

Screening of ectomycorrhizal and other associated fungi in South African forestry nurseries

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Where leaders learn

Ectomycorrhizal (ECM) fungi and Pine

- Initial planting of pine within South Africa were very rarely successful.
- The presence of ECM fungi allowed pines to become dominant in a varying range of climates and poor soil conditions (Dickie *et al.*, 2010)

ECM fungi



- Are essential to the health and growth of many forest trees
 - Provide plant with increased access to nutrients such as, P and N for plant produced C. (Garcia & Zimmerman, 2014)
 - Plant–growth promoting hormones
 - Increased resistance to pathogens
 - Increased tolerance to drought and acid soils (Smith & Read, 2008)

Benefits to seedlings



- Reduce transplant shock
- Seedlings inoculated with ECM fungi have increased:
 - Height
 - Nutrient reserve within the seedling
 - Growth and survival after out-planting (Ricon et al., 2007)
 - Adaptability to changeable conditions (Sanchez-Zabala et al., 2013)

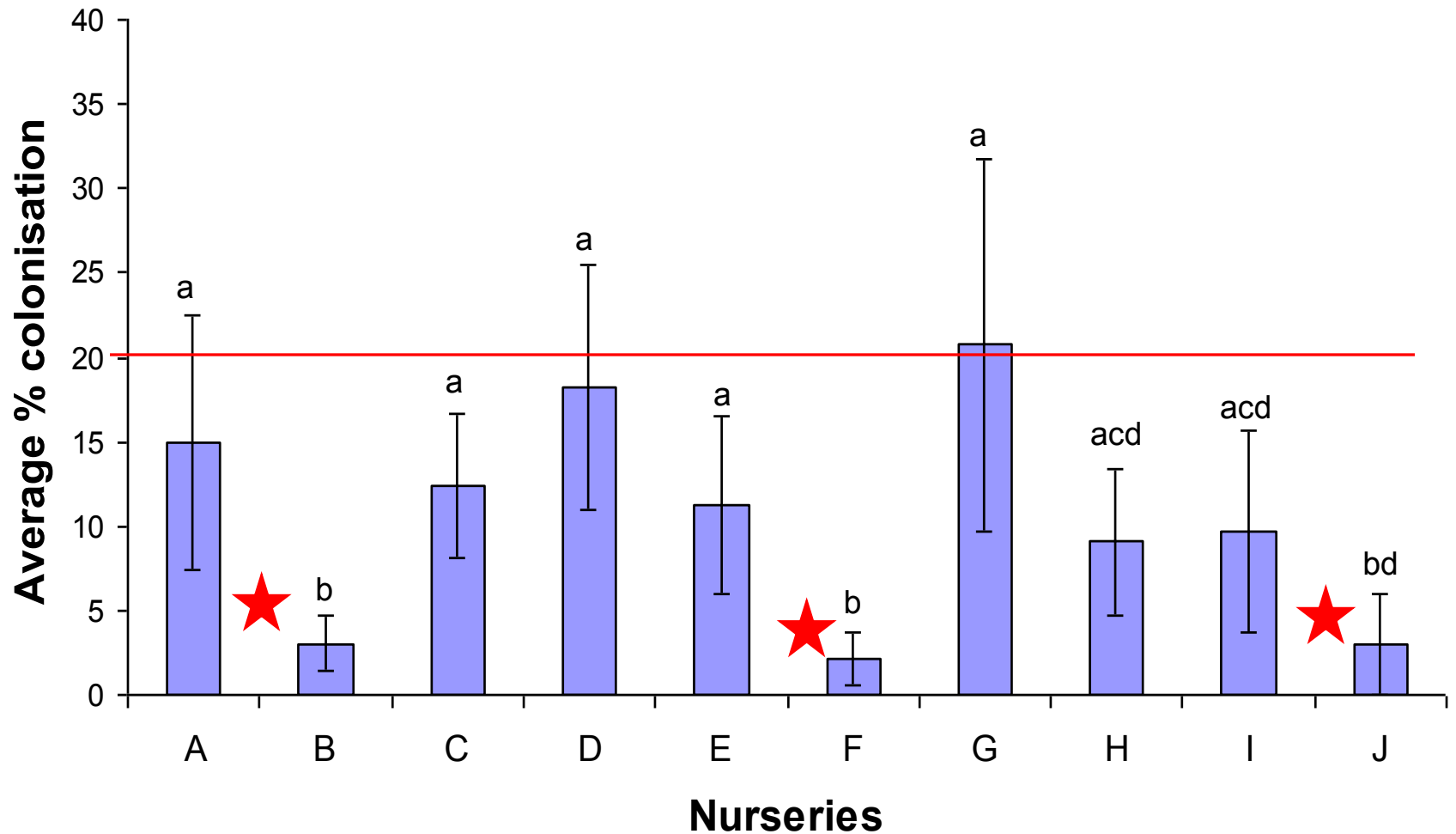


Aims

Determine the fungal biodiversity of *Pinus patula* seedlings with an emphasis on the ECM fungi

- Assess natural ECM fungal colonisation on *Pinus patula* seedlings from selected nurseries
- Morphologically and molecularly identify the ECM and other associated fungi

Average Percentage Colonisation



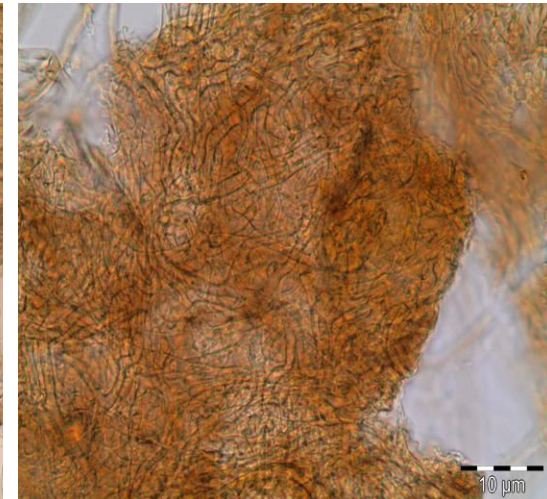
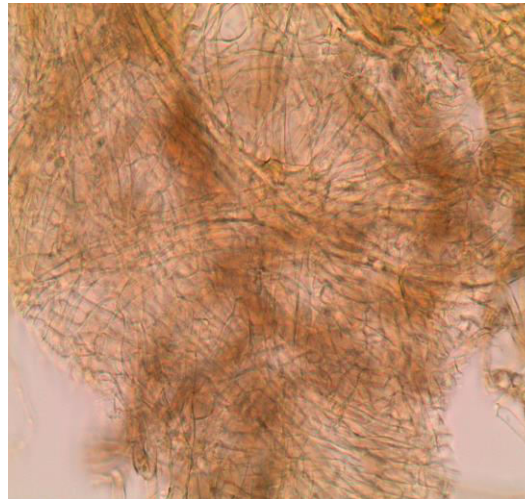
H: (9, N=180) = 108.7233 p=0.00001

Morphology – identifying characteristics

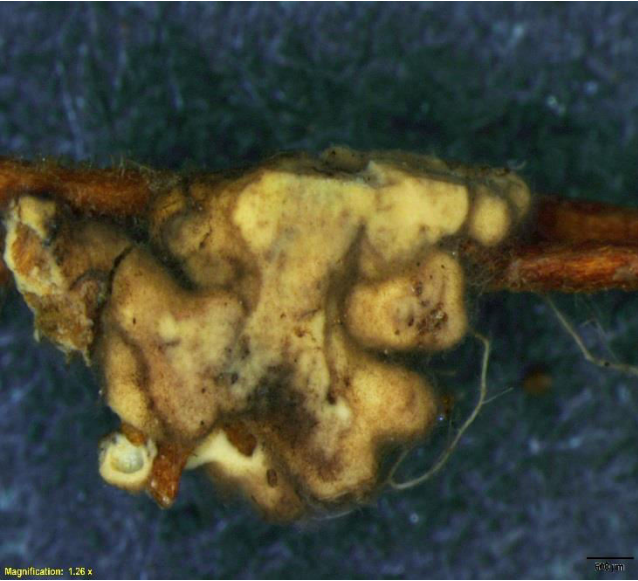
- Shape, colour and texture of branches, and presence of rhizomorphs



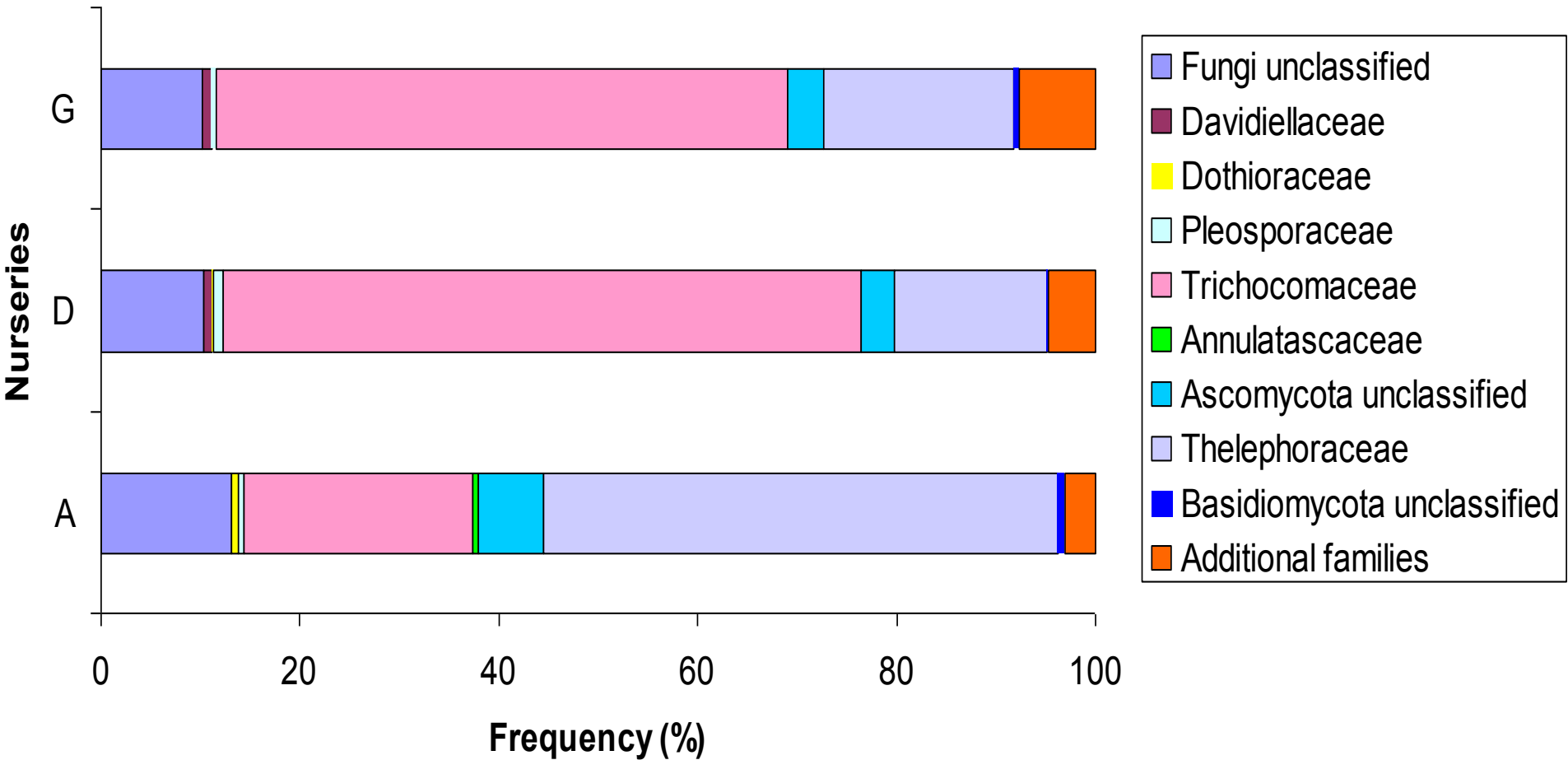
- Mantle arrangement and number of layers



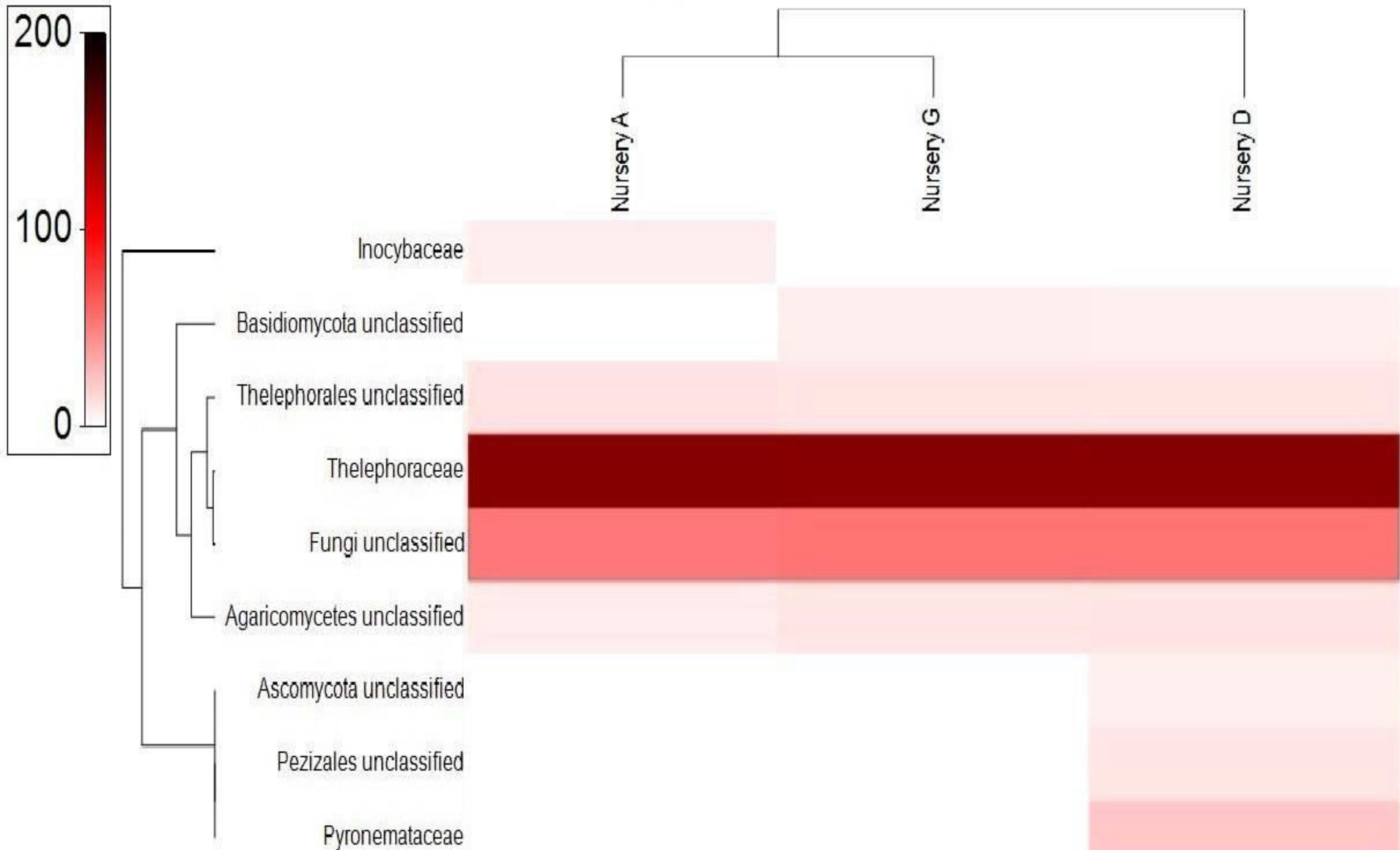
Different fungal Morphotypes



Fungal diversity



ECM fungal diversity





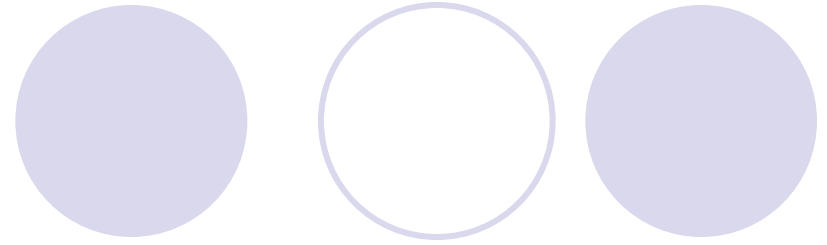
What does this tell us?

- South African nurseries have low levels of ECM fungal colonisation
- The majority of the ECM fungi present are offer little reward to the seedlings
- The diversity within seedling roots varies according to nursery practice
- Thus, is it important to inoculate seedlings early with known beneficial ECM fungi

References

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