

Changes in Soil Microbial Diversity and Community Composition Across a Pine Invasion Gradient



Benjamin Reimer¹, Kaile Zhang¹, Ko-Hsuan Chen¹,
Rytas Vilgalys², Jason Hoeksema³, Jonathan Plett⁴,
Ian Anderson⁴, Jeff Powell⁴, Alejandro Rojas⁵, Hui-ling Liao¹

¹University of Florida, Gainesville, FL, USA

²Duke University, Durham, NC, USA

³The University of Mississippi, Oxford, MS, USA

⁴Western Sydney University, Penrith, Australia

⁵University of Arkansas, Fayetteville, AR, USA




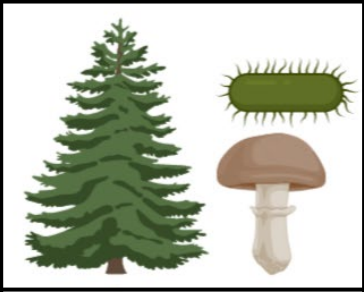


Trends in plant-microbe invasions

Native Community

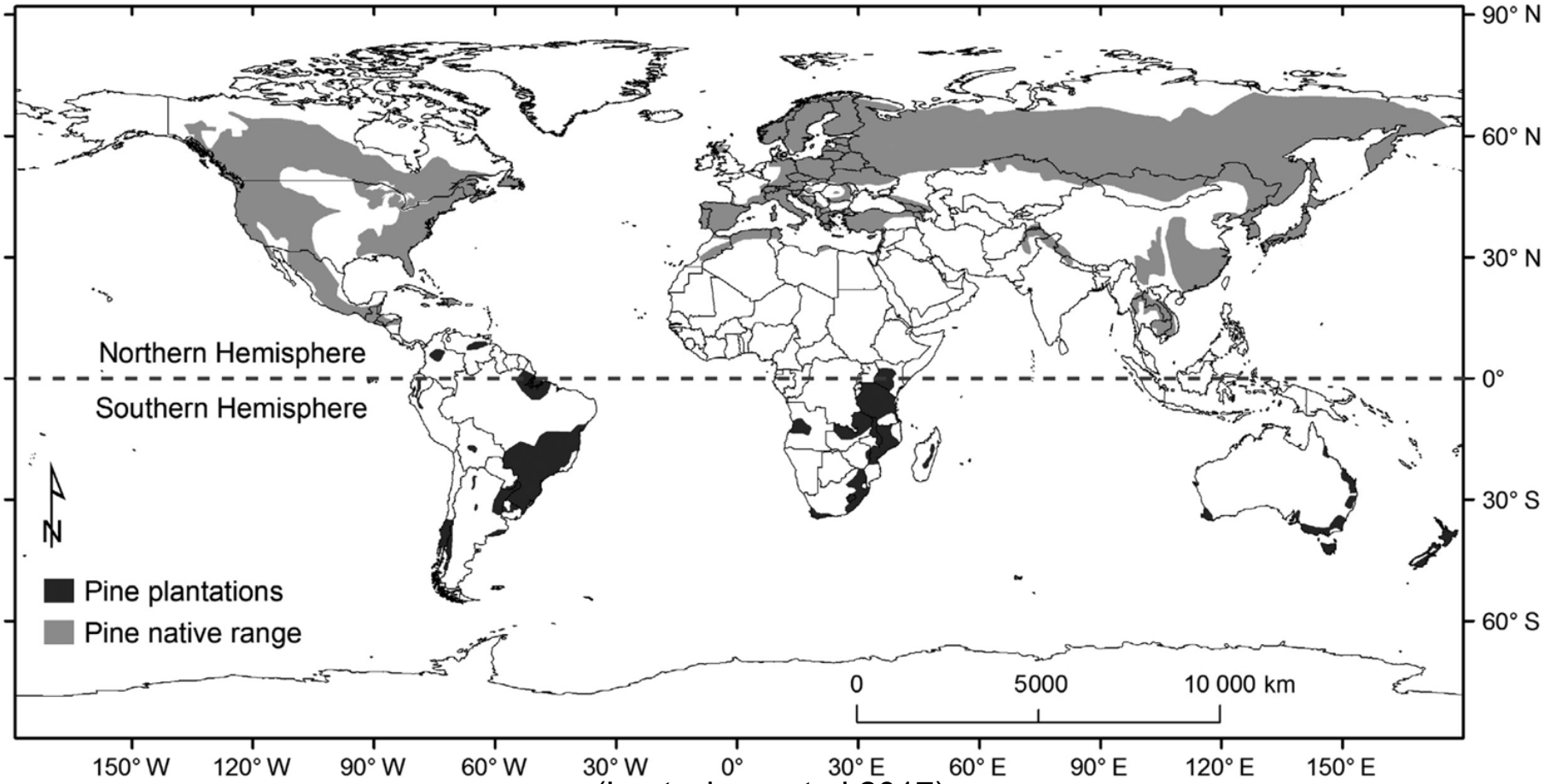
Invasion Strategy

Invasion Front Community

Consequences within the soil

	<p>Co-invasion of both host & microbes</p>		<ul style="list-style-type: none">• Changes in nutrient availability and turnover• Plant-Microbe feedback loop• New pathogen vectors• Loss of soil microbe diversity	
	<p>Novel association with local microbes</p>			
	<p>No symbiotic microbes required for establishment</p>			

Timber plantations in the southern hemisphere use pines native to the northern hemisphere



(Lantschner et al 2017)

Target Questions

What are the roles and factors of soil microbiota in a pine invasion?

- How does the diversity of soil bacteria change across an invasion gradient?
- Which families of microbes distinguish or dominate their respective forest types
- Which forest types exhibit unique or similar compositions of microbe communities

Means and Methods

A Gradient of Forests, Representing Invasion

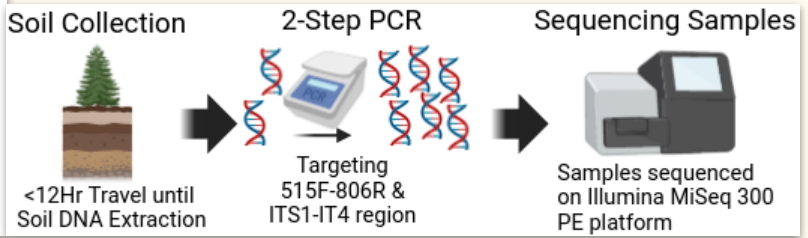
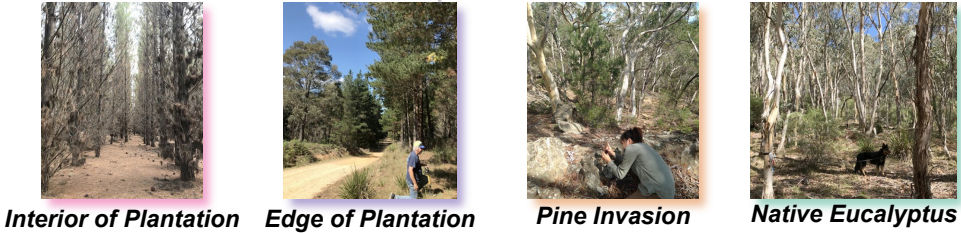
- Native Pine Forest- USA
- Interior of a Pine Plantation-AUS
- Edge of a Pine Plantation-AUS
- Pine Invasion Front-AUS
- Native Eucalyptus Forest-AUS

Tree Soil Samples from

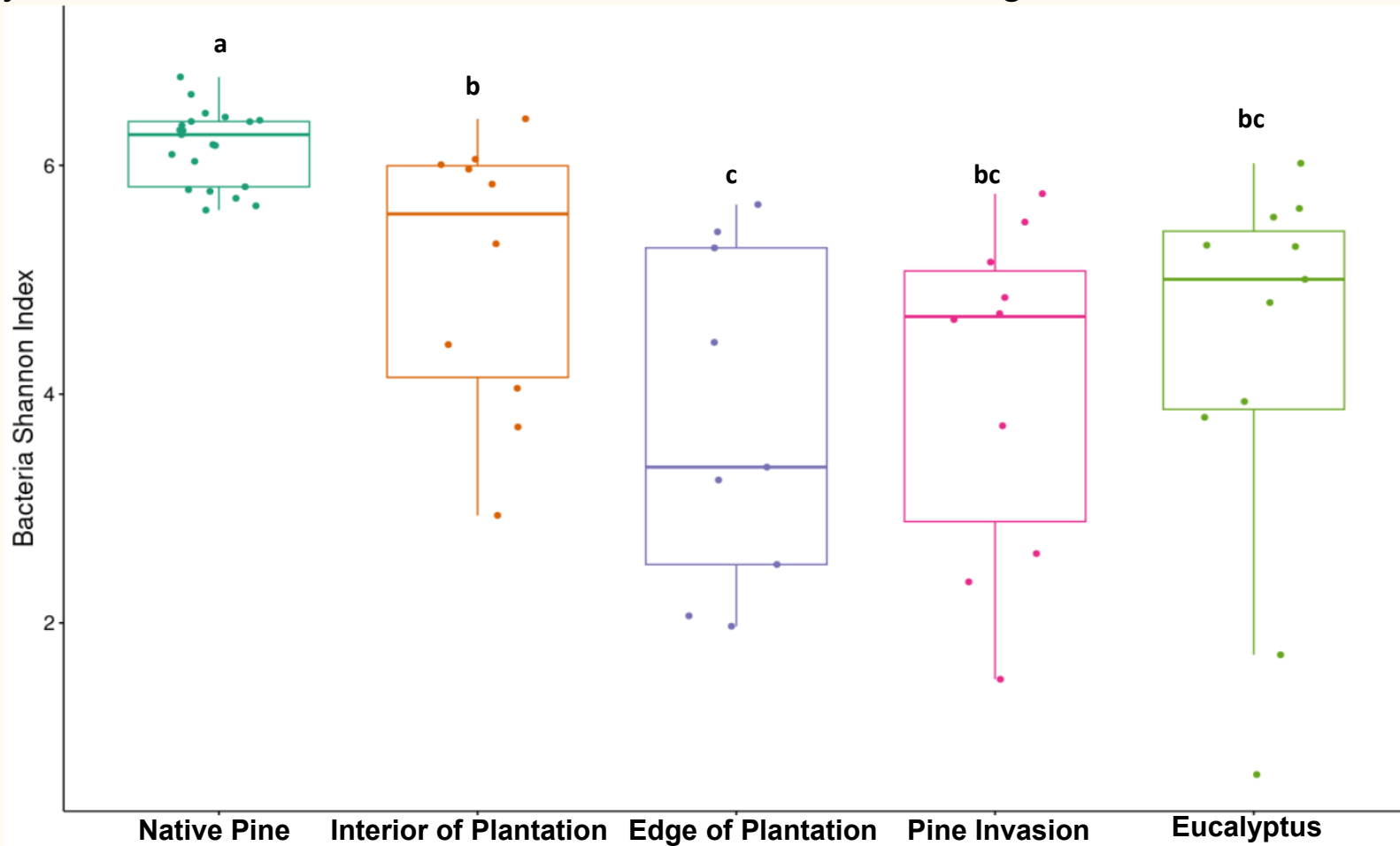
- Pinus radiata*, Monterey Pine
- Eucalyptus camaldulensis*, River Red Gum

PCR Identification Regions

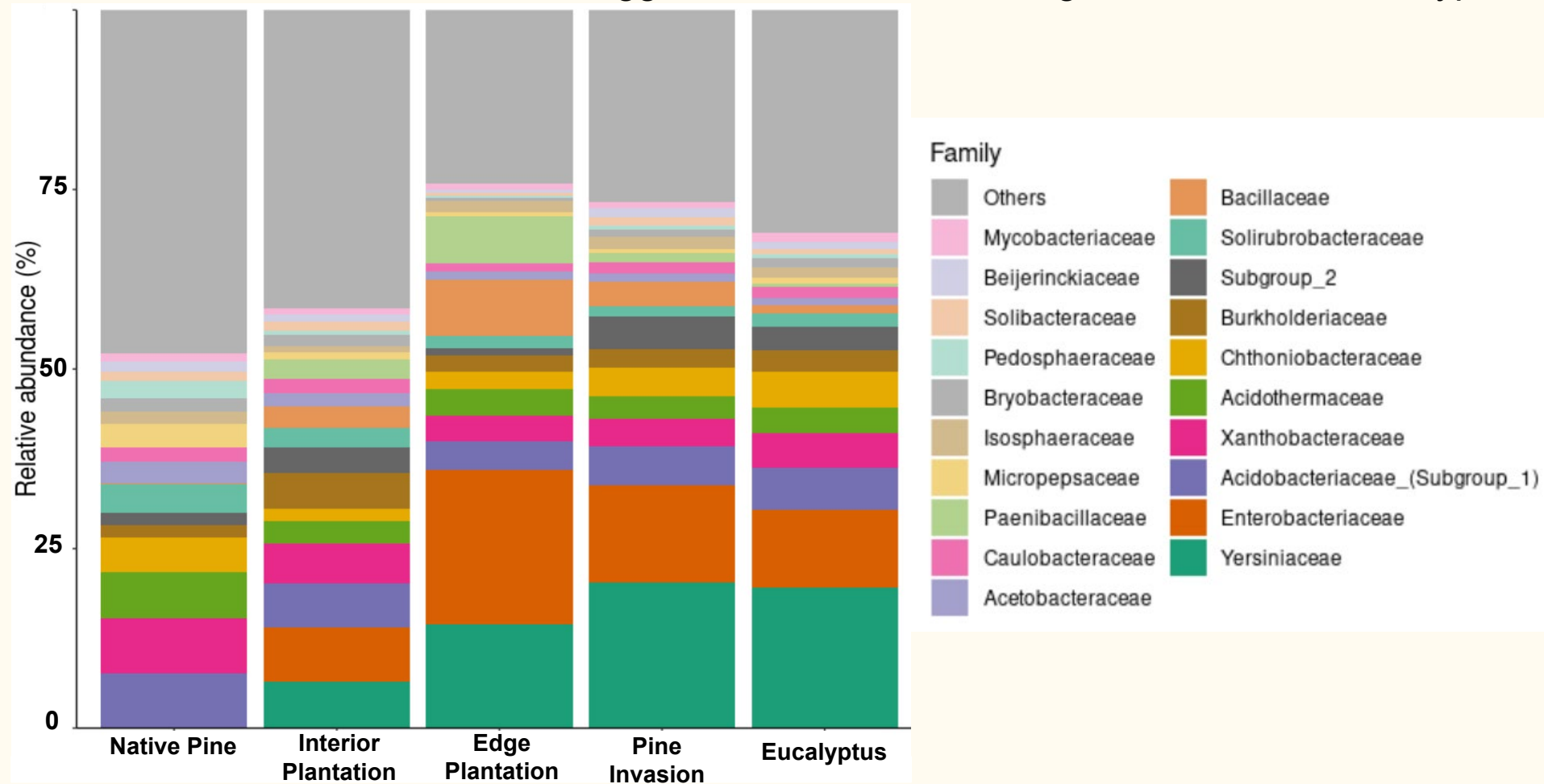
Bacterial 16S, 515F-806R primer



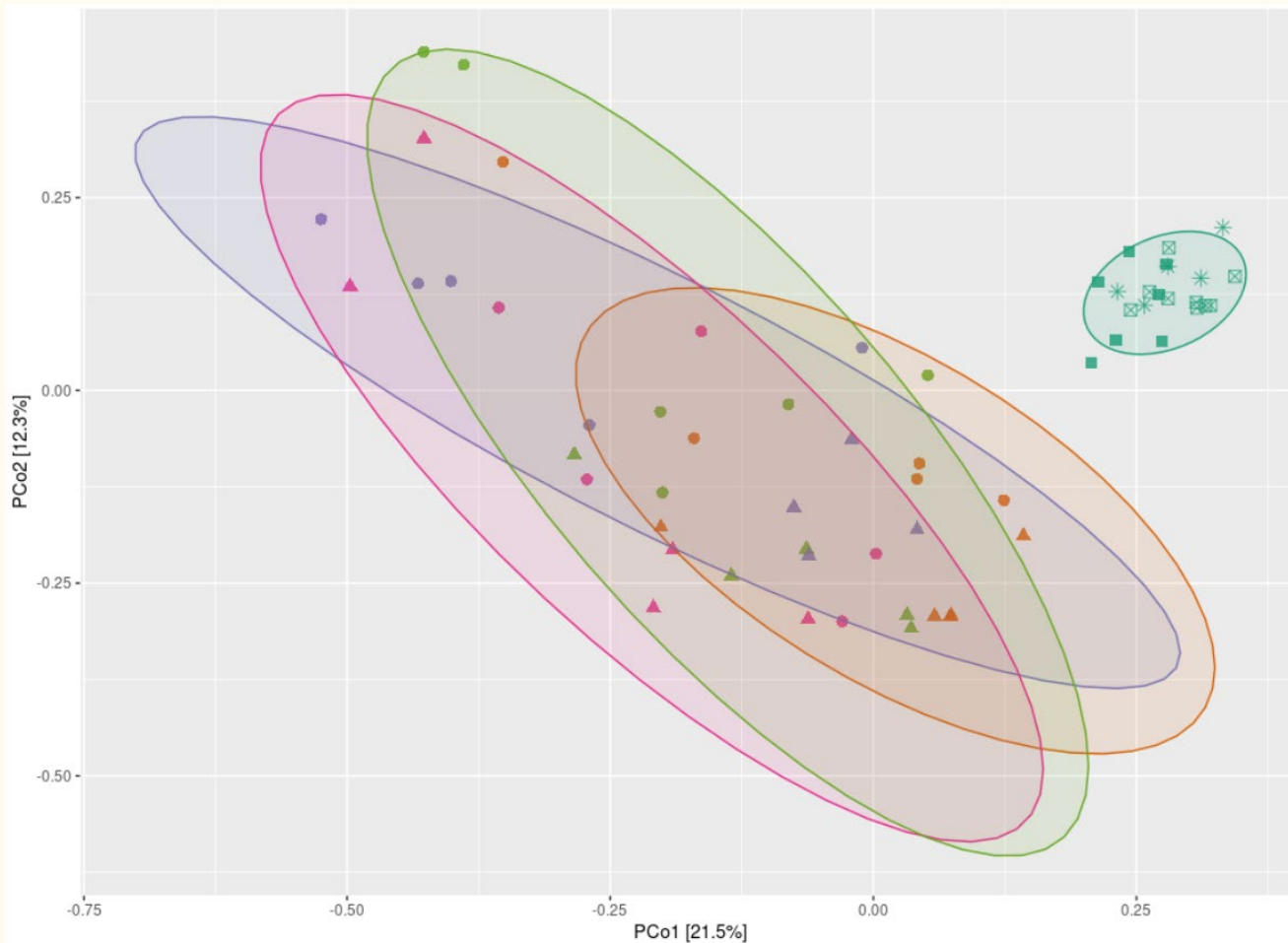
Diversity of soil bacteria association was lost when transitioning between USA and Australia



Relative abundance of bacteria suggest a few families distinguish between forest types



PCoA ordination show Australian forests with distinct composition from USA native forests



Summary

- We found reduced diversity of bacteria associated within the non-native pine range, compared to the native pine range
- We identified novel associations of bacteria families in the non-native range.
- The soil community structures of Australia show greater similarities with one another than with US native pine ranges, independent of the tree species

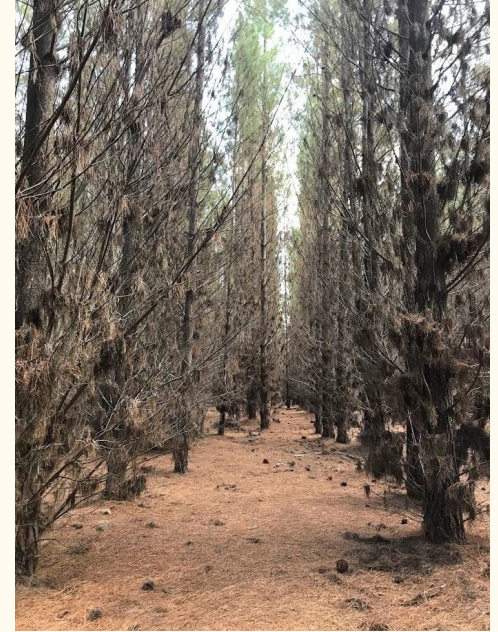
Possible explanations, and future steps



Consider understory
and broader plant
diversity



Including soil chemistry
data



Inclusion of fungi &
direct root association
datasets

Acknowledgments

Co-Authors

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Rytas Vilgalys
Jason Hoeksema
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Lantschner, M. V., Atkinson, T. H., Corley, J. C., & Liebhold, A. M. (2017). Predicting North American Scolytinae invasions in the Southern Hemisphere. *Ecological Applications*, 27(1), 66-77.

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