



Testing the effect of native arbuscular mycorrhizal fungi on prairie restoration success at Nachusa Grasslands



Reb L. Bryant^{1,2} and James D. Bever^{1,2}

1. Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, KS 66045
2. Kansas Biological Survey and Center for Ecological Research, University of Kansas, Lawrence, KS 66045



Introduction

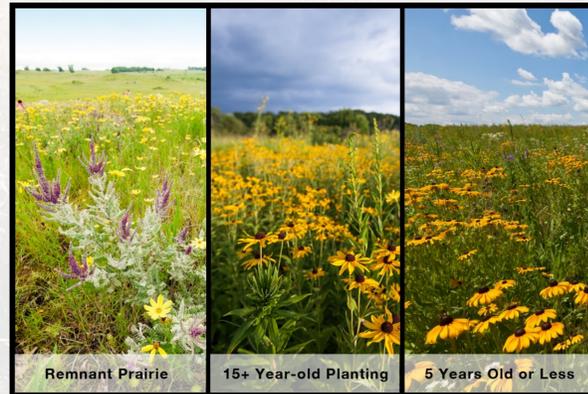
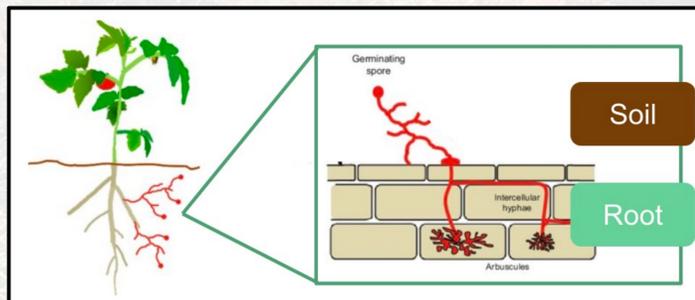


Photo by Jason Willand

- Prairie restorations often lack the level of biodiversity of remnant prairies despite tremendous effort
 - Missing and rare plants are often highly conservative "late successional" species



Adapted from López-Ráez and Pozo (*Progress in Symbiotic Endophytes*, 2013)

- Arbuscular mycorrhizal (AM) fungi in the soil form symbiotic relationship with many land plants
 - Provide plants with nutrients like phosphorous and water in exchange for carbon
 - Communities have been shifted due to agricultural
- Late successional plants tend to respond more to AM fungi than early successional plants that readily establish in restorations

Will native AM fungi help rare late successional plants establish and increase biodiversity in prairie restorations?

Design

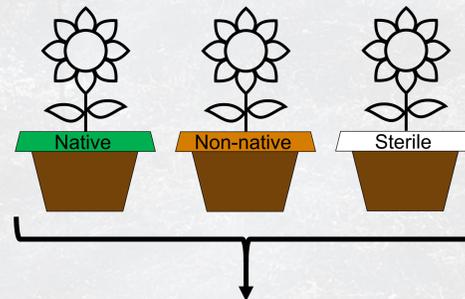
Sampled soil from **remnant prairies** and a **non-native-dominated site**



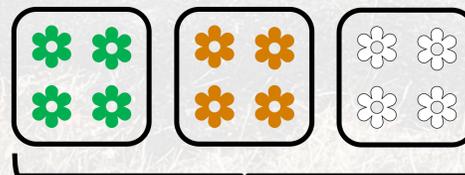
Extracted AM fungi spores for targeted cultures

Cultured soil microbes like AM fungi from whole soil

Inoculated seedlings of late successional species



Plant seedlings into restorations planted in both 2015 and 2021



Monitor seedling survival and growth, and measure overall plant biodiversity in plots in 2022 and 2023



Expected Results

- Inoculated seedling survival and growth will be higher in plants inoculated with native AM fungi



- Plots with seedlings inoculated with native AM fungi will see higher biodiversity over time than those with sterile soil or non-native AM fungi



- Both older and newer restorations will see biodiversity increases over time in plots with native AM fungi

Research Implications

- Would demonstrate that native AM fungi are beneficial to rare, late successional prairie plants
 - Especially for target species in study
- AM fungi may prove to be key to increasing and maintaining the native biodiversity of prairie restorations at Nachusa Grasslands

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