

From Moon-dust to Lunar soil: Growing crops in deep space

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Introduction and motivation

In-situ resource utilization reduces the reliance on Earth-based supplies.

- Lunar regolith holds promise as a source of nutrients. Inaccessible elements and trace minerals found in regolith can be used to support plant growth and establish a sustainable lunar presence.
- LR contains contaminants toxic to most biological life, lacks organic matter, and has poor structural properties.
- To mitigate these obstacles we leverage the interactions between terrestrial organisms Arbuscular Mycorrhizal Fungi (AMF) Vermicompost (VC), and Chickpea (CP).

Results

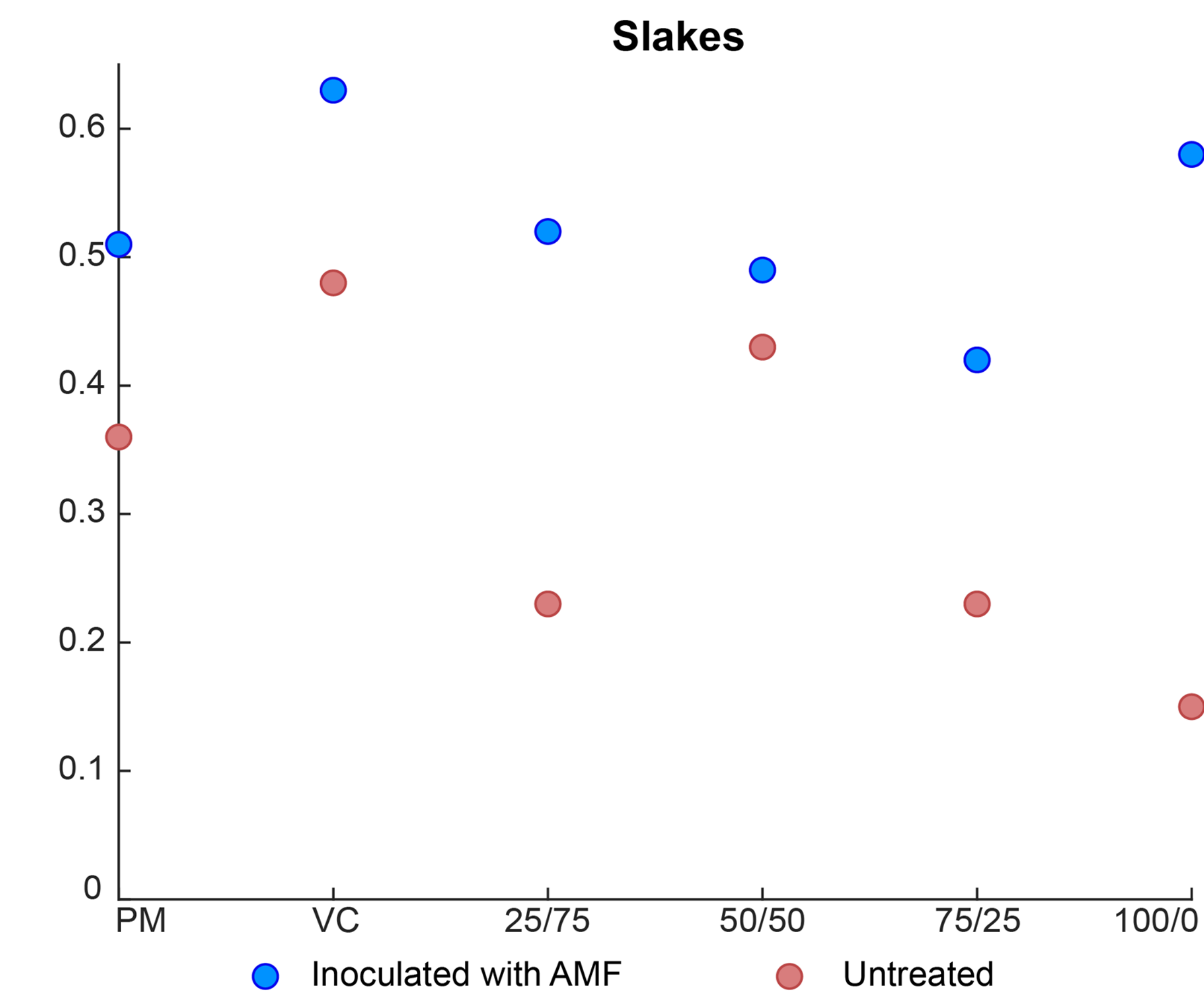
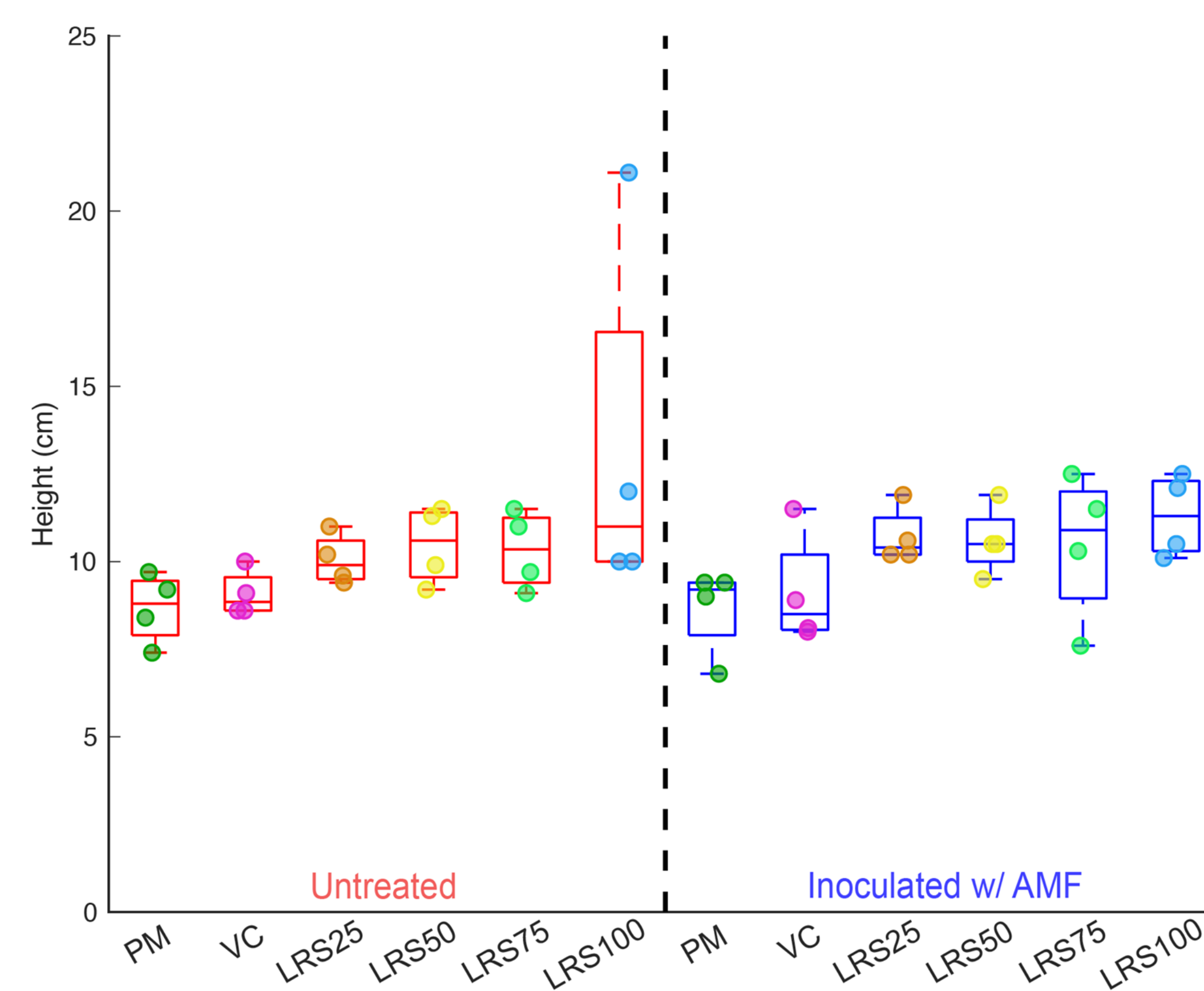
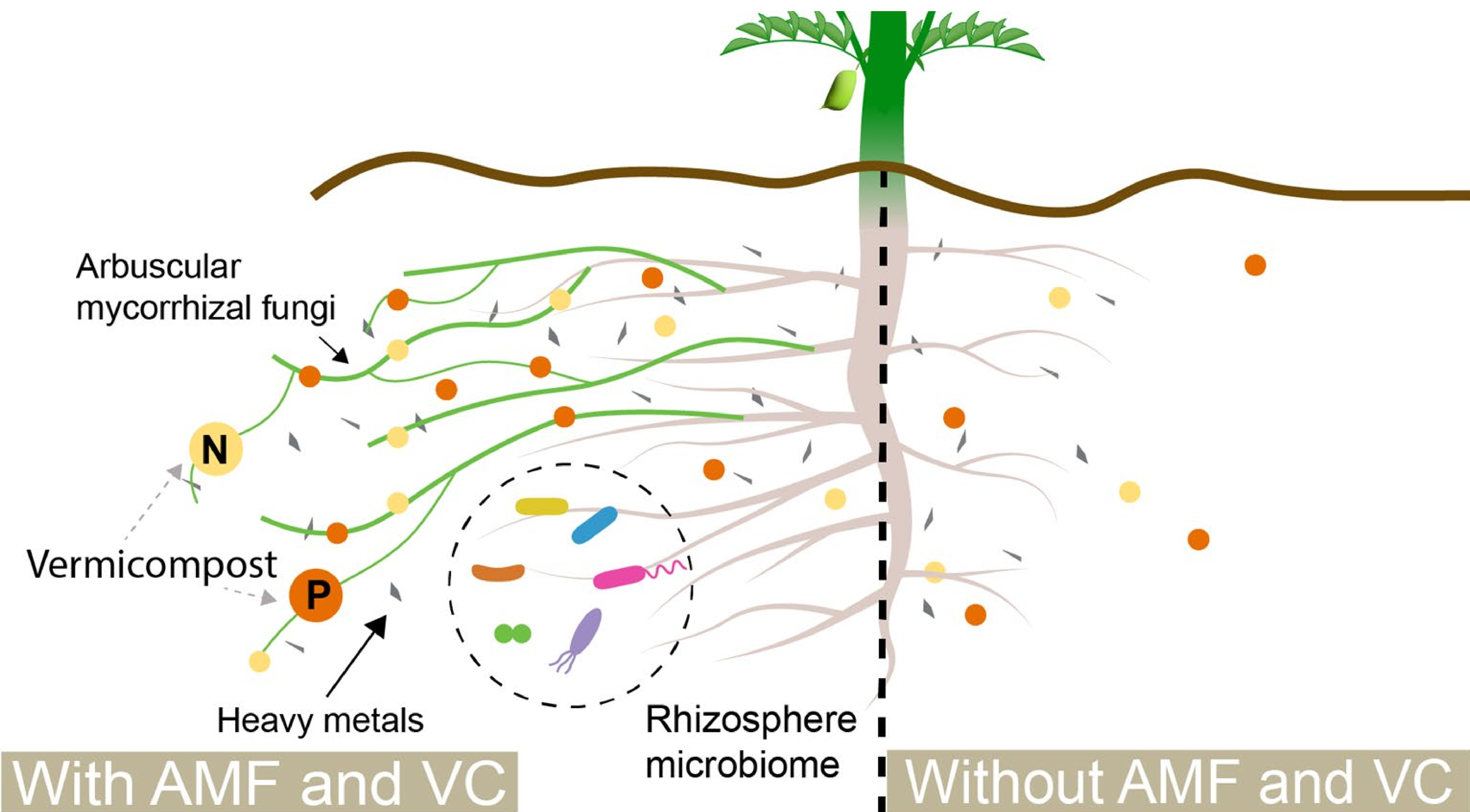
- All plants exposed to LRS exhibited signs of stress including stunting, reduced leaf area, limited shoot branching.
- CP grown to maturity, demonstrating seed set, revealing successful reproduction in LRS concentrations. CP did not experience bolting in inoculated 100% LRS, we hypothesize this was due to AMF mitigating elemental toxicity.
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Soil Aggregate Stability using SLAKES¹

Soil aggregation increases resistance to erosion, improves water infiltration, and retention.

- Inoculated LRS, consistently demonstrates higher slake values across diverse treatments, indicating AMF inoculation enhances the stability of lunar regolith through glomalin secretion.
- P-value of 0.006 shows strong difference between AMF and non-AMF.

1 - Fajardo et al., 2016



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Scan for BioRxiv pre-print



For general audiences



Discover
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Newsweek



Chickpea grown in 75% LRS

Veteran Research
SHOWCASE

