

Determining fungal communities associated with the bark beetle *Dendroctonus approximatus* in Mexico and Central America

Tessa Bauman^{1,2}, Lori Eckhardt², Wilhelm de Beer¹,
Michael Wingfield¹

¹University of Pretoria, South Africa; ²Auburn University

Presented by Andrea Cole



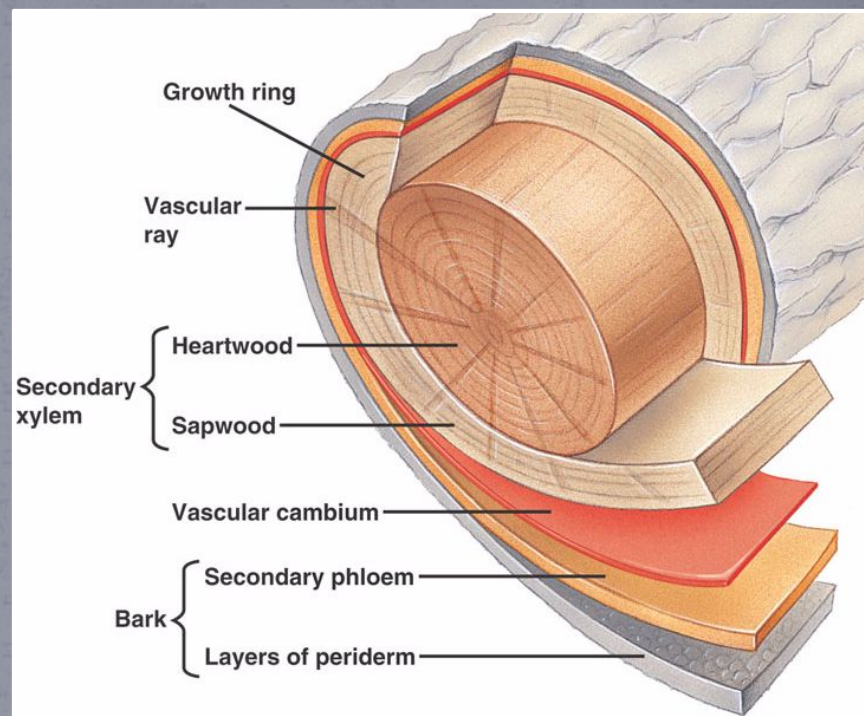
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi



Background

- Bark Beetles are small and cryptic
- Associated with mutualistic and antagonistic fungi
- Have structures to facilitate spore transfer
- Generally attracted to declining trees
- Some species attack healthy trees (*Dendroctonus* spp.)
- Bark Beetles and/or their associated fungi are introduced into novel environments every year

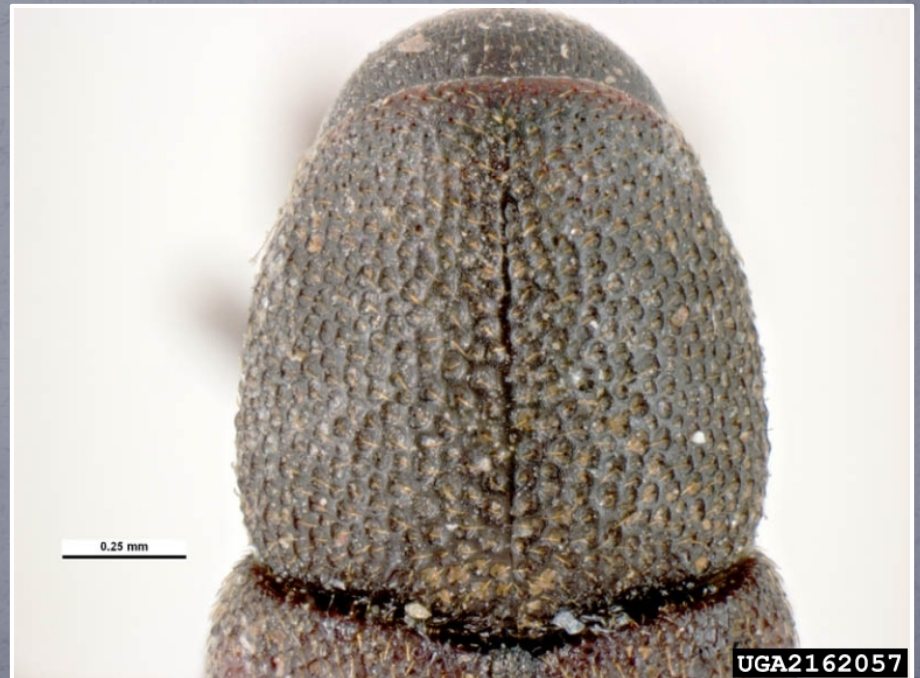


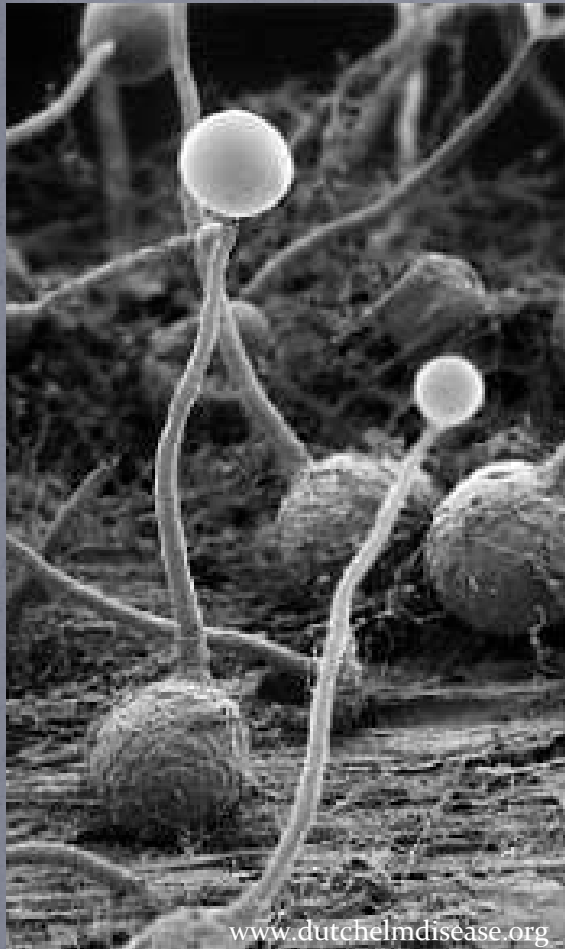
Mycangia

Setae

Crevices

Punctures



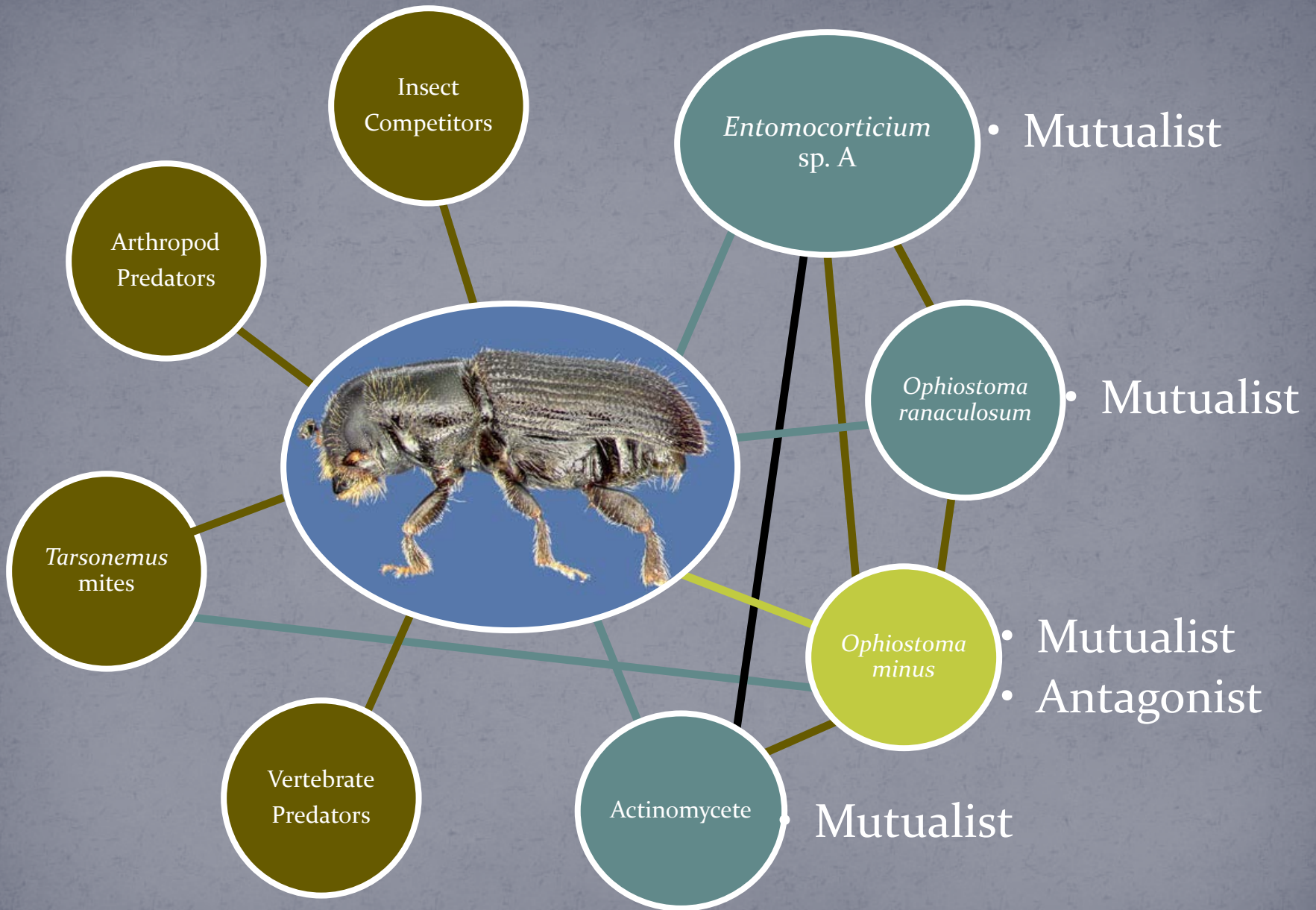


Bark Beetle Signs



Bark Beetle/Fungal Signs

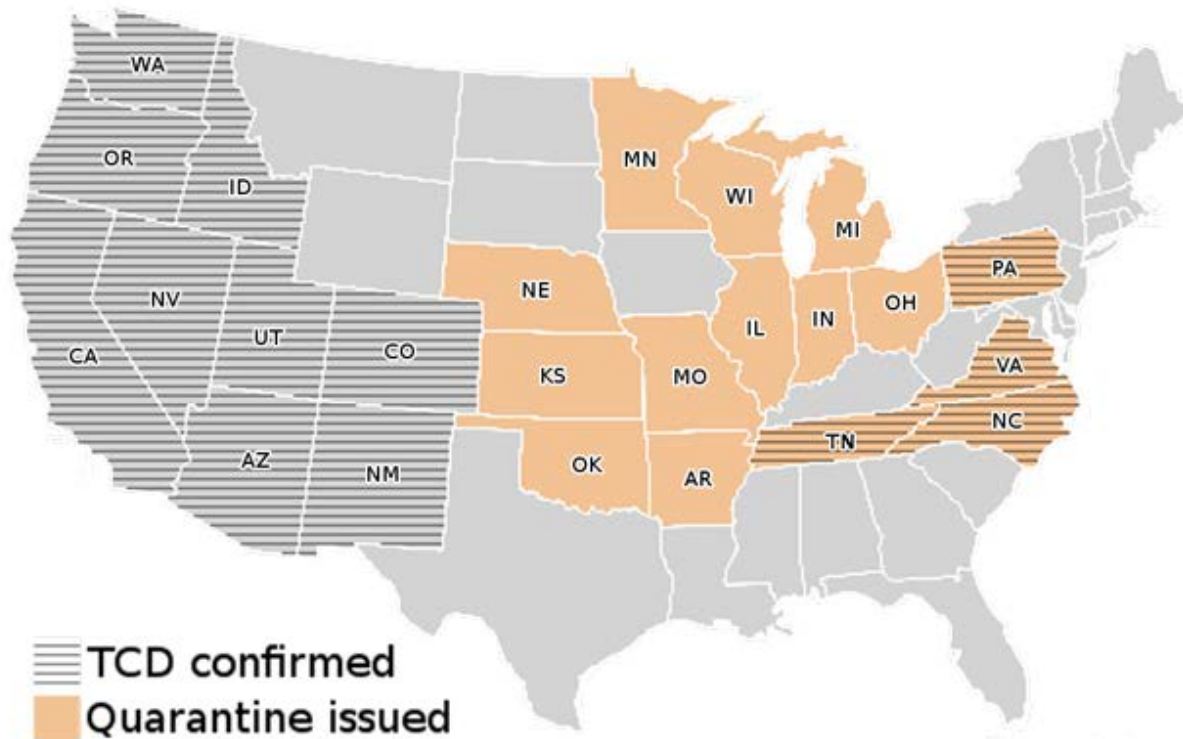




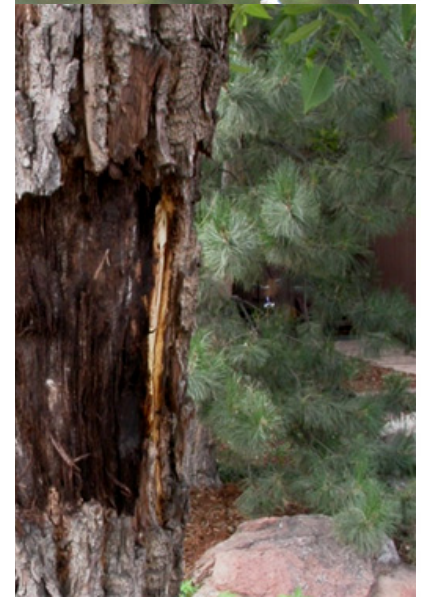
Project Background

- 2007 INAFOR requested assistance; Alberto Sediles of UNA, Roger Menard and James Ward of USFS
- 8000+ ha of natural regeneration in stands of *Pinus oocarpa* and *P. caribea*; ten years after a southern pine beetle epidemic and wildfires; trees were sapling sized and 10 to 20 percent of a each stand was affected
- 2009 Study was expanded to include Honduras, Mexico and Guatemala

Distribution of Thousand Cankers Disease as of February 7, 2013



Source: www.thousandcankers.com



ulcr

Purpose of the study

- To identify insect and fungal associations related to mortality of *Pinus* spp. in Nicaragua and Central America





Tree Symptomology



Tree Symptomology

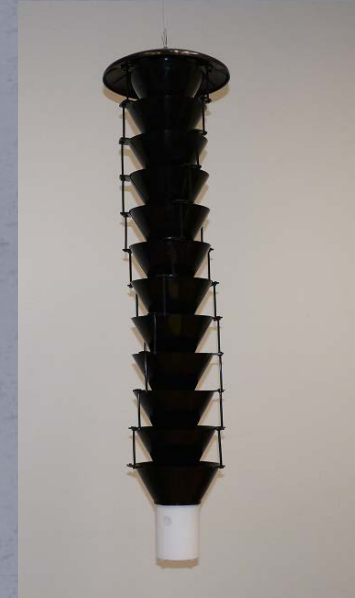


Methods

Stands Evaluated

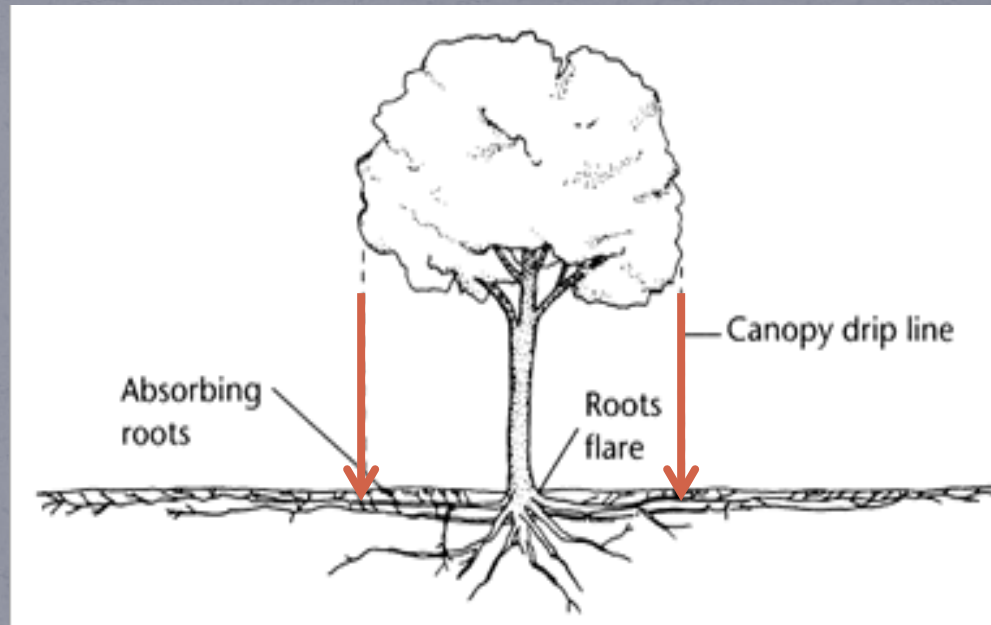
Insect Trapping

Fungal Samples



Methods

Fungal samples taken from roots, galleries and insects



Fungal Identification Methods

DNA Extraction

PCR amplification

Elongation Factor, β -tubulin, ITS, Actin and Calmodulin

Sequencing

Contig Assembly

Phylogenetic Analysis



Preliminary Results - Insects



Hylastes fulgidus Blackman



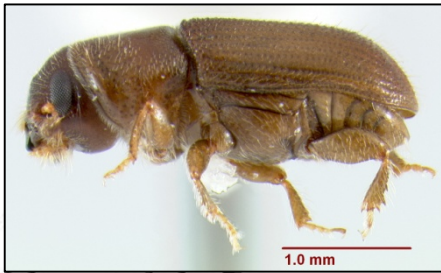
Dendroctonus valens LeConte



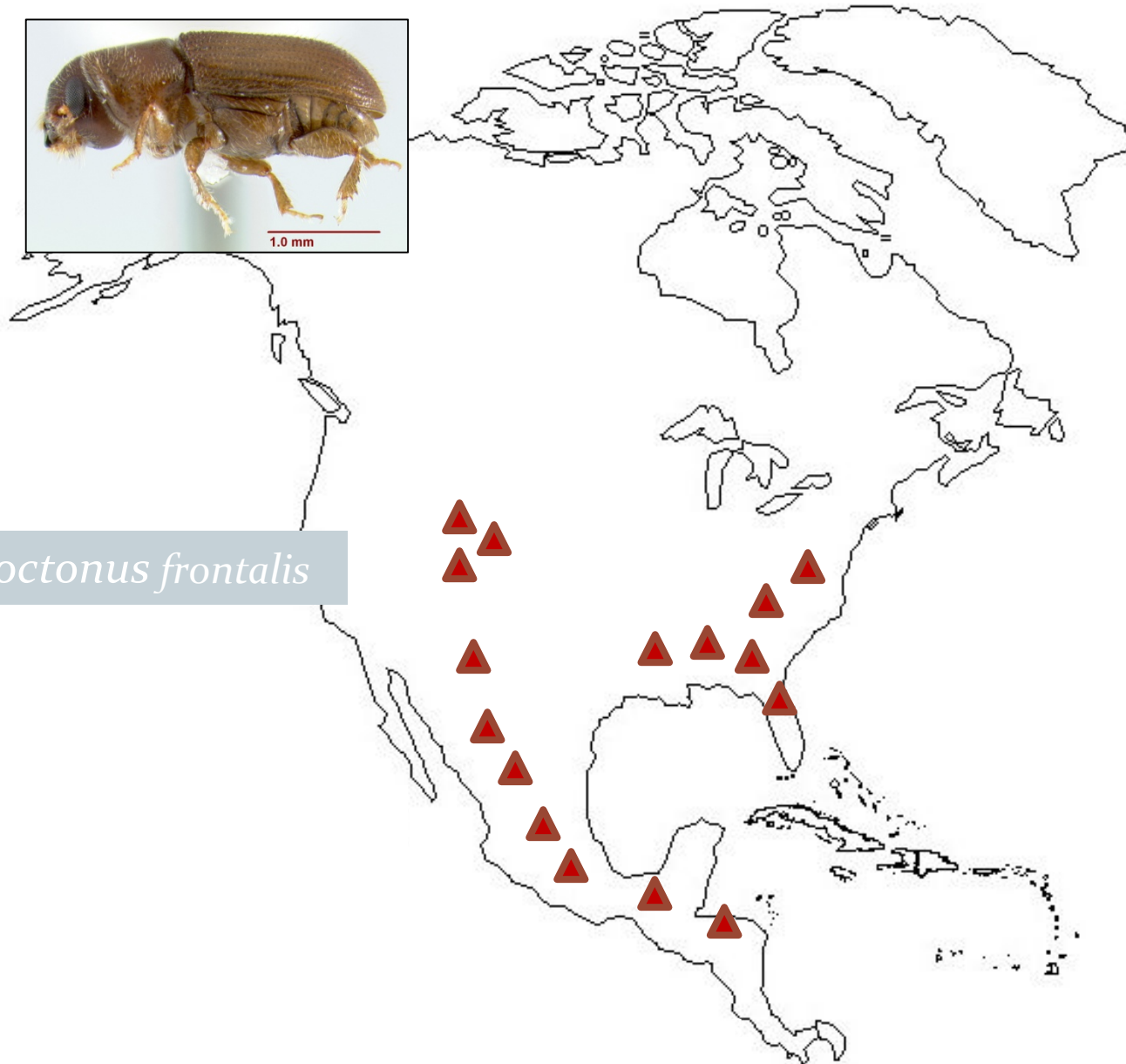
Dendroctonus approximatus Dietz

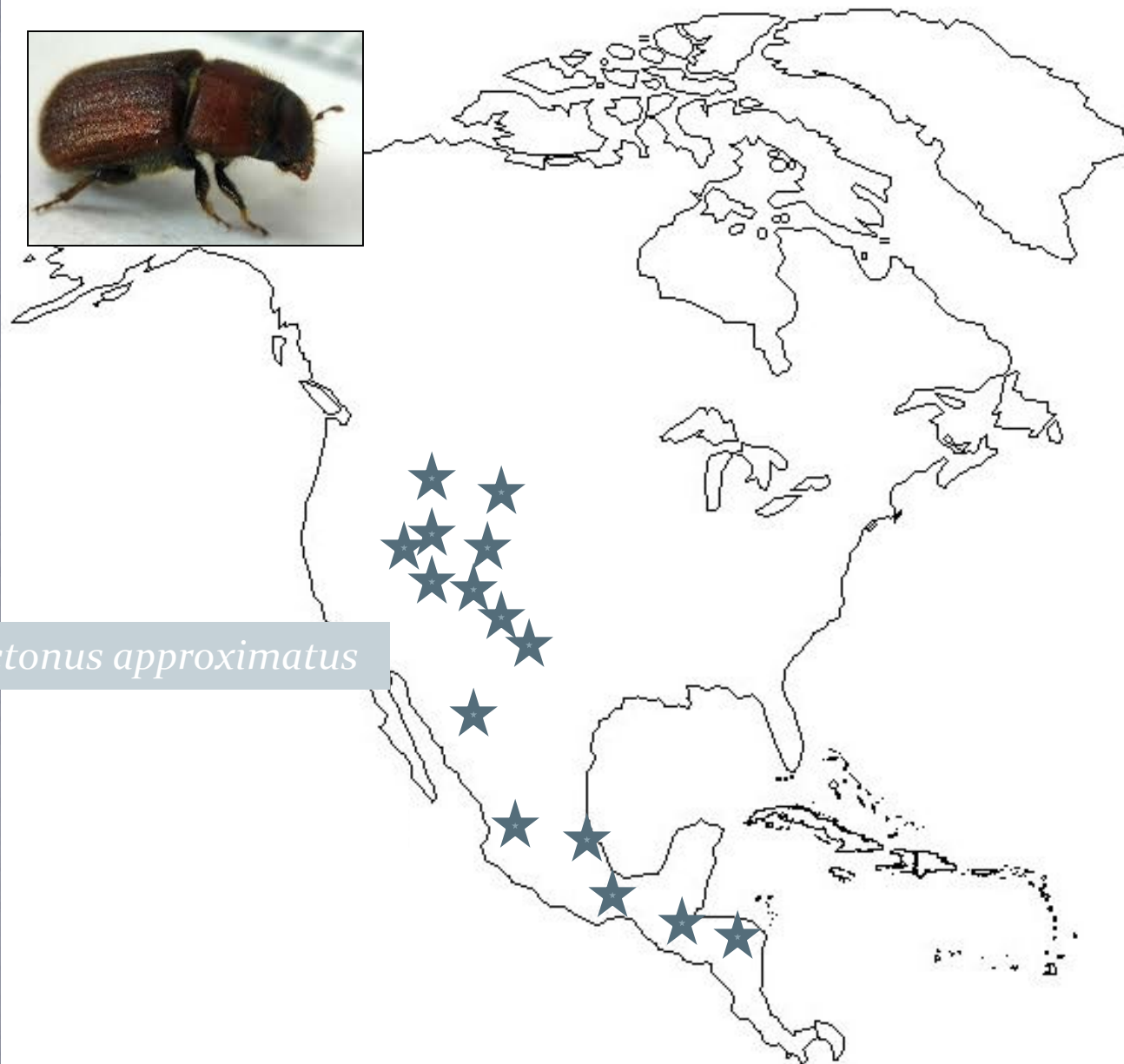


Ips apache Lanier

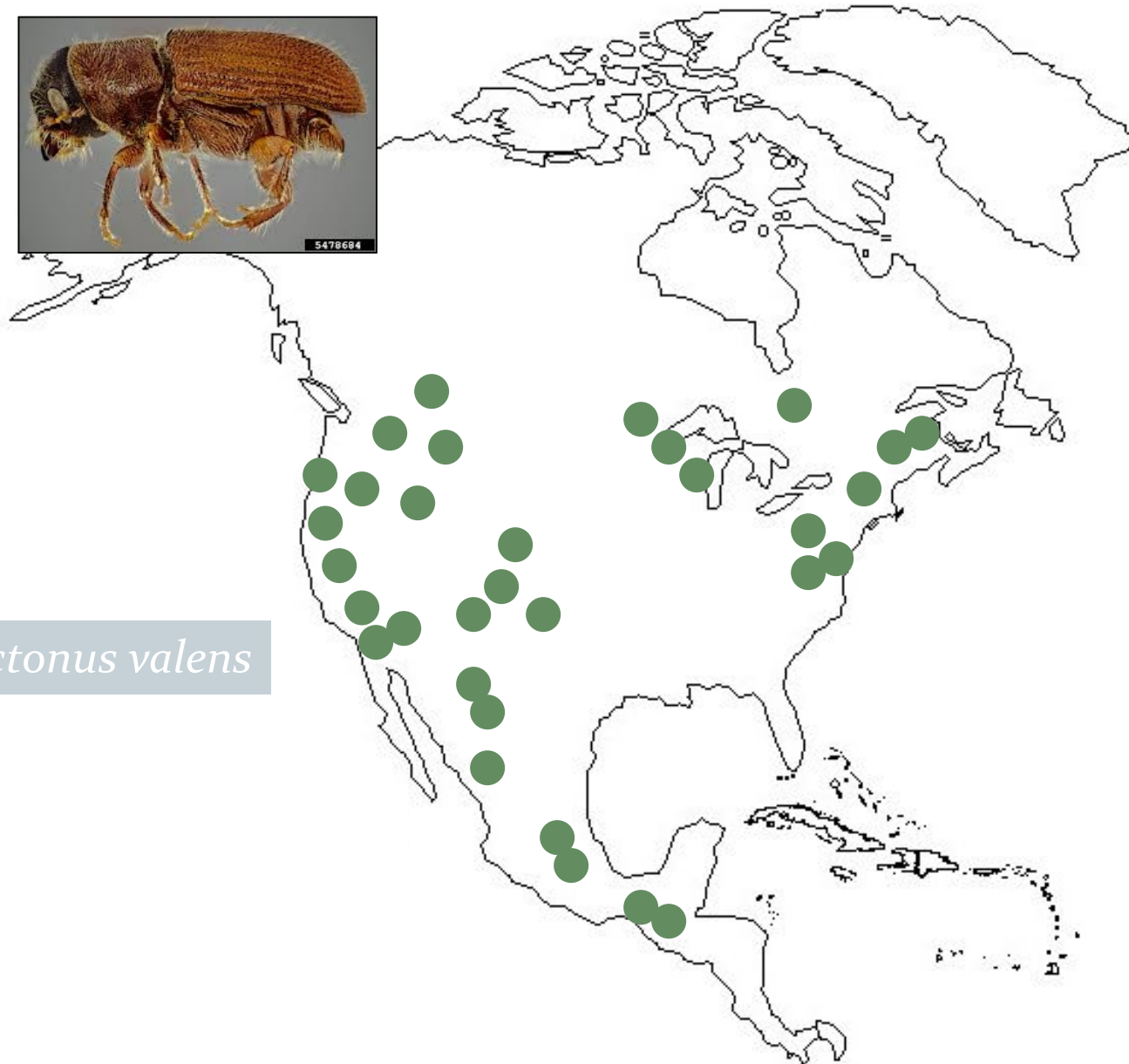


Dendroctonus frontalis





Dendroctonus approximatus



Dendroctonus valens



Hylastes fulgidus



Ips apache



Preliminary Results – Fungi

Ophiostoma pulvinisporum-like sp. nov. ? 27 isolates
Ips sp. and *D. approximatus* galleries

O. pseudoips-like sp. nov.? 4 isolates
Ips sp. and *D. approximatus* galleries, *P. oocarpa*

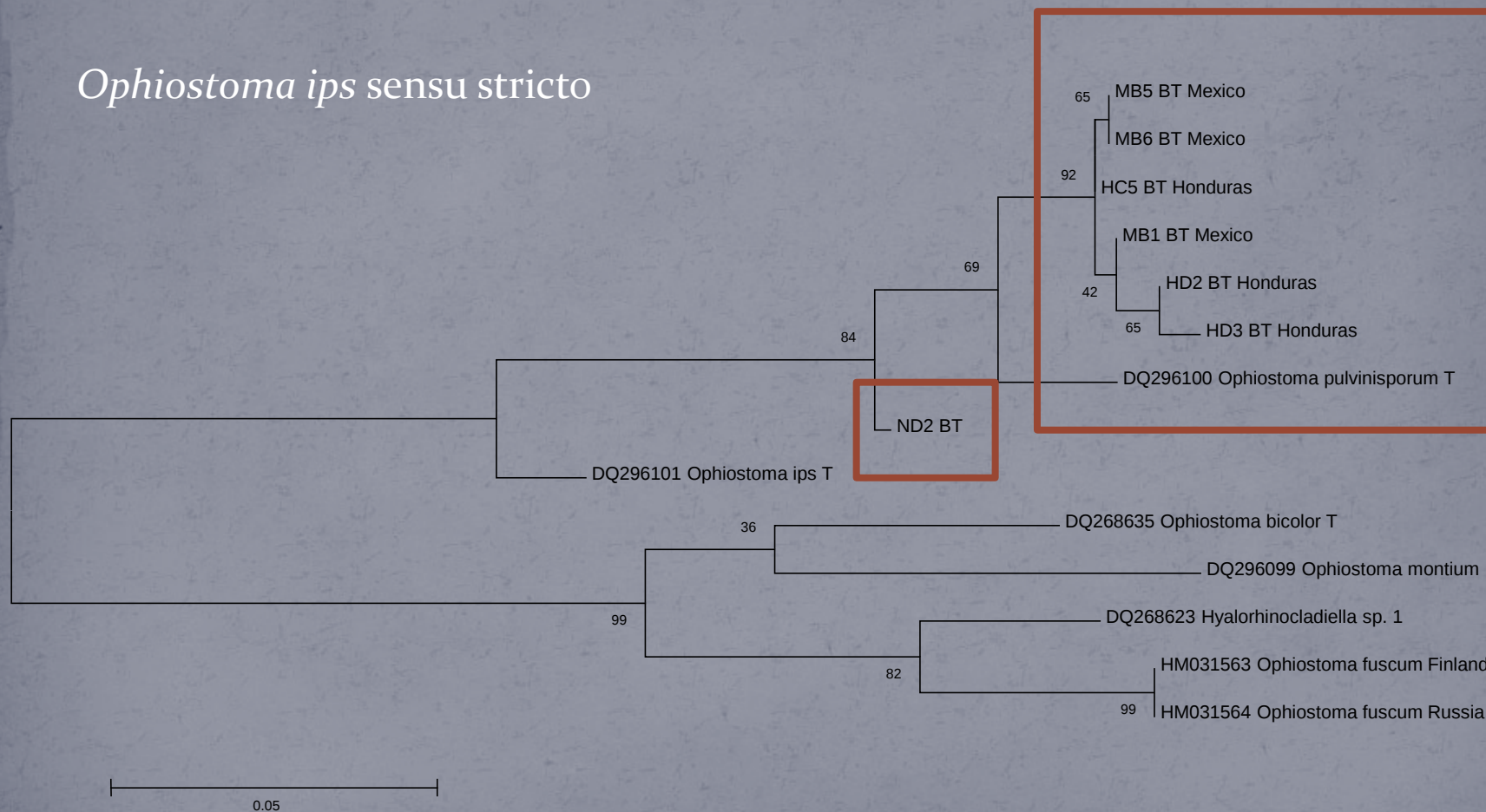
O. pluriannulatum complex 6 isolates
Ips sp., *D. approximatus* and *P. oocarpa*

Leptographium profanum-like sp. nov. ? 7 isolates
D. approximatus galleries

L. terebrantis 8 isolates
Pinus oocarpa

Preliminary Results – Fungi

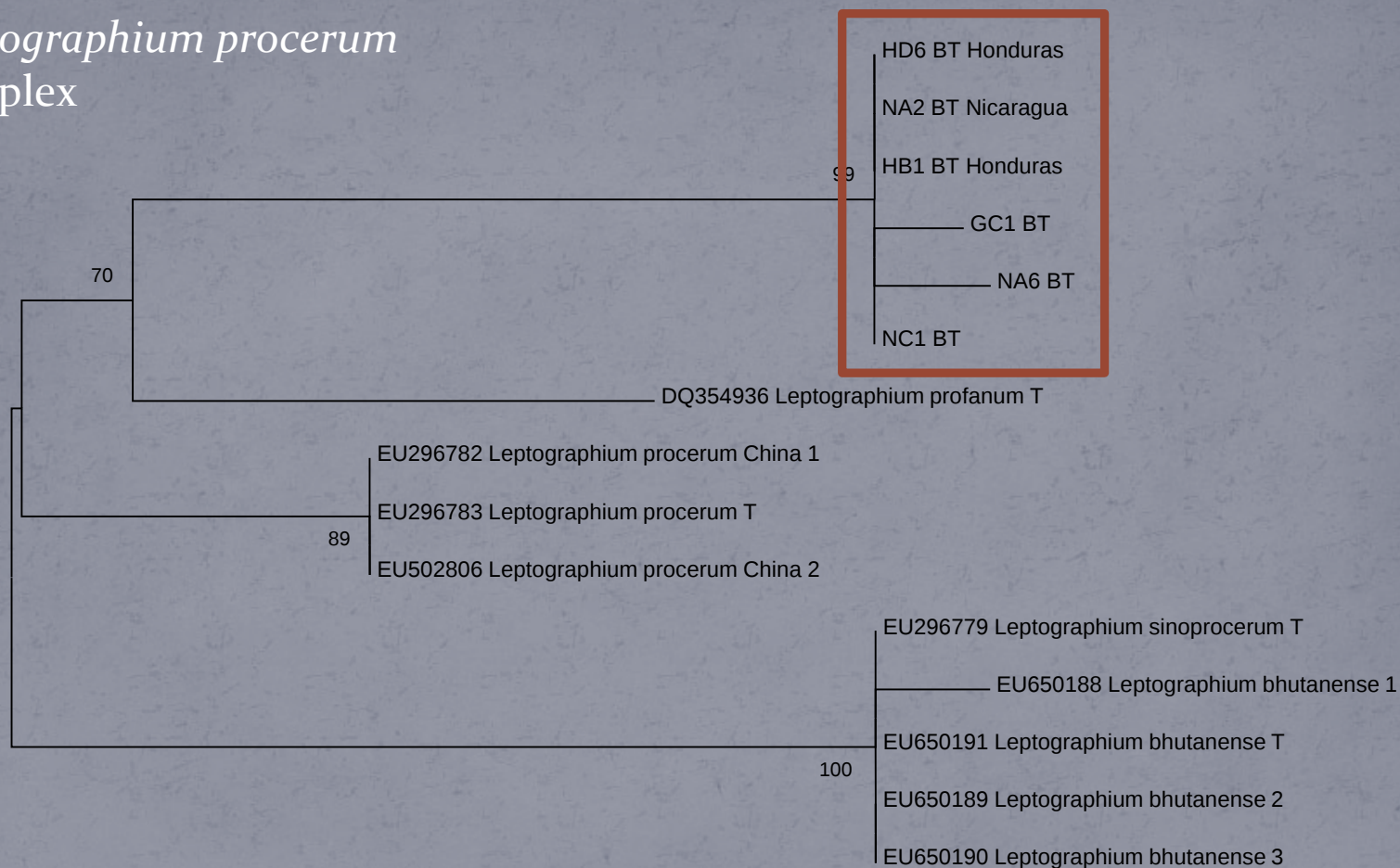
Ophiostoma ips sensu stricto



D. approximatus and *Ips apache* galleries

Preliminary Results – Fungi

Leptographium procerum
complex

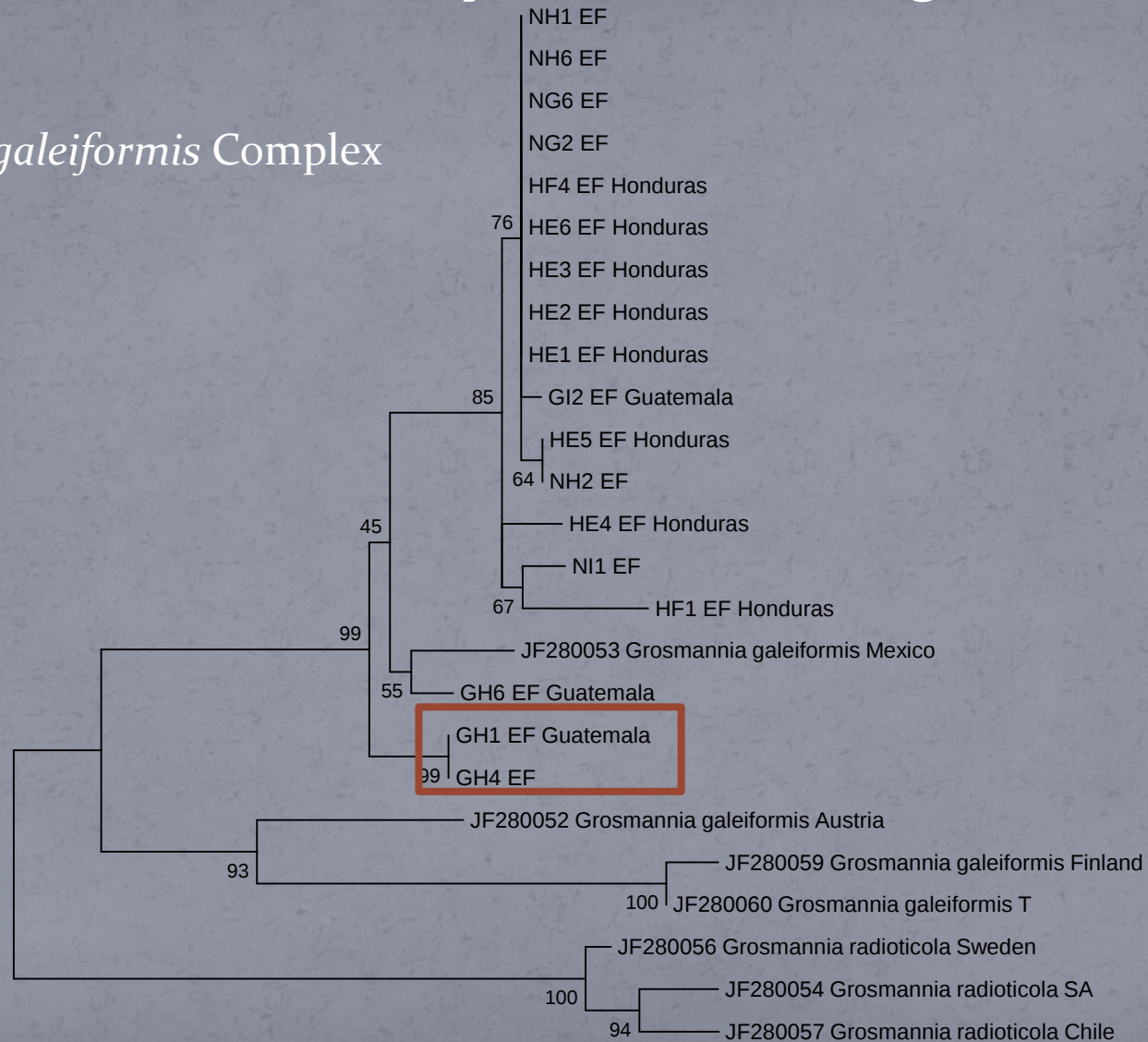


0.005

Hylastes fulgidus and *Ips apache*

Preliminary Results – Fungi

Grosmannia galeiformis Complex



0.005



+



= ?

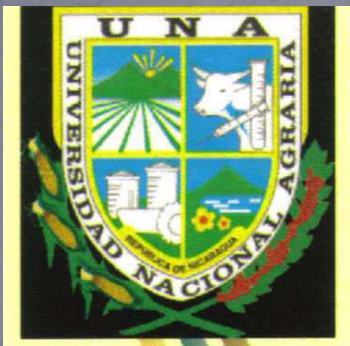
Future Work

Identify remaining Cultures

Phylogenetic Analyses

Fill in the Holes





Questions?

