Arbuscular mycorrhizal fungal abundance in dry Afromontane forests in northern Ethiopia

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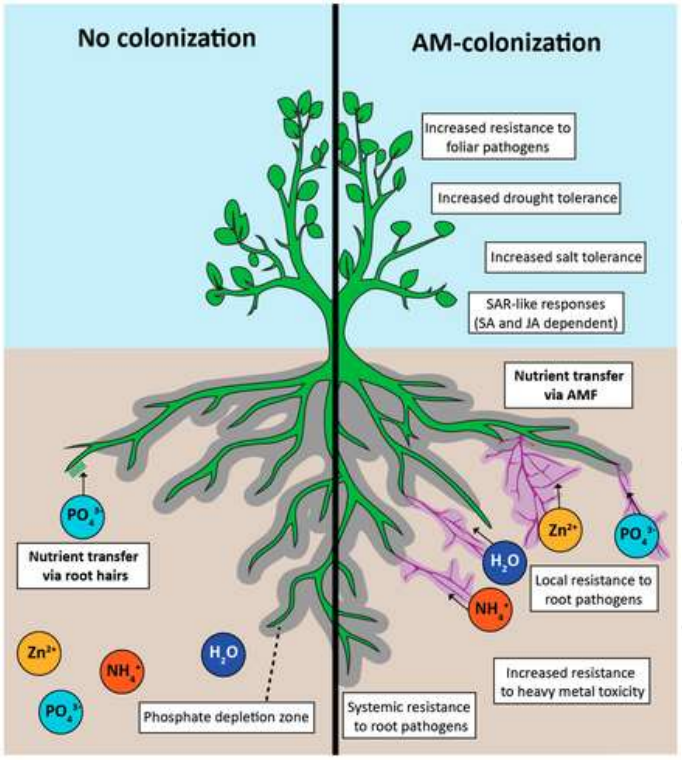
RESEARCH PROGRAM ON Water, Land and Ecosystems

CGIAR

Context

- Arbuscular mycorrhizal fungi (AMF) play important functional roles in ecosystems
- (AMF)-spore density and root colonization are sensitive to host species and abiotic factors such as climate and soil
- But knowledge gaps exist



Positive effects of AMF colonization (https://en.wikipedia.org/wiki/Arbuscular_mycorrhiza#:~:text=An%20arbuscular%20mycorrhiza%20(plural%20mycorrhizae,with%20ectomycorrhiza%20or%20ericoid%20mycorrhiza.)

We investigated AMF spore density & root colonization along disturbance and altitudinal gradients in fragmented forest landscapes in northern Ethiopia

1. AMF abundance along disturbance gradient

3 plant communities along distubance gradient

Juniperus procera—Maytenus senegalensis

Pterolobium stellatum—Celtis africana

Cadia purpurea—Opuntia ficus-indica

diversity

MDPI

https://www.mdpi.com/1424-2818/12/4/133

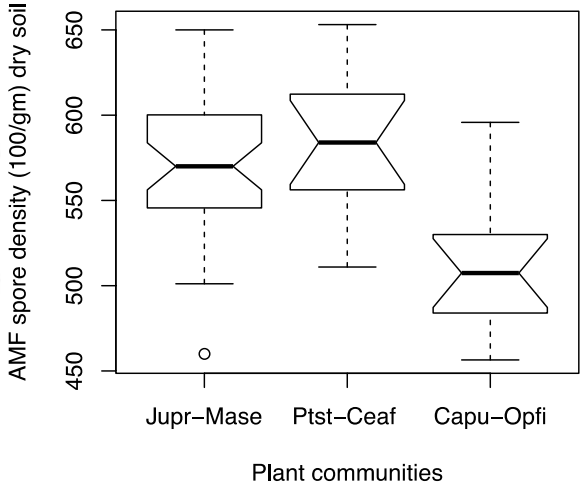
Article

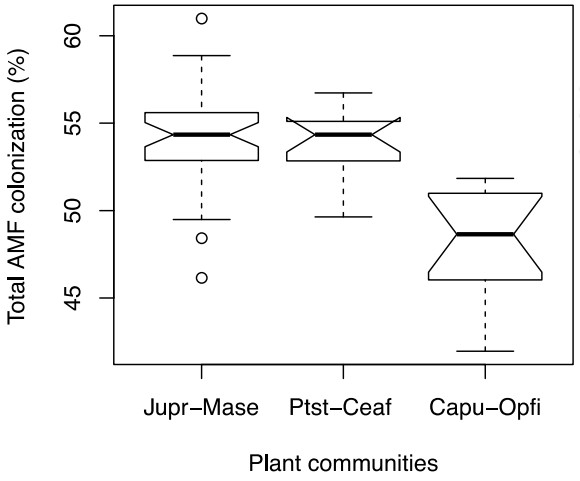
Effects of Forest Composition and Disturbance on Arbuscular Mycorrhizae Spore Density, Arbuscular Mycorrhizae Root Colonization and Soil Carbon Stocks in a Dry Afromontane Forest in Northern Ethiopia

Emiru Birhane [1,*], Kbrom Fissiha Gebretsadik [1], Gebeyehu Taye [1], Ermias Aynekulu [3], Meley Mekonen Rannestad [2] and Lindsey Norgrove [4]

Results

- AMF Spore density and root colonization differed significantly among the three plant communities
  - Jupr-Mase having the highest and Capu-Opfi the lowest colonization rate
    - Forest landscape degradation significantly affected ABM density





2. ABM abundance along altitudinal gradient in church forest gradients

Church forests are biodiversity ‘hotspots’ on agricultural landscapes

Microbial Ecology
https://doi.org/10.1007/s00248-021-01744-5

(https://link.springer.com/article/10.1007/s00248-021-01744-5)

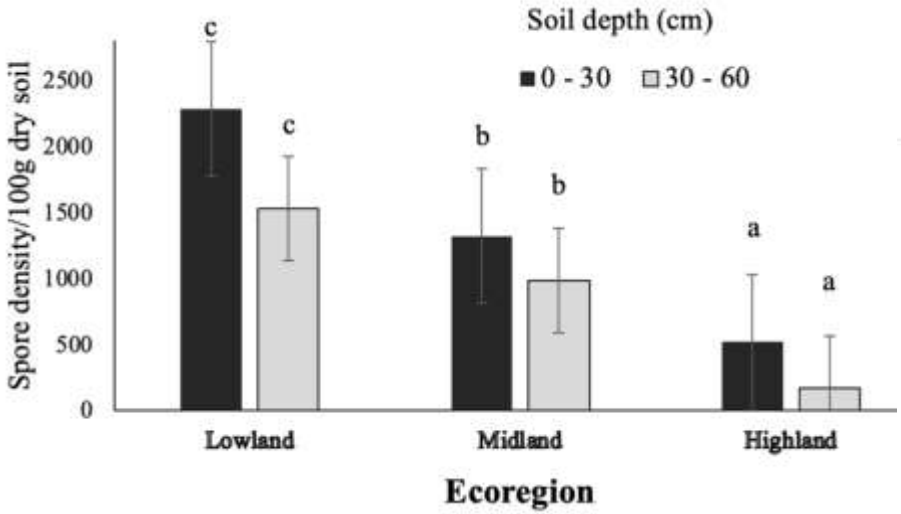
FUNGAL MICROBIOLOGY

Root Colonization and Spore Abundance of Arbuscular Mycorrhizal Fungi Along Altitudinal Gradients in Fragmented Church Natural Forest Remnants in Northern Ethiopia

Emiru Birhane[1] · Teklemariam Gebregergs[2] · Mengisteab Hailemariam[1] · Lindsey Norgrove[3] · Ermias Aynekulu[4]

Results

- AMF abundance and colonization increase with decreasing elevation
- AMF abundance and colonization was higher on the topsoil than subsurface soil
- *Ficus* species and *Hagenia abyssinica* harbor high spore densities



Conclusions and implications

- The evidence applicable for ecosystem restoration, agriculture, biodiversity
- Conserving remnant forests as ABM spore bank inoculums for restoration of degraded landscapes
- More research on ABM and soil biology needed

Thank you for your attention