

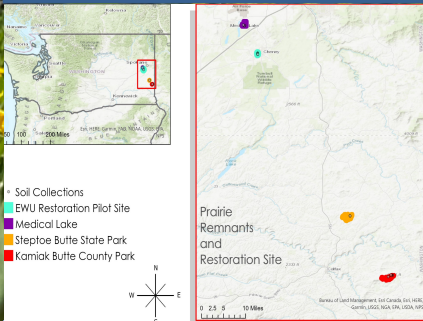
Introduction

- A goal of ecological restoration is to move a damaged system to an ecological state that is more similar to a less disturbed system or reference site.
- Palouse prairies are one of the most endangered ecosystems within the continental United States due to conversion for agriculture.
- EWU has committed 130-acres of campus to restoring the native Palouse Prairie.
- Nematodes are the most abundant animal species on earth and many studies have used them as biological indicators of the soil food-web.
- Few studies have investigated the influence of biochar on soil food-webs outside of agricultural settings.

Objectives

1. Compare soil abiotic conditions between Palouse prairie remnants and EWU's prairie restoration site.
2. Assess nematode functional group composition at EWU's prairie restoration site and intact remnants.
3. Investigate the effect of biochar soil amendments on the soil food web at EWU's restoration site.

Sites



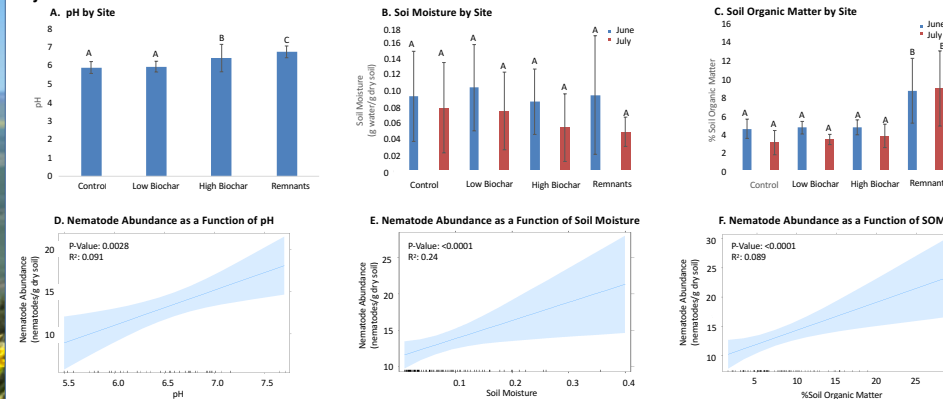
• Figure 1: Soil was collected in June and July from EWU's prairie restoration site and 3 intact Palouse prairie remnants.

Methods

- Nematodes were extracted from 40 grams of field moist soil via Baermann funnels.
 - All nematodes were counted to determine abundance.
 - 10% or a total of 30 nematodes, whichever was larger, were sorted and identified by functional group.
- Soil moisture and soil organic matter were measured using gravimetric analysis.
- Soil textures were determined using the micropipette method and were characterized using the online USDA soil texture calculator.
- Generalized linear mixed-effects models were used to analyze nematode data.
- Bar graphs were used to make comparisons between sites and one-way ANOVAs were used to find significant differences between sites.

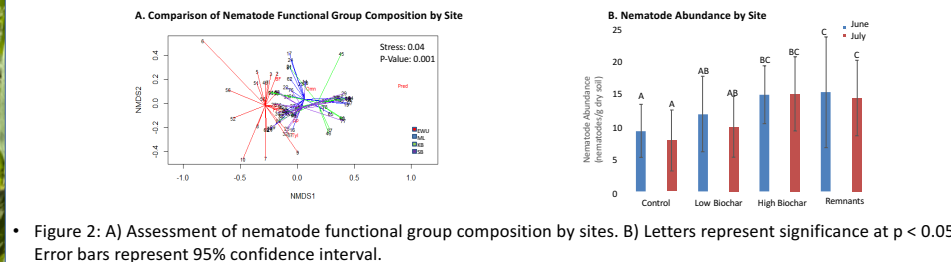
Results

Objective 1



• Figure 2: A-C) Letters represent significance at $p < 0.05$. Error bars represent 95% confidence interval. (D-F) includes the interaction of location and soil moisture, pH, and the additive effect of soil organic matter.

Objectives 2 & 3



• Figure 2: A) Assessment of nematode functional group composition by sites. B) Letters represent significance at $p < 0.05$. Error bars represent 95% confidence interval.

Results

- Soil Texture at both EWU's restoration site and the remnant sites were characterized as silty clay loam or silt loam.
- Remnants had significantly higher soil organic matter compared to EWU's restoration site.
- Nematode abundance was found to have a significant relationship with pH, soil moisture, and soil organic matter.
- Results from the NMDS plot suggest that the nematode functional group composition found in local remnants are significantly different from what is currently found at EWU's restoration site.
- Our results suggest that the high concentration of biochar significantly increases nematode abundance, similar to what is found at local remnants.
- Biochar soil amendments increased the pH of the soil significantly

Conclusion

- I believe that biochar has the potential for being a good tool in restoring EWU's site.
- Results suggest that biochar has shifted the EWU's restoration site closer to remnant sites in terms of nematode abundance and pH.
- Results from this study can be used as baseline data for future studies in order to track the progress of the restoration and to determine how restoration efforts are affecting the above and below-ground food webs over the long-term.

Acknowledgements

- I would like to thank Dr. Bastow, the rest of the biology faculty, and the McNair staff at Eastern Washington University for support during this project. I would like to thank Kristy Snyder for assistance in the field and statistical analysis. Funding for this study was provided by the TRIO Ronald E. McNair Scholars Post-Baccalaureate Achievement Program.

References

1. Black AE, Strand E, Wright RG, Scott JM, Morgan P, Watson C (1998) "Land use history at multiple scales: implications for conservation planning." *Landscape and Urban Planning* 43: 49 - 63
2. Neher, D. A. (2001) "Role of nematodes in soil health and their use as indicators." *Journal of nematology* 33.4:161.
3. Palmer, M. A., Falk, D. A., & Zedler, J. B. (2016). *Foundations of restoration ecology*. Island Press.

