

The role of soil microbes in restoration of diverse prairies

Mentor: Dr. Emily Grman (faculty, Eastern Michigan University Department of Biology)

Introduction: Most of Michigan's native prairie has been lost through development and agricultural use. Prairie restoration on former agricultural land can help land managers provide habitat for prairie-dependent plant and animal species. However, outcomes of restoration are highly variable and unpredictable. Even when their seeds are added to a restoration, many native species fail to establish. There are many possible explanations for this failure, including legacies of past agricultural land use, missing mutualists such as soil microbes or pollinators, or introduction of low genetic diversity populations. This summer, we will be working in a series of brand new prairie restorations around the Kellogg Biological Station to understand seedling establishment in the early phases of restoration. We have partnered with the DNR to create large-scale replicate prairies that vary in species diversity and the genetic diversity of 11 focal species.

In this REU project, a student will develop an independent project to explore whether soil microbes can help improve plant establishment or diversity in prairie restorations. Though the student will be encouraged to develop his/her own ideas, two topics make good starting places:

- 1) ***Does inoculation with soil microbes affect plant communities in the field?*** Adding rhizobia or mycorrhizal fungi could improve plant relationships with these soil microbes, which could lead to increased abundance or diversity of sown species in restoration.
- 2) ***Does the abundance of sown plant genotypes in restored prairies relate to their dependence on rhizobia or mycorrhizal fungi?*** Different genotypes of our focal species likely differ in how they respond to soil microbes, and this could influence their establishment success in the field.

Specifics: This opportunity will take place at Michigan State University's Kellogg Biological Station from May 23-August 5, 2016 (11 weeks). We offer a \$5000 stipend plus room and board at the station. The work schedule will be somewhat flexible, depending on the specifics of the independent research project, but will average 40 hours a week. Indoor and outdoor working conditions may include unpleasant weather (hot, rainy, etc) and occasional heavy lifting.

In collaboration with the mentor, the student selected for this position will be encouraged to develop independent research and to carry out their project from start to finish. The student will gain experience in specific field, lab, and greenhouse techniques, reading the scientific literature, problem solving, and critical thinking. The student will also have the opportunity to help with data collection on the large prairie restoration experiment and to interact with a larger team of ecologists.

The student should enjoy outdoor work, contributing to team efforts, paying attention to details, and solving problems through creativity and perseverance. If interested, the student will also be encouraged to continue data analysis and preparation of a manuscript or presentation after the end of the summer experience.

Please feel free to contact Emily (egrman@emich.edu) with any questions about this position.