Arbuscular Mycorrhizal Fungi Colonization Decreases Under High Precipitation and Compost Treatment in Semi-Arid Rangelands

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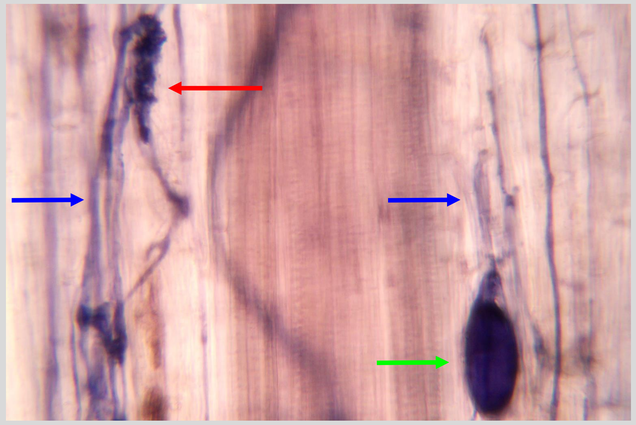
Introduction

- Arbuscular mycorrhizal fungi (AMF) are plant symbionts
- AMF increase plant nutrients while receiving plant C
- How compost amendments affect AMF is unknown.
- **Here we measure the AMF-plant relationship under fertilizer and compost amendments across a precipitation gradient in semi-arid rangelands.**



AMF structures: hyphae (blue), vesicles (green), or arbuscules (red). These structures are found near cortical cells of plant roots, and conduct nutrient storage, transport, and transfer.

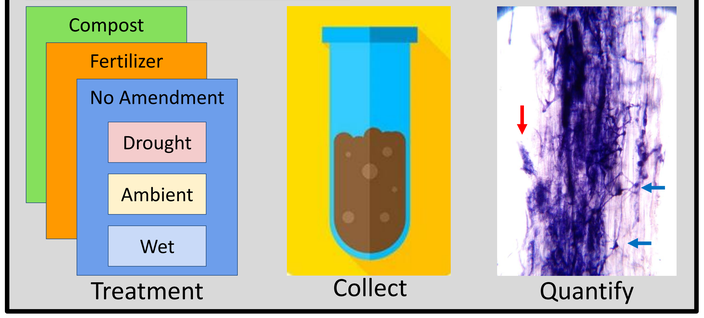
Hypothesis

We expect that as increased nutrients and precipitation supplement the benefits of AMF colonization, plant hosts will reduce C delivery to AMF:

H1: AMF colonization rates will be highest under no amendment soils, decrease under inorganic fertilizers, and be the lowest under composted conditions. These effects will be exaggerated by increased precipitation.

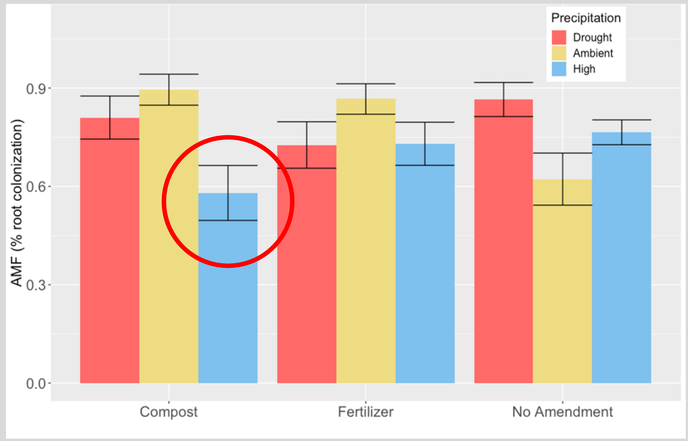
H2: Root biomass will negatively correlate with AMF under soil amendments

Methods



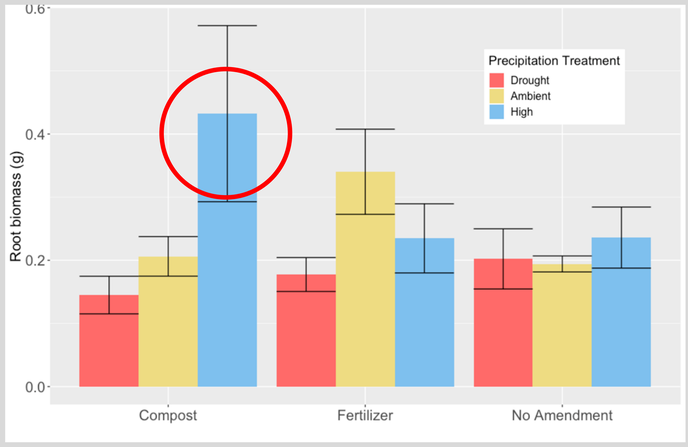
Results

AMF Decrease With Compost and High Precipitation Treatments



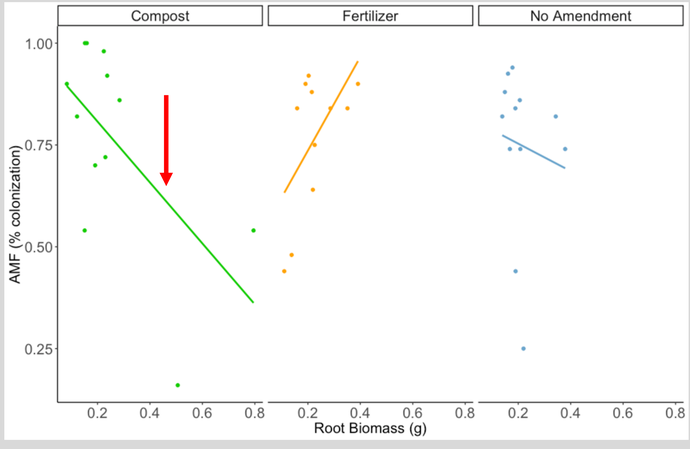
- **Within the compost treatment, high precipitation had lower AMF colonization than the ambient precipitation treatment ($p = 0.0058$)**

Root Biomass Increases With Compost and High Precipitation Treatments



- **Plant root biomass was greatest in the compost, high precipitation treatment**

AMF Negatively Correlate With Root Biomass Under Compost

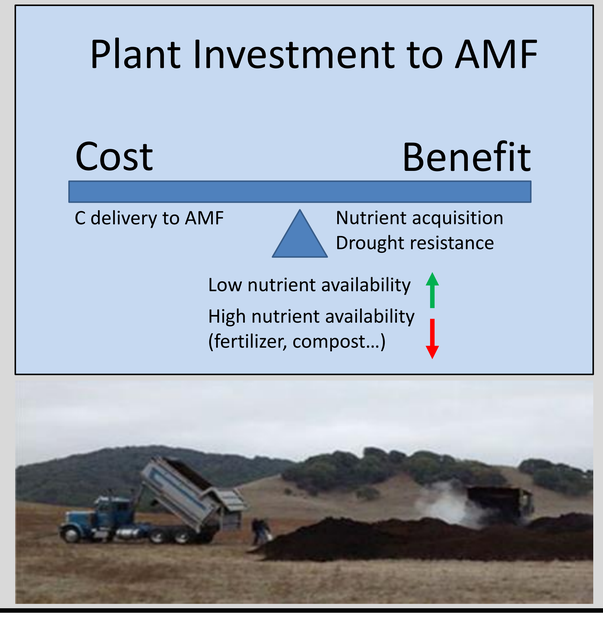


- **AMF colonization significantly negatively correlated with plant root biomass under the compost treatment ($p = 0.03948$, $R^2=0.33$)**

Conclusions

H1 was not fully supported by AMF colonization data, as there was no significance between nutrient treatments. However, we can conclude that under high precipitation and compost treatments, AMF colonization was significantly decreased.

H2 was partially supported by a significant negative relationship between AMF and root biomass under compost amendments.



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Acknowledgments

Thanks to Dr. Ashley Shaw and Dr. Lauren Hallett for this research opportunity, Dr. Bitty Roy for using her lab, Dr. Roo Vandegrift for advice on AMF identification, UC Sierra Foothills Research and Extension Center, and the UO ESPRIT program. UO Noyce ESPRIT is funded by NSF DUE 1660724. Project funding from USDA grant 2018-67019-27848.