Raffaelea species associated with *Xyleborus glabratus* and other ambrosia beetles

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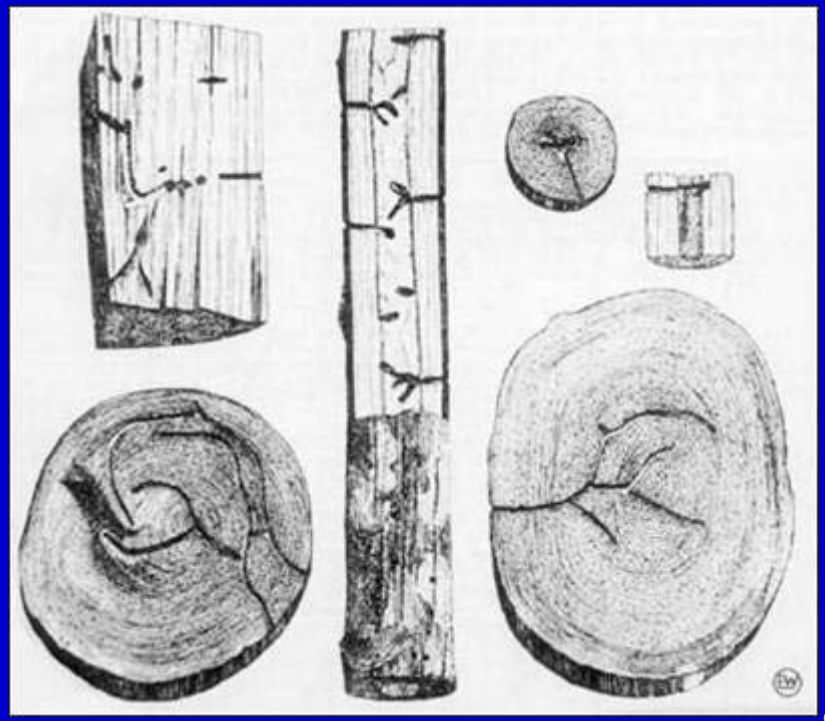
The main vector of the *Raffaelea lauricola* is *Xyleborus glabratus*

Xyleborus glabratus - Redbay Ambrosia Beetle
native to Southeast Asia
On members of the Lauraceae and other aromatic trees

Ambrosia beetle galleries

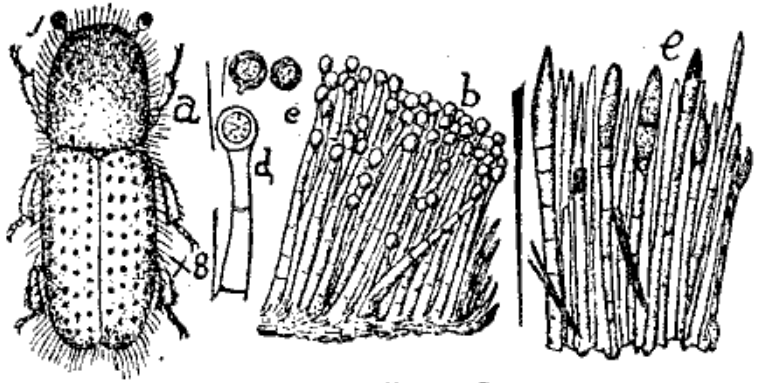


Schedl

Hailey Daniels

Ambrosia beetle gallery; Robert Rabaglia

Ambrosia, Food of the gods

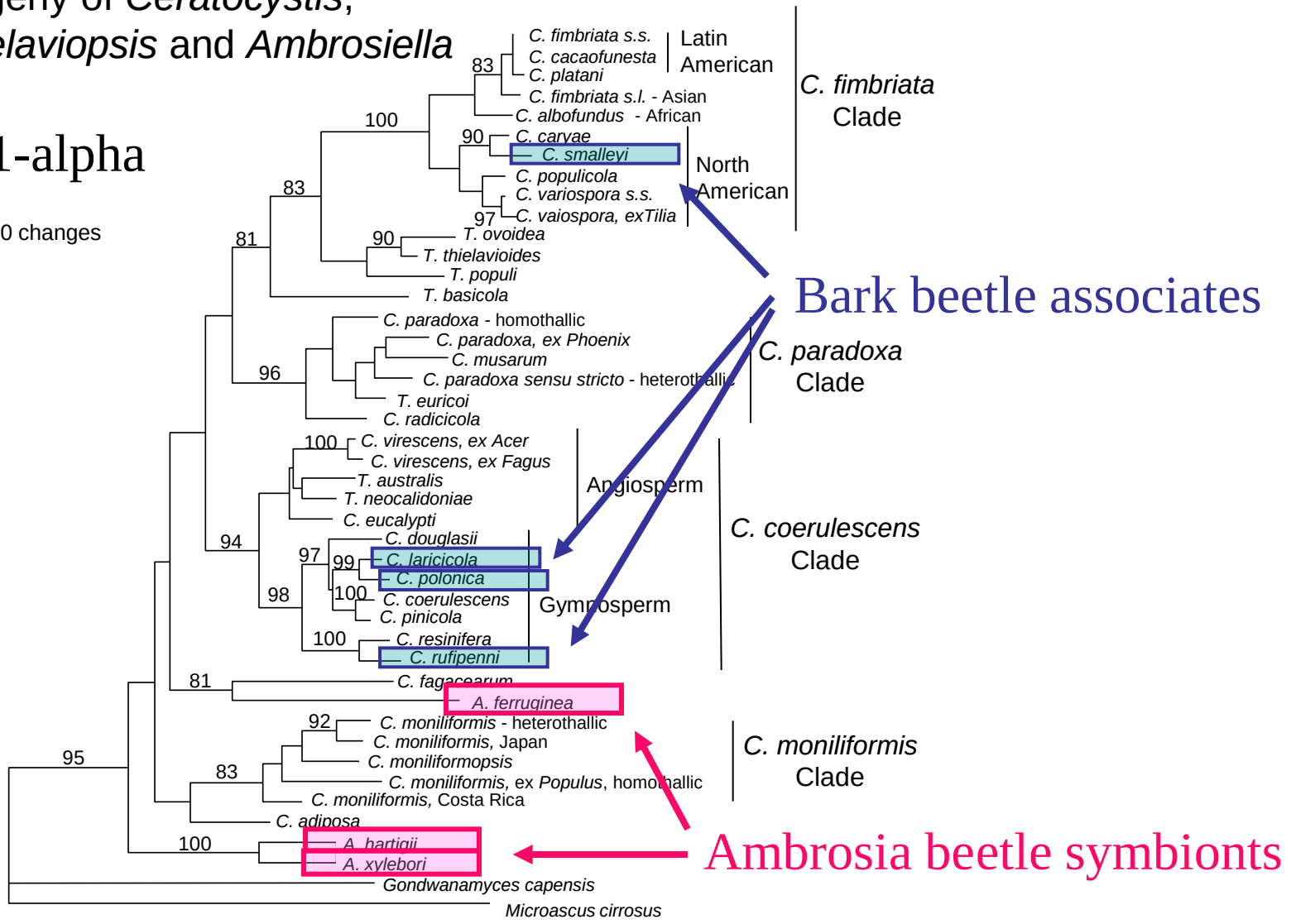


Ambrosia Beetle, p. 68.

Most ambrosia beetle symbionts are derived from *Ceratocystis* or *Ophiostoma*

Phylogeny of *Ceratocystis*, *Thielaviopsis* and *Ambrosiella*

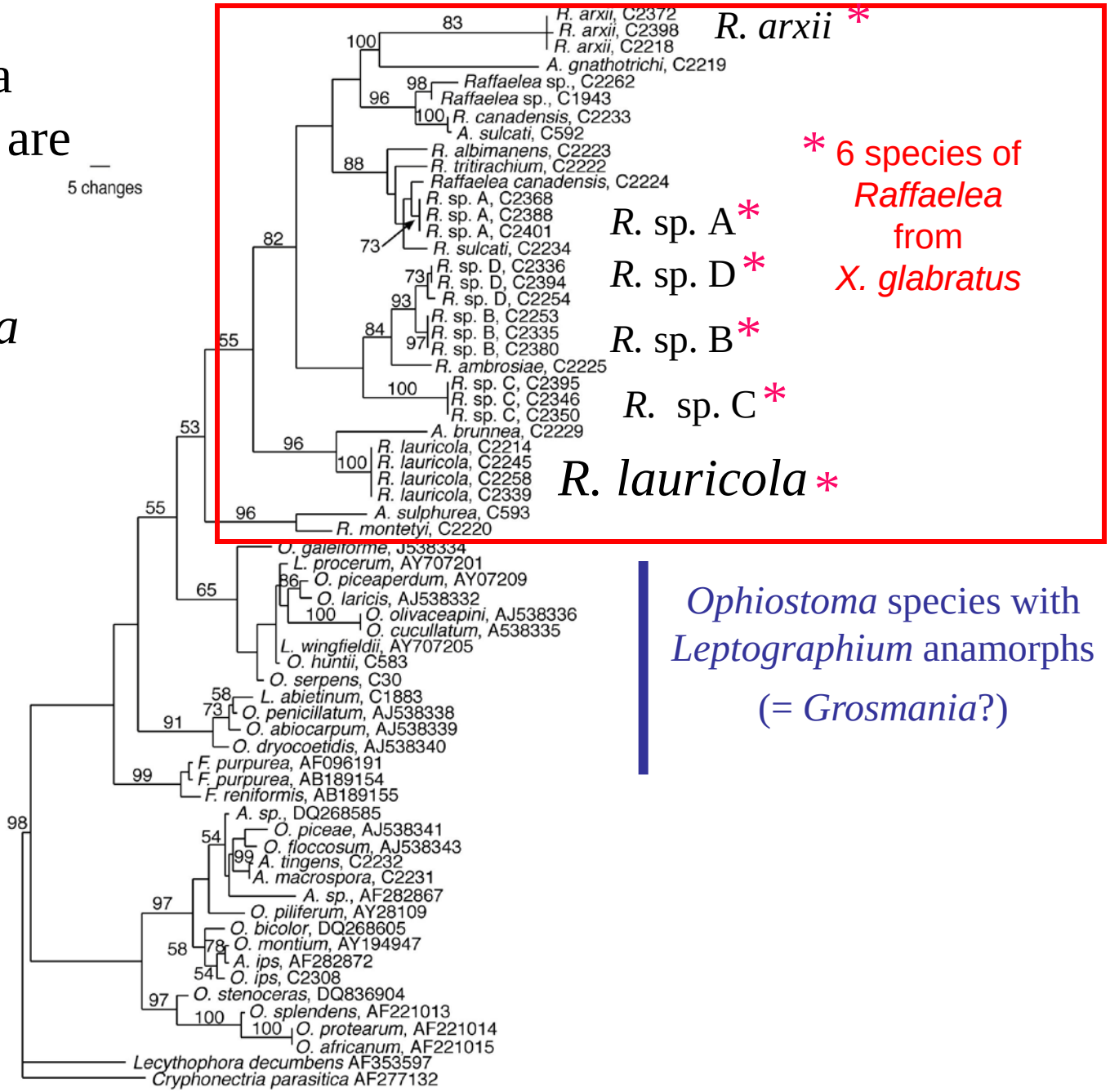
EF1-alpha

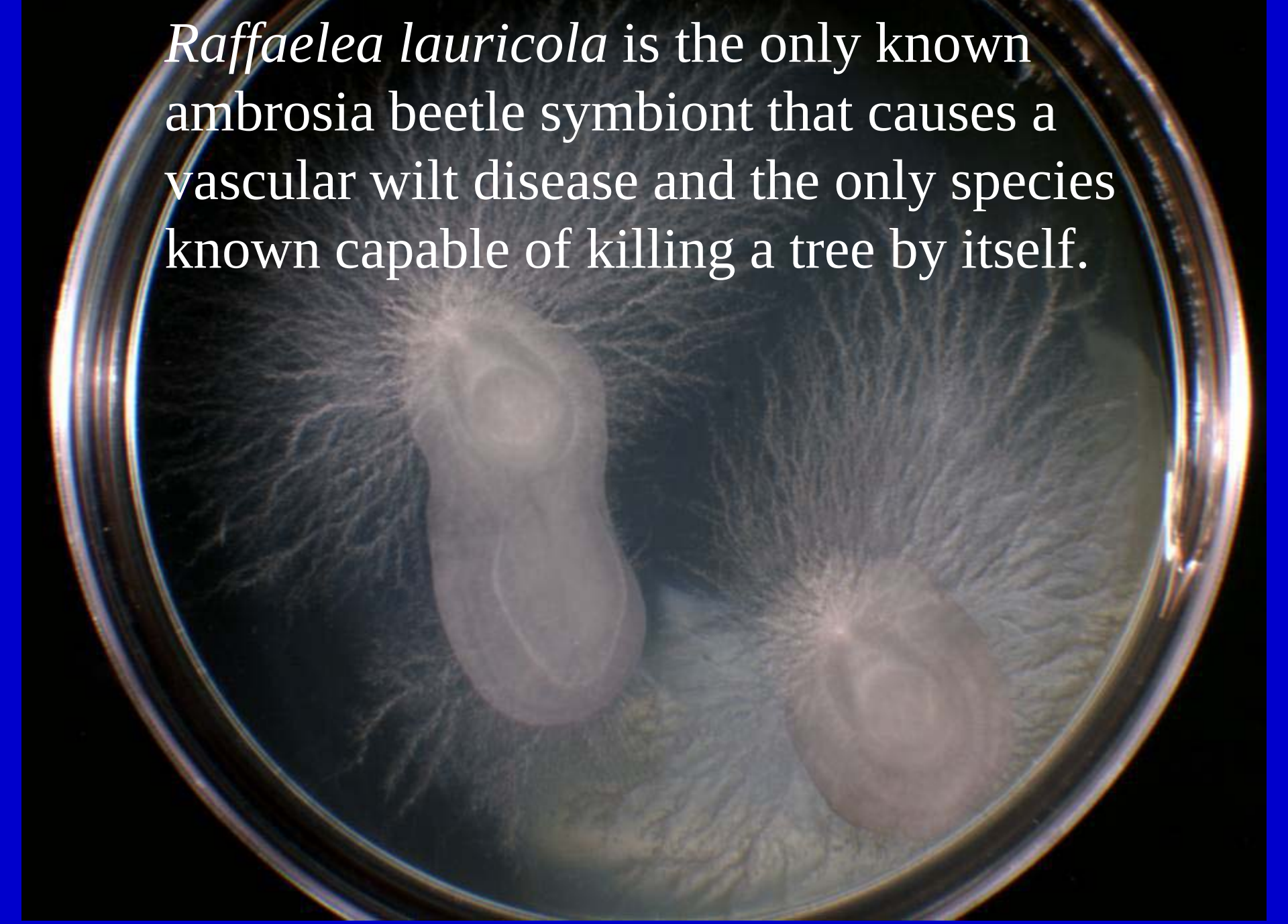


Most ambrosia beetle symbionts are derived from *Ceratocystis* or *Ophiostoma*

LSU rDNA

Species of *Ophiostoma*, *Fragosphaeria*, *Leptographium*, *Ambrosiella* and *Raffaelea*





Raffaelea lauricola is the only known ambrosia beetle symbiont that causes a vascular wilt disease and the only species known capable of killing a tree by itself.

Initial infections seem to be due to aborted tunneling by *Xyleborus glabratus* in healthy redbay trees.

Vascular discoloration in main stem, but before egg-laying attacks by ambrosia beetles

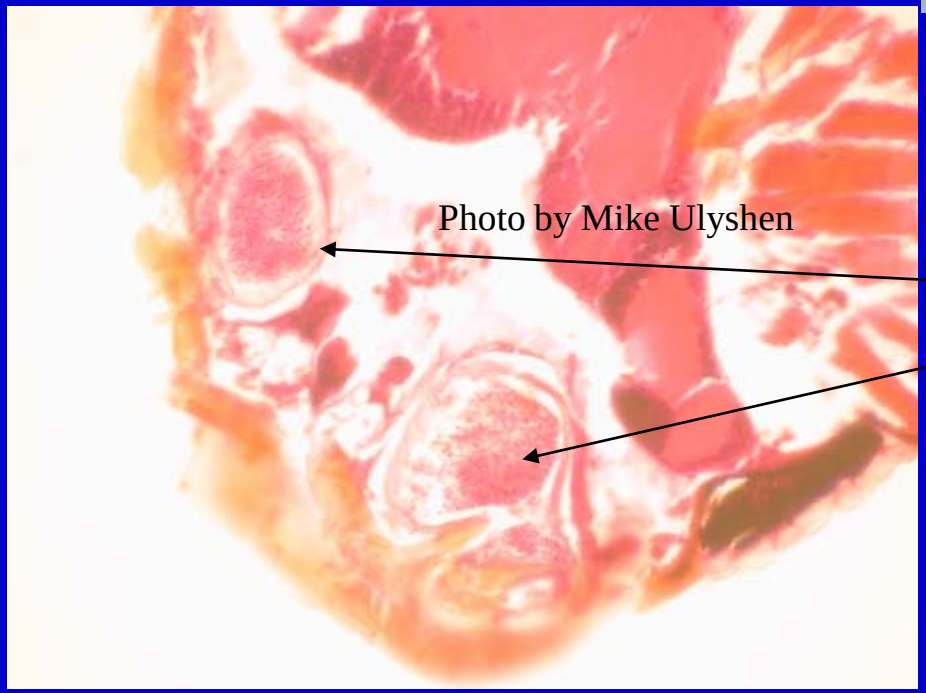
Empty tunnels in branches and stems of redbay, with vascular discoloration emanating from the tunnels.

Xyleborus glabratus and other ambrosia beetles attack and lay eggs in redbay trees with laurel wilt.

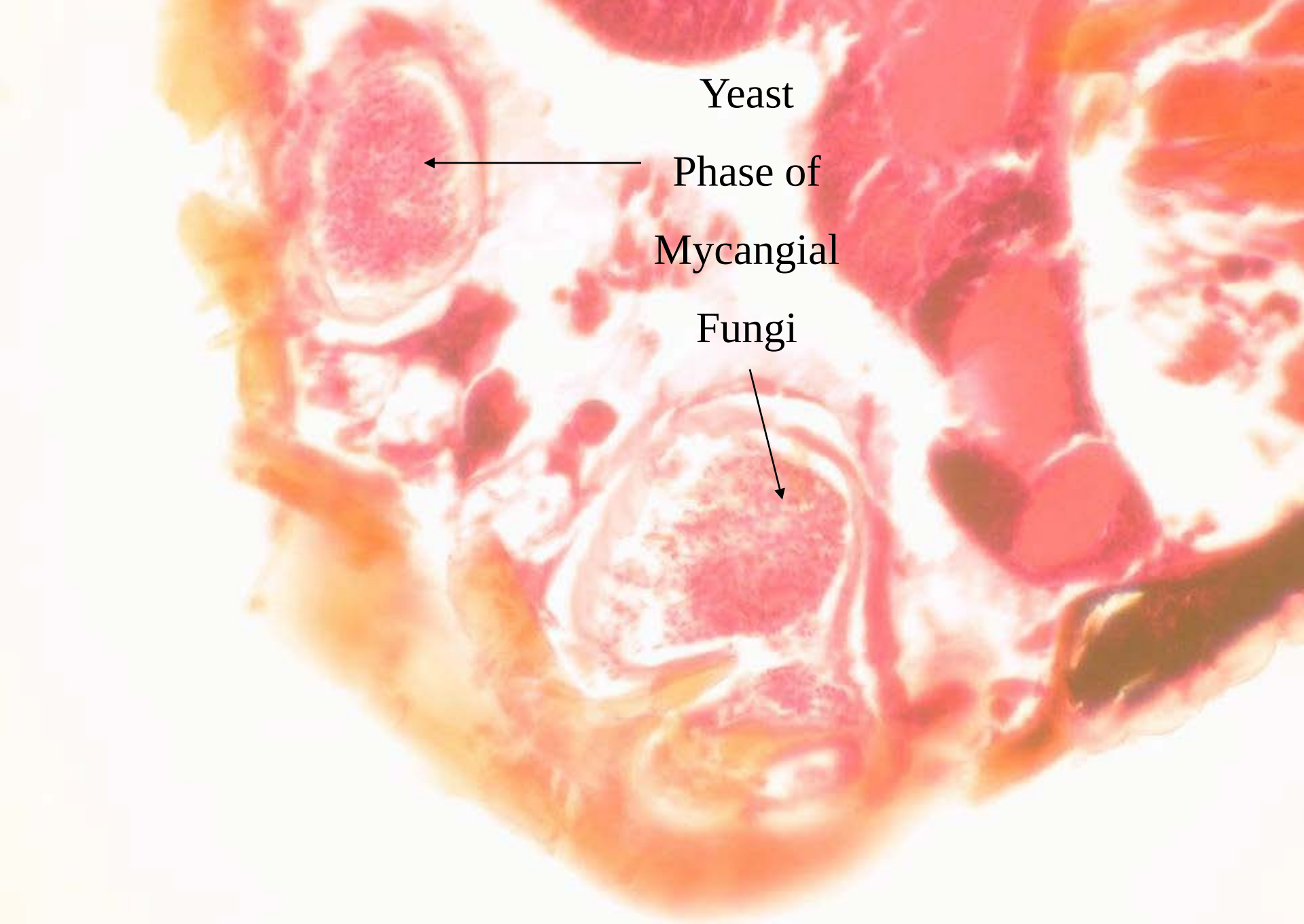
Xyleborus glabratus and other species of *Xyleborus* spp. carry their fungal symbionts in mandibular mycangia.

***Xyleborus glabratus* females have paired mycangia with budding spores.**

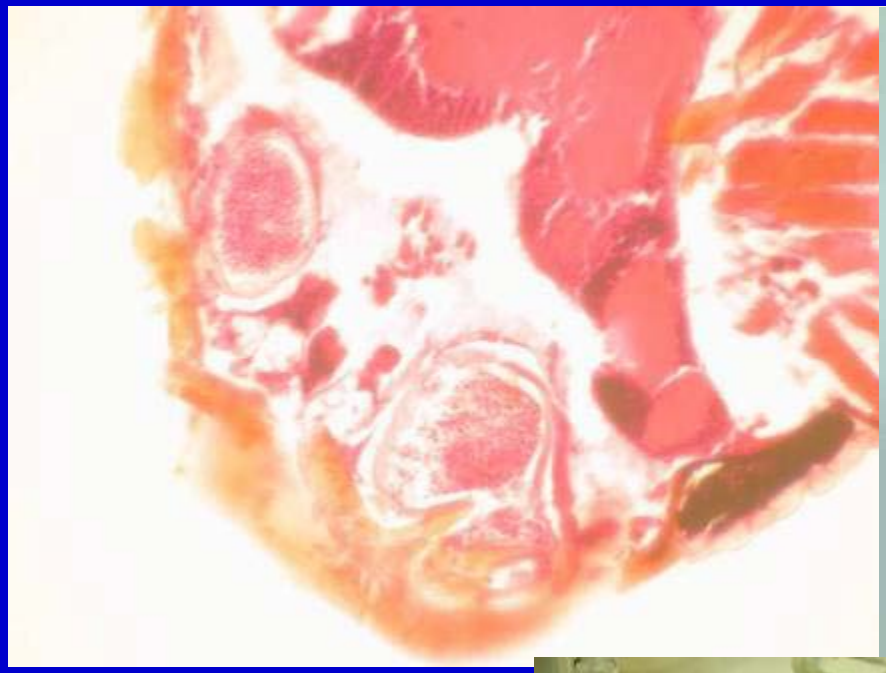
M. C. Thomas



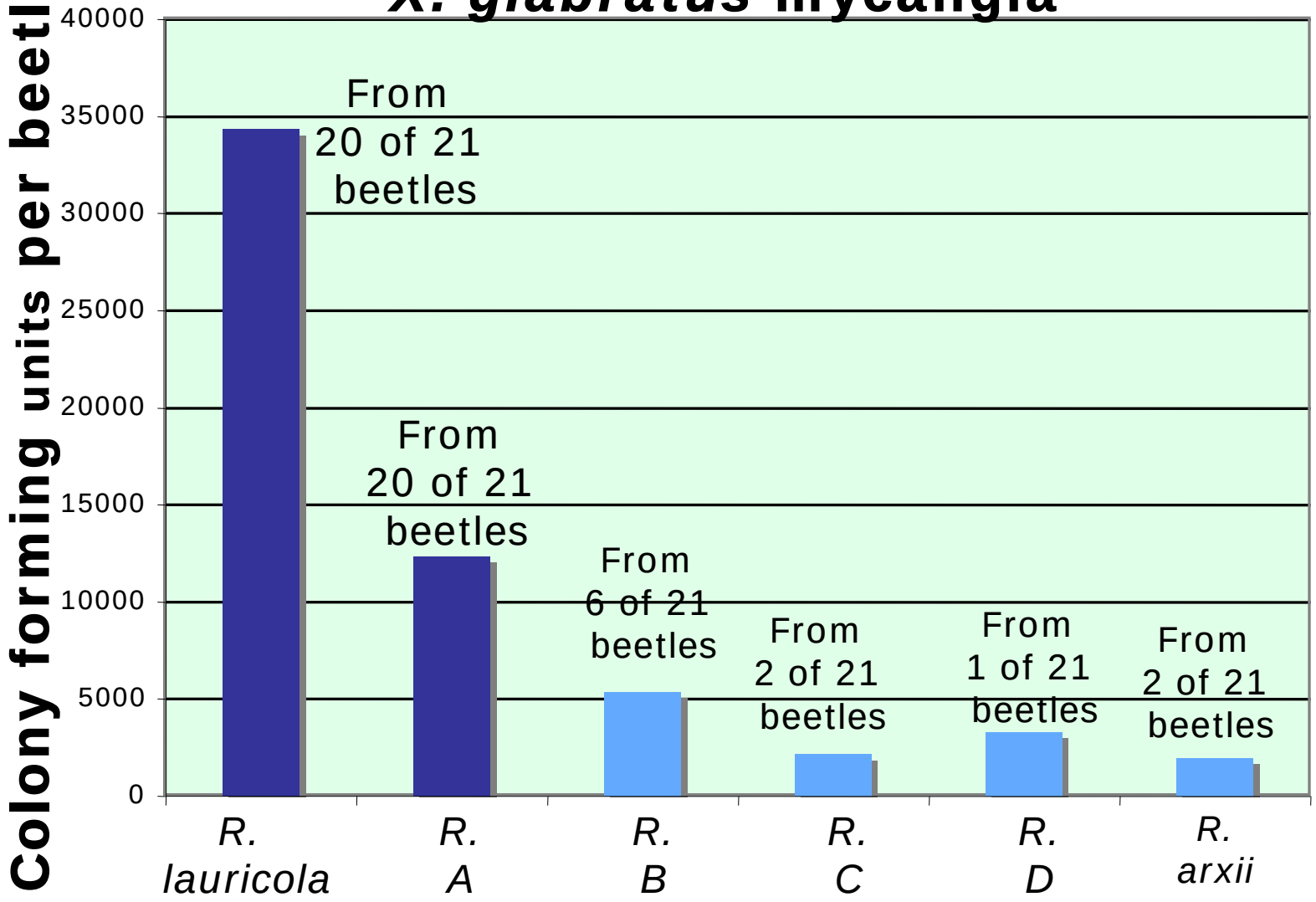
Mandibular Mycangia


Yeast
Phase of
Mycangial
Fungi

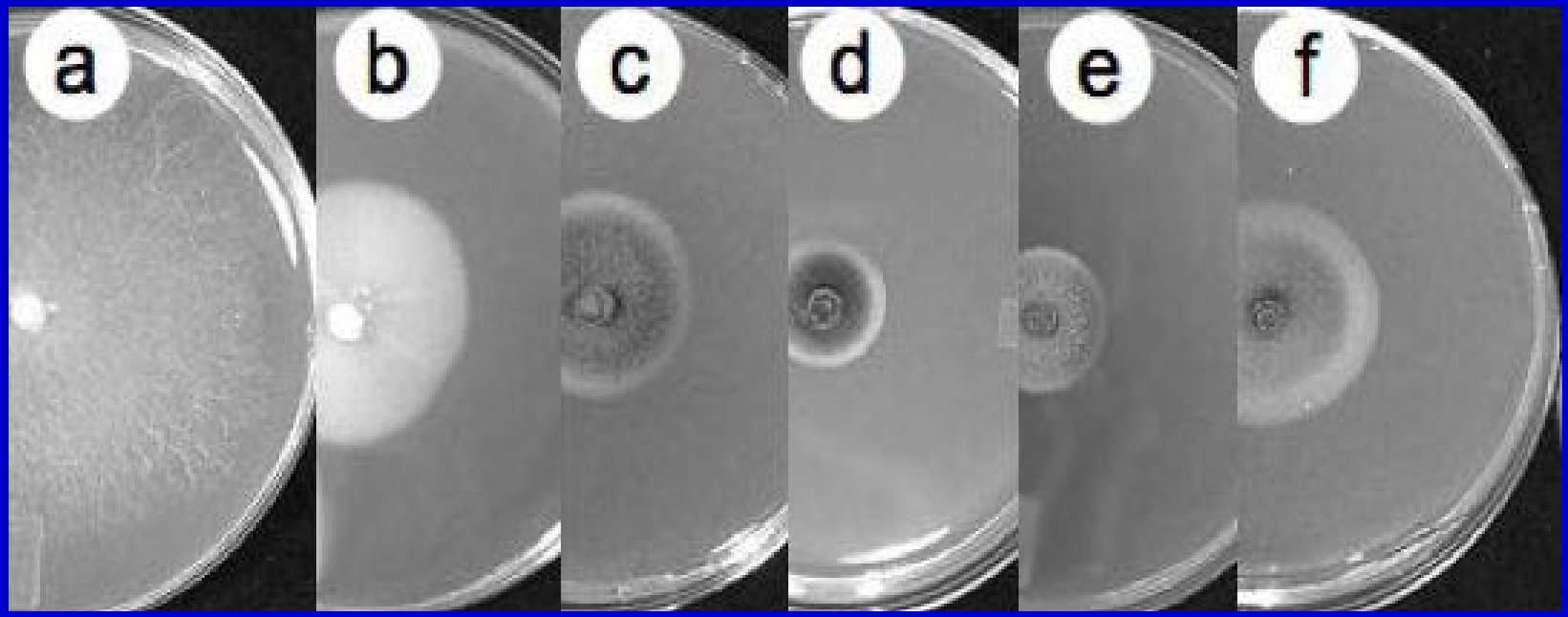
We collected *X. glabratus* females and did dilution plating from individual beetles, and we quantified the fungi present.

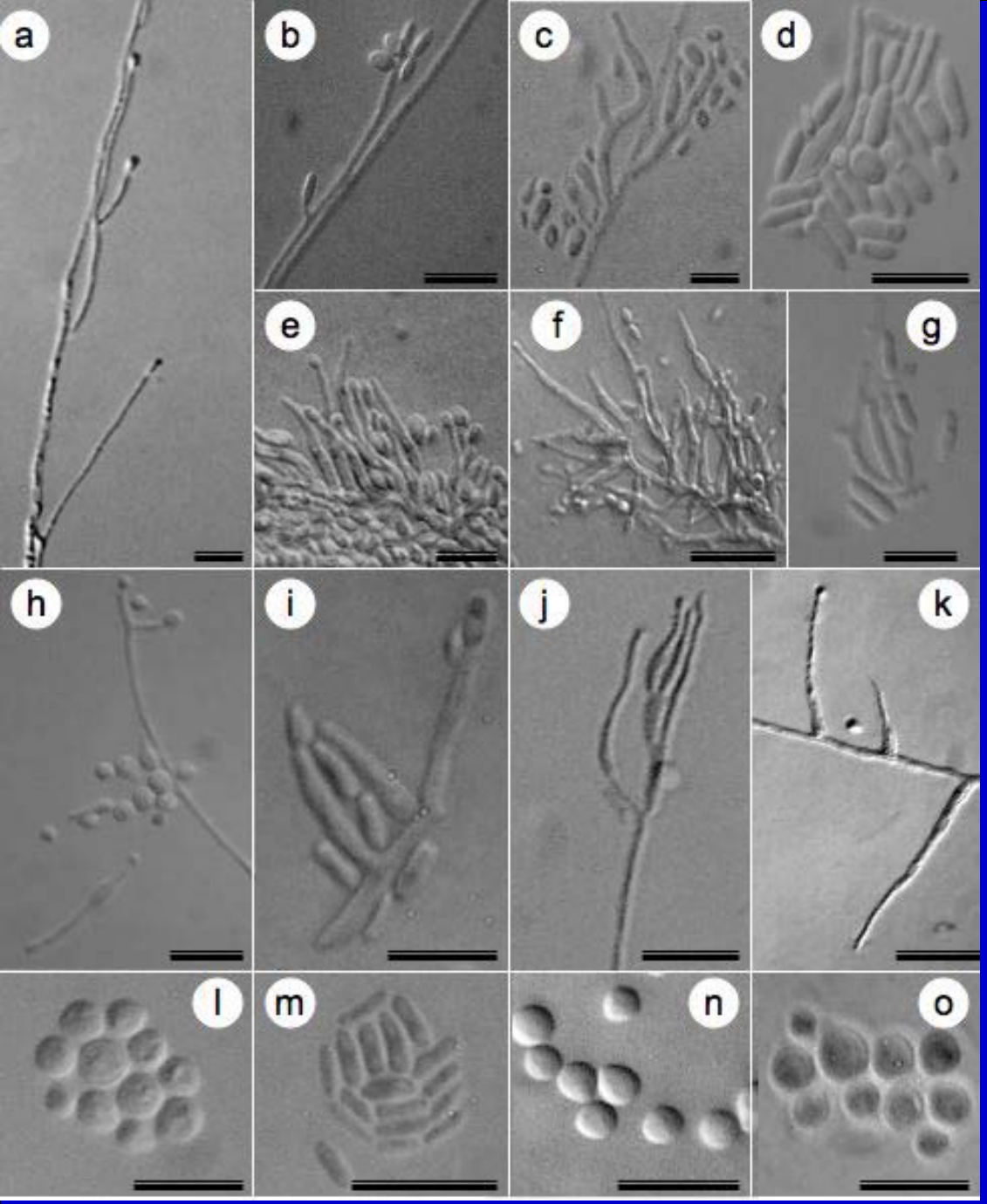


Isolations of *Raffaelea* species from *X. glabratus* mycangia



Raffaelea species isolated from mycangia of *Xyleborus glabratus*





Raffaelea species (*Hyalorhinocladiella*) isolated from mycangia of *Xyleborus glabratus*

Ambrosia beetles associated with redbay

Xyleborus glabratus

Xylosandrus compactus

Xylosandrus crassiusculus

Xyleborinus saxeseni

Xyleborus glabratus
(redbay, sassafras)

Xyleborus glabratus **(and *X. saxeseni?*) carry the laurel wilt fungus and other *Raffaelea* species.**

Xyleborinus saxeseni

2 of 3 beetles from pondspice had the laurel wilt fungus (2,000 to 8,000 cfu's per beetle).

Xyleborinus saxeseni
Fruit-tree pinhole borer
(pondspice)

Xylosandrus crassiusculus

Paul M. Choate, University of Florida

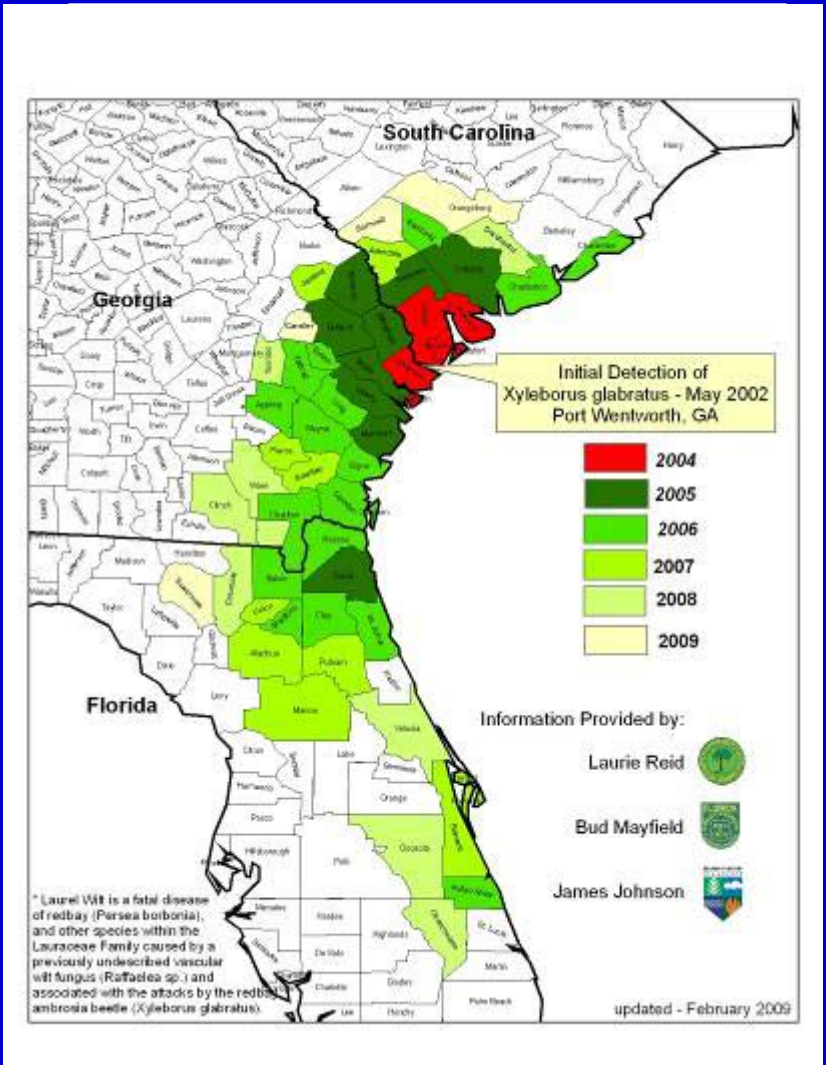
***Xylosandrus compactus* and *Xylosandrus crassiusculus* have *Ambrosiella* (*Ceratocystis* anamorphs) and apparently do not carry *Raffaelea* species.**

Xylosandrus compactus

Hara and Beardsley

Harrington & Fraedrich 27-Feb-09

Future Plans



- Continue evaluating fungi associated with *X. glabratus* and other ambrosia beetles in SE USA
- Locate *X. glabratus* in Asia and hopefully determine fungal symbionts there.