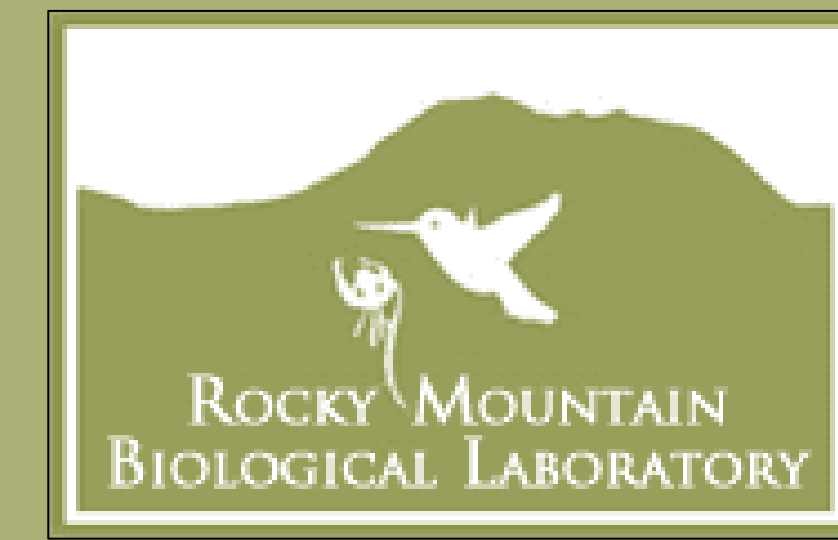


Host specificity in hemiparasitic *Castilleja* and its influence on plant community diversity



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Introduction

- Root hemiparasites are partially parasitic plants that reduce the health and biomass of their neighboring plant hosts via belowground root structures called haustoria.¹
- Depending on their host specificity, hemiparasites may alter community structure and diversity.^{2,3}
- Observational study on the genus *Castilleja*, a hemiparasitic plant in Gunnison, CO.



Figure 2.
Castilleja chromosa found at ~2,670 m (8,770 ft) elevation.



Figure 3.
Castilleja linariifolia found at ~3,020 m (9,900 ft) elevation.



Figure 4.
Castilleja septentrionalis found at ~3,200 m (10,470 ft) elevation.

Methods

Host specificity and host determination

1. Spatial analysis of plots containing *Castilleja* species: recorded all plant species within 10 cm of *Castilleja*.
2. Compared frequency distribution of nearest neighboring species.

Community diversity sampling

1. Each plot containing *Castilleja* was paired with a non-*Castilleja* control plot.
2. Recorded all plant species in the plots and % cover.
3. Compared richness, evenness, and overall diversity in *Castilleja* plots and control plots.
4. Analyzed using a Linear Mixed Effect Model.



Figure 1.
Castilleja plot and non-*Castilleja* (control) plot. *C. septentrionalis* near Emerald Lake.

Preliminary Results

1 Host specificity and ID

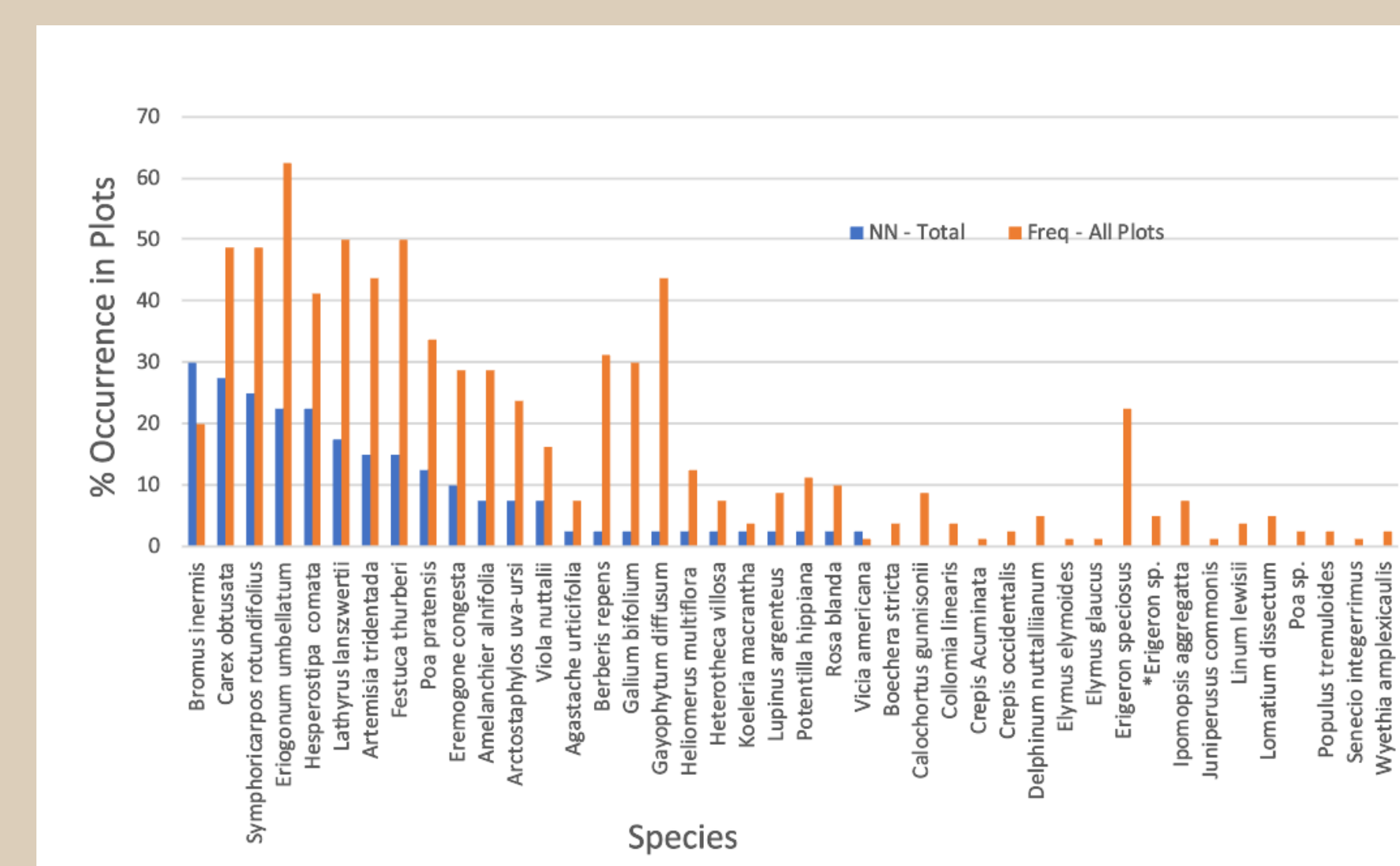


Figure 5.
Castilleja co-occurs with the most abundant species.

2 Species richness

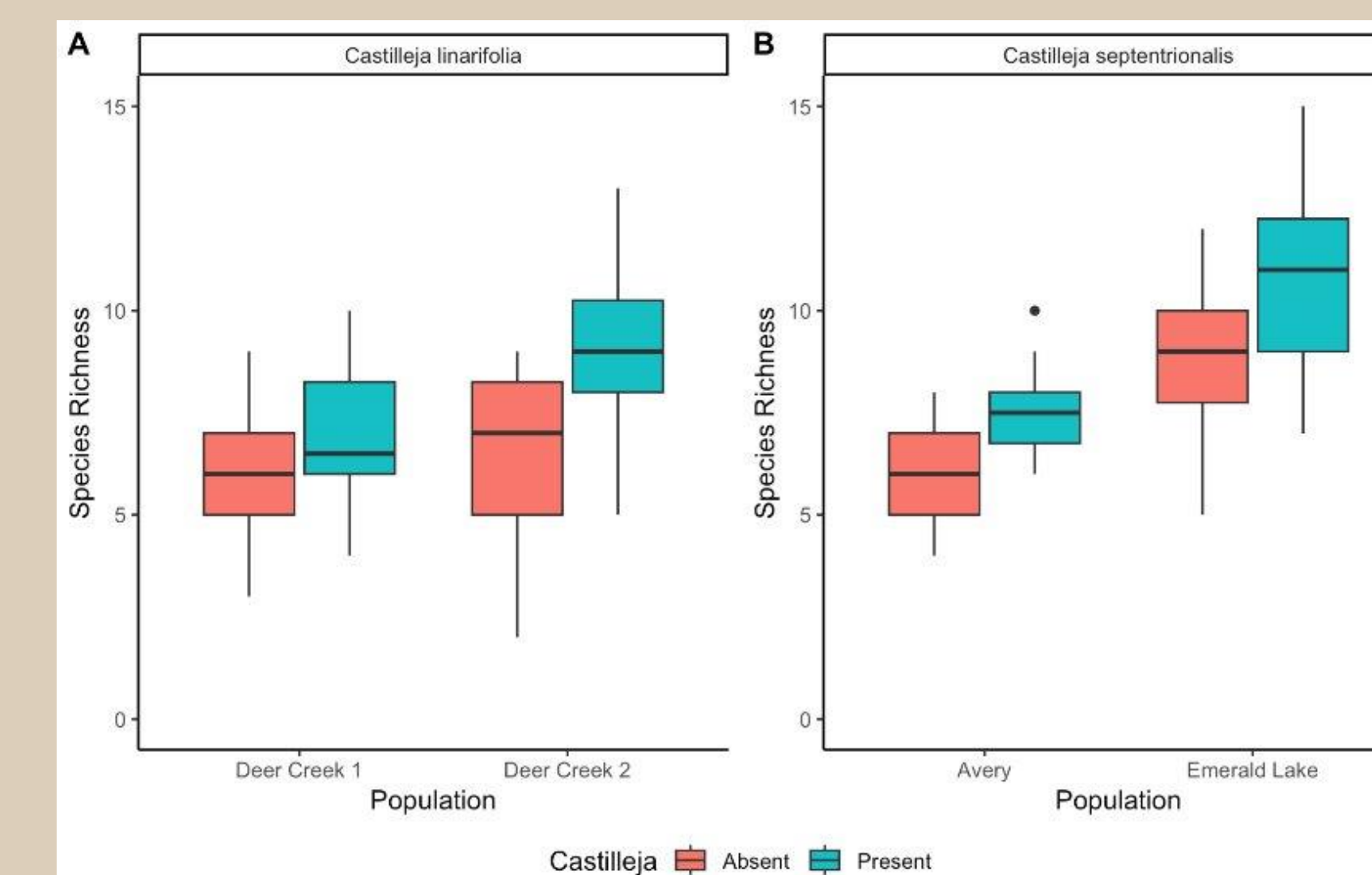


Figure 6.
Castilleja plots contain more species.

3 Overall diversity

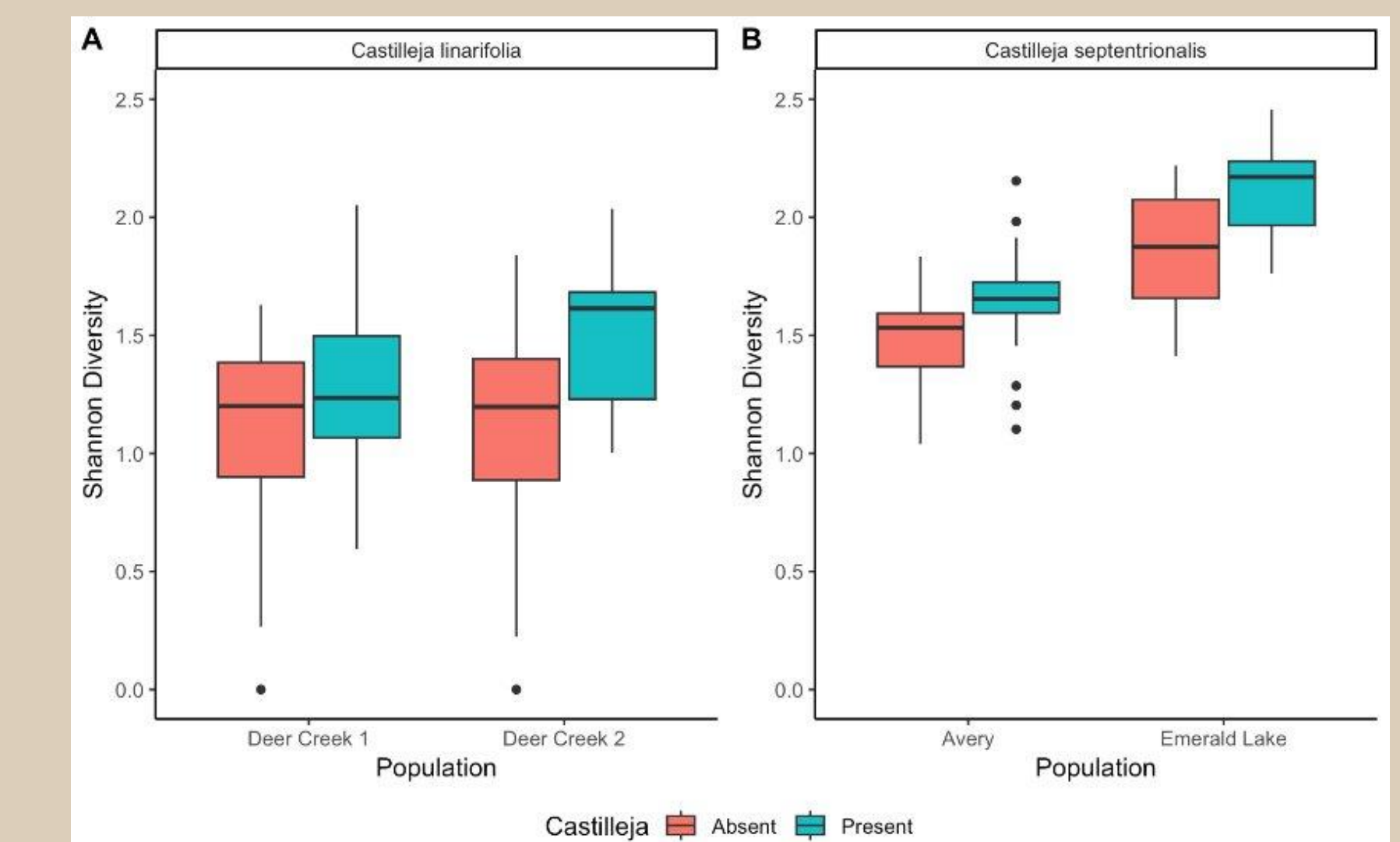


Figure 7.
Higher overall diversity in *Castilleja* plots.

Discussion and Projections

- *Castilleja* appears to be a generalist; associated with the most common species.
- *Castilleja* is associated with higher richness and overall diversity. Consistency across species.
- These findings align with those of previous studies that have investigated hemiparasitic plants and their impact on community composition.

Next Steps

- Increased diversity *may* be the indirect result of *Castilleja* presence, but more research needs to be done.
- An additional set of data will be obtained this field season to verify our findings.
- This study is part of a larger project, attempting to understand if this association with species diversity is driven by *Castilleja* or other factors.

References

1. Kuijt, J. (1969) The biology of parasitic flowering plants. University of California Press, Berkeley.
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3. Gibson, C.C. and Watkinson, A.R. (1991). Host selectivity and the mediation of competition by the root hemiparasite *Rhinanthus minor*. *Oecologia* 86:81–87