyleborus ferrugineus



Xyleborinus gracilis



Xyleborinus saxeseni



Xylosandrus crassiusculus

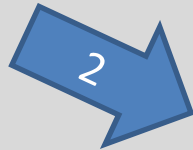
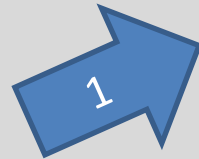


Ambrosiodmus devexulus



Ambrosiodmus lecontei

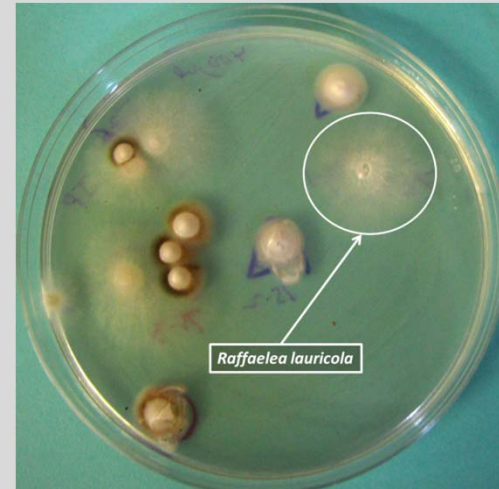
Materials and Methods



Part 1. Recovery of *R. lauricola* from beetles



Surface
sterilization



Microsatellites
(CHK, IFW)
+
LSU

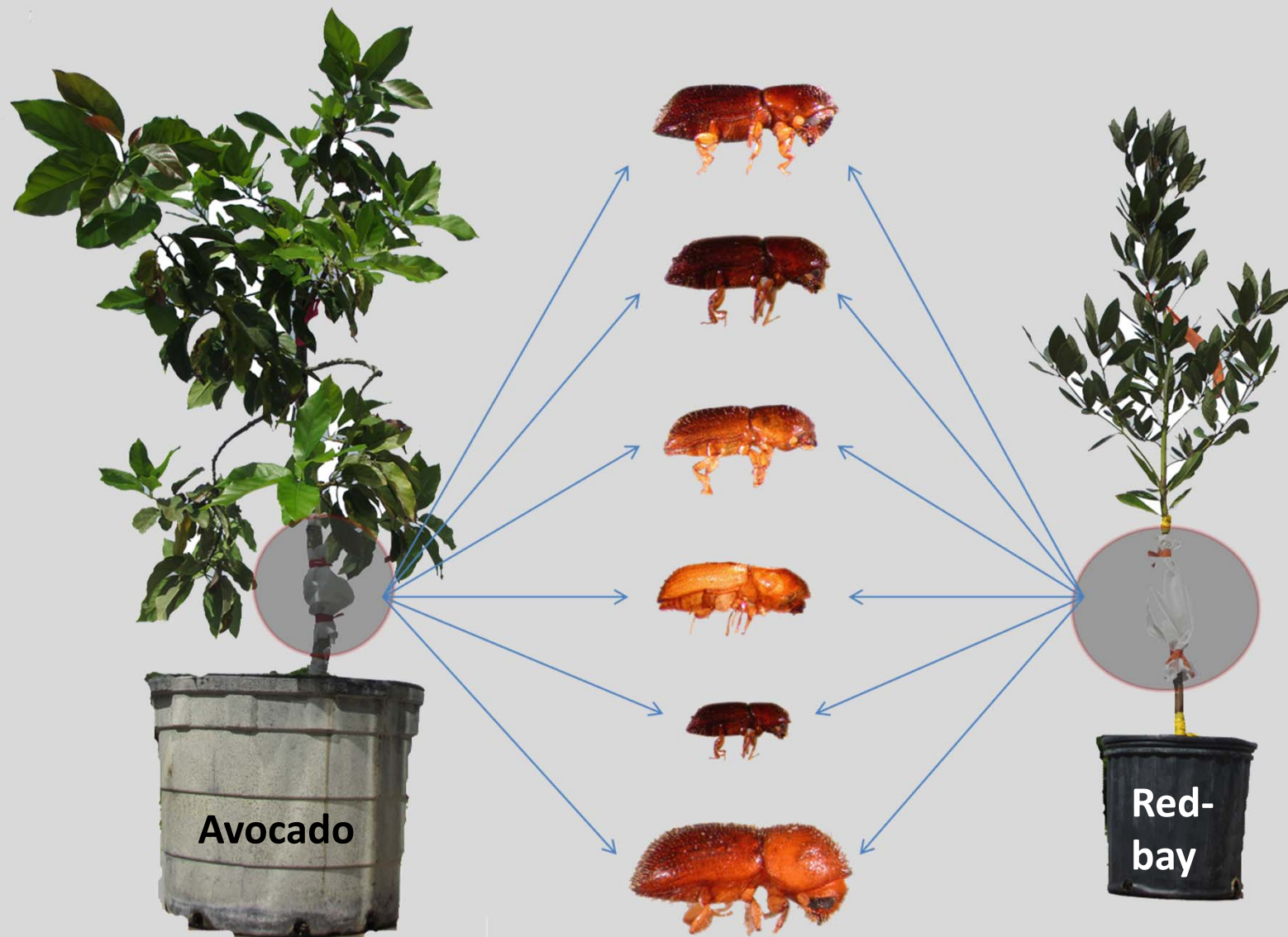
R. lauricola CFU

Recovery of *R. lauricola*

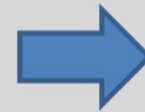
species	n=	No. beetles carrying <i>R. lauricola</i>	probability of a beetle carrying <i>R. lauricola</i>	CFUs Mean ± SEM	CFU Range
<i>Xyleborus glabratus</i>	50	43	0.86 a	2783.3 ± 281.9 a	0 - 7800
<i>Xyleborus affinis</i>	41	5	0.12 c	1 ± 0.6 c	0 - 20
<i>Xyleborus volvulus</i>	39	20	0.51 b	28.4 ± 10.6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



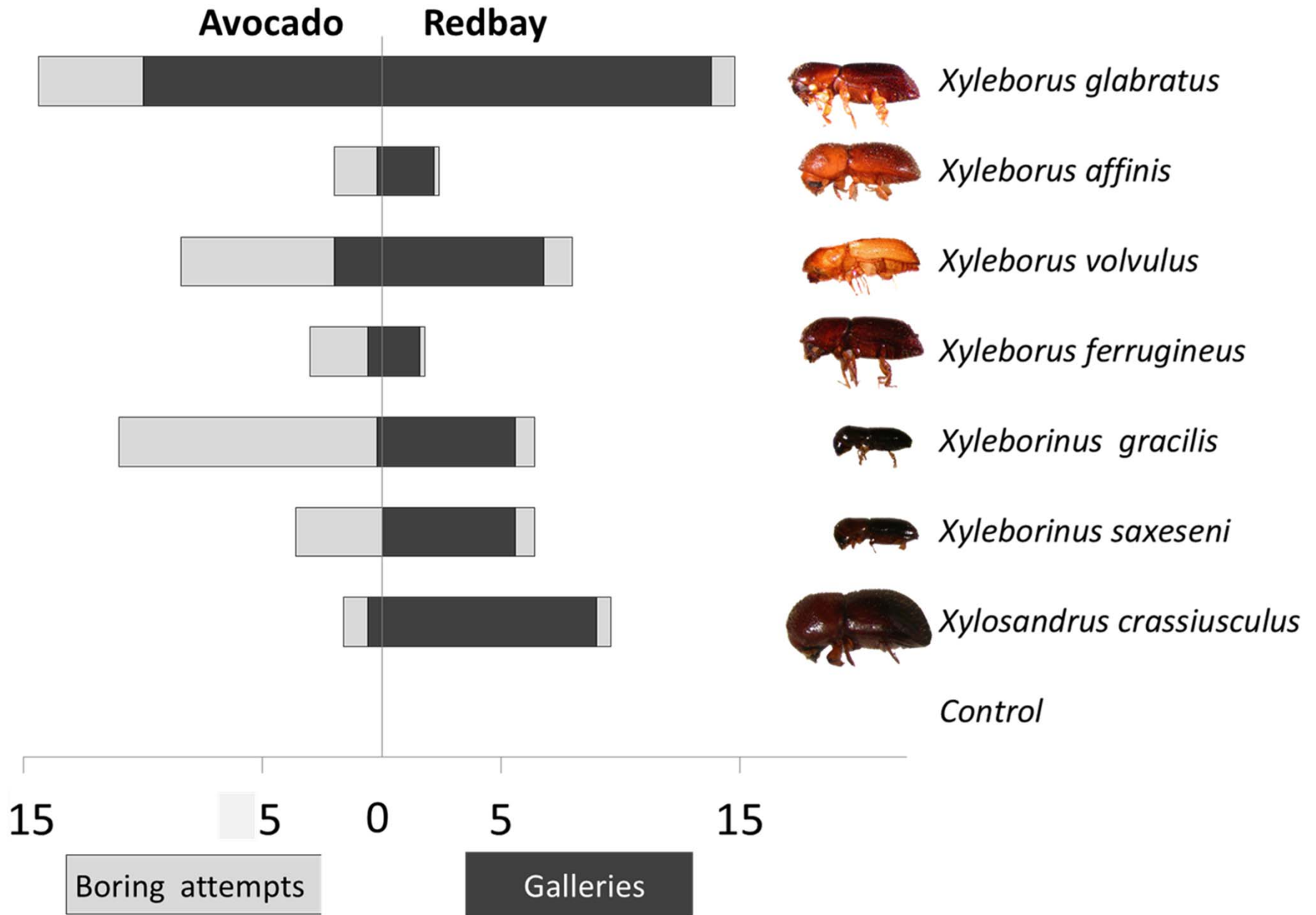
Part 2. Transmission of *R. lauricola* to healthy trees



Plant dissection

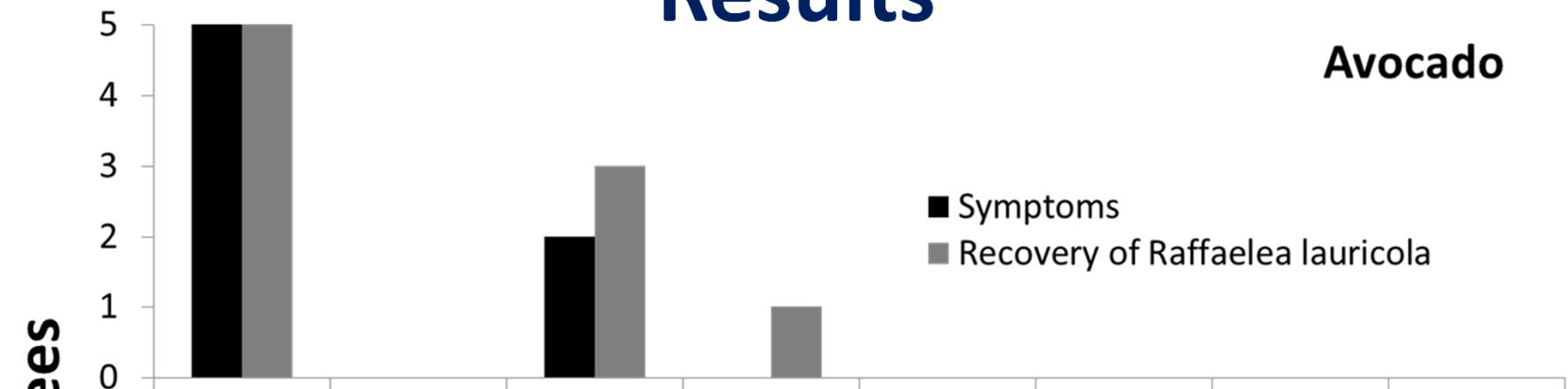


Results

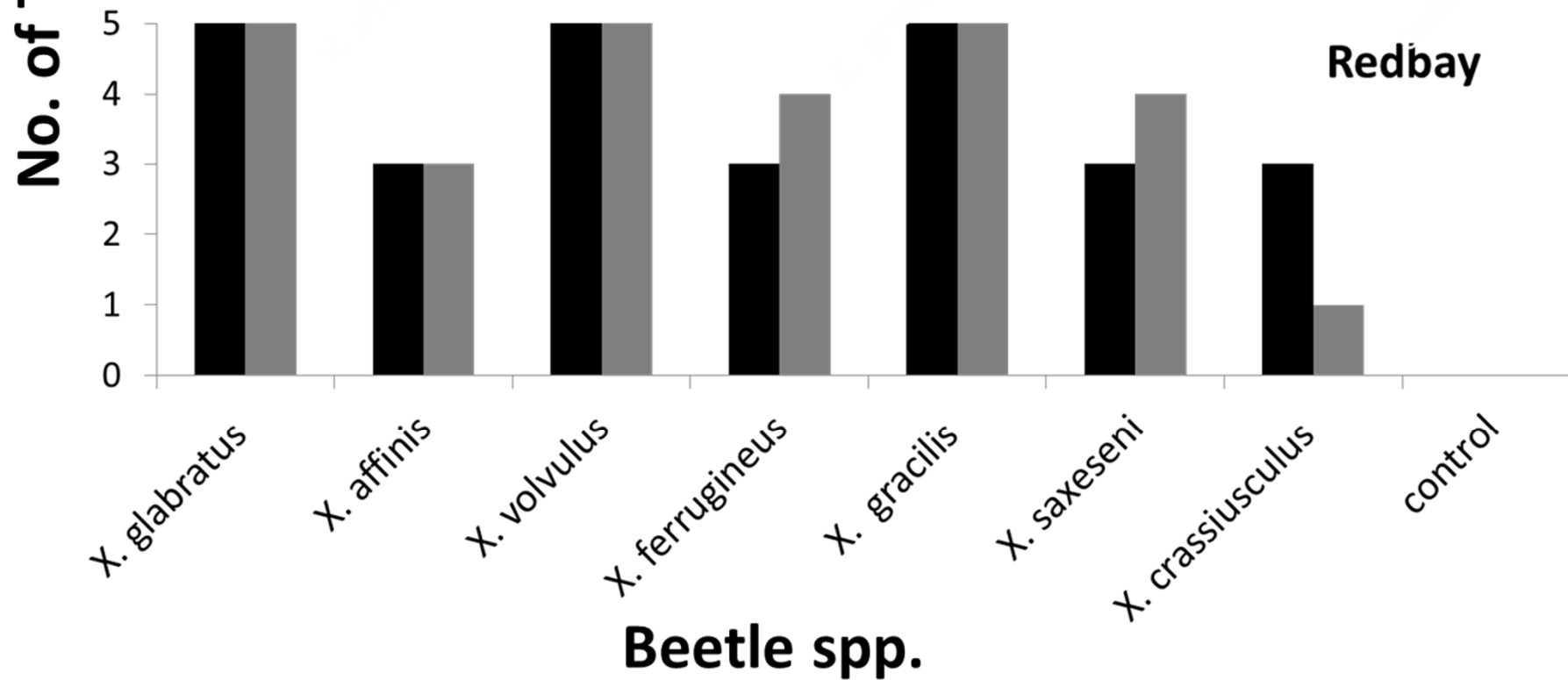


Results

Avocado



Redbay



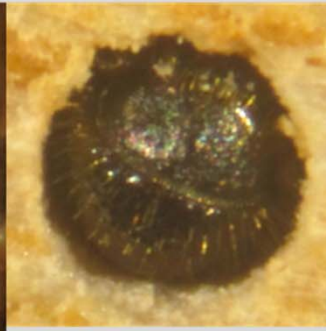
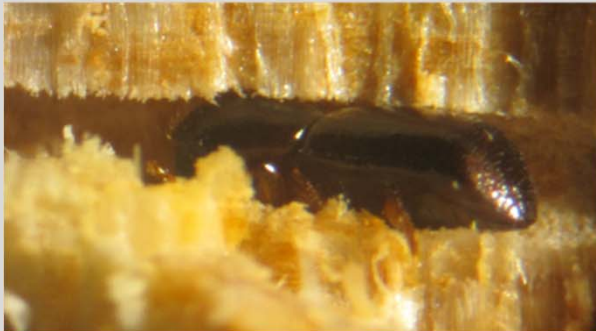
Conclusions








New beetle-fungus association (multiple lateral transfer of *R. lauricola*)

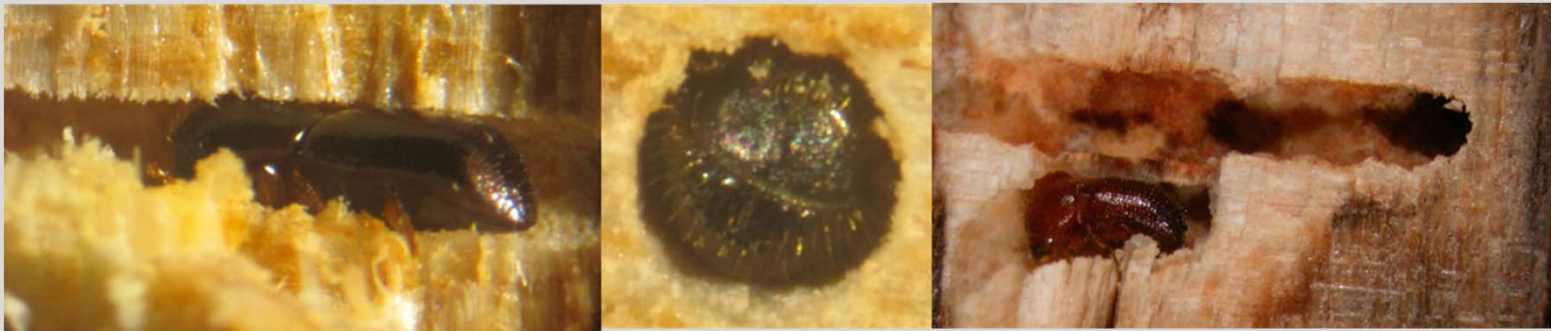


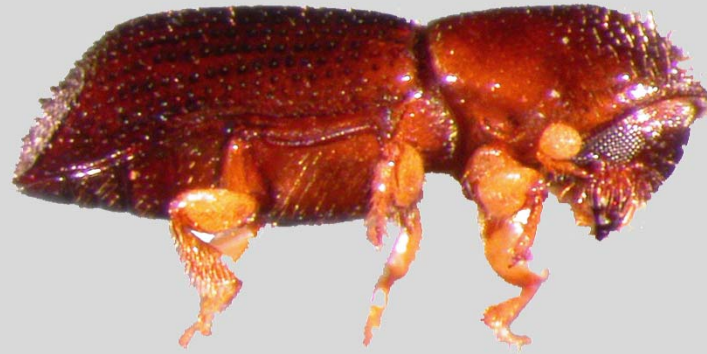
At least six Xyleborini spp. other than RAB can carry and transmit *R. lauricola* to healthy trees and cause LW (under controlled conditions, more in redbay than in avocado).



Questions

-  New beetle-fungus associations: mutualistic, antagonistic?
-  Will “other” AB that carry *R. lauricola* attack healthy plants?
-  Would they be attracted to stressed plants?
-  Pruning?
-  Where is *X. glabratus*?





Acknowledgements:
Florida Avocado Committee
FDACS Specialty crops grant
Mike Thomas for ID's
Peña & Ploetz labs

