

Project Year-End Summary Report

Title of Project: Harnessing soil microbial communities to facilitate dryland restoration

Begin answering in the shaded box right beside or below each question and it will expand to accommodate as you type. Use up to a total of two and a half pages for questions 1-8. More detailed presentations, a final report, articles or posters are welcome separately (See final instructions at the end of this form.)*

1. Organization name or Individual who received the grant: Parikrama Sapkota

2. Amount of Grant: \$2000

4. Was additional outside funding obtained? (check box that applies) Yes No

Other funding source(s) if you checked "yes." Botanical Society of America; Jornada LTER; Dodson Grant UTEP; College of Science Graduate Student Research Grants Program

5. Briefly, how was the grant money from the Carter Conservation Fund used?

Grant money was used to buy DNA extraction kit, material for extracting soil from the field

6. Write an abstract or summary of the activities performed and the progress that was made this year on your project. (Save any conclusions, lessons learned, and benefits achieved for the final sections, 7&8.)

During the summer of 2023, we initiated a greenhouse experiment, which was originally planned to span nine months. However, the project encountered an unexpected hurdle when it was discovered that the greenhouse was under construction, rendering it unusable for our purposes. Consequently, we had to modify our approach and conduct the initial phase of the experiment within the laboratory setting.

This temporary laboratory phase lasted for one month, during which our plants did not perform optimally. Despite the challenges, we leveraged this period to gather preliminary data. Subsequently, we patiently awaited the greenhouse's renovation and, once completed, resumed our originally intended nine-month greenhouse experiment, commencing in September 2023.

From the preliminary experiment, we harvested rhizosphere soil samples from both native and invasive plant species at the end of the one-month period. These samples were then subjected to DNA extraction, PCR, and sequencing, enabling us to explore microbial abundance and diversity among the selected plant varieties. In addition to the soil analysis, we collected biomass data and monitored germination growth curves for all plants to assess variations across treatments.

Currently, all laboratory work has been successfully completed, and the samples have been dispatched for sequencing. We are eagerly awaiting the sequencing data from core facilities. Following this initial phase, we have resumed our long-term, nine-month greenhouse experiment as initially planned.

As of now, we are in the early stages of this experiment, focusing on the first phase. We anticipate continuing to collect rhizosphere soil samples from this phase to perform further sequencing, allowing us to delve deeper into the microbial dynamics among native and invasive plant species.

7. How does your project further a Native Plant Society mission area, namely: *plant or ecological education; conservation/restoration of native plants and/or their habitats; adds to botanical research; promotes appropriate use of native plants to conserve water, land and/or wildlife.*

My project aligns with several mission areas of the Native Plant Society, and it reflects my commitment to plant and ecological education, conservation and restoration of native plants and their habitats.

Plant or Ecological Education:

I'm proud that my project offers valuable insights into plant and ecological education. Through my research, I aim to provide opportunities for students and the wider community to better understand the intricate relationships between native and invasive plant species, particularly in terms of microbial abundance and diversity in their rhizosphere soils. I believe that sharing my findings and experiences can help foster a greater appreciation for native plant systems and their ecological significance.

Conservation/Restoration of Native Plants and Their Habitats:

The core objective of my project is to support the conservation and restoration of native plants and their habitats. By studying both native and invasive plant species, I hope to contribute to our understanding of how these plants interact with their environment. This knowledge is crucial for developing effective conservation and restoration strategies that prioritize the health of native plants and the ecosystems they inhabit.

Contribution to Botanical Research:

I view my project as a valuable contribution to botanical research. By examining rhizosphere soils and assessing microbial abundance and diversity among plant species, I am advancing our understanding of plant-microbe interactions. This research has implications not only for native plants but also for the broader field of botany. I am excited to be a part of this important research endeavor.

In conclusion, I am deeply committed to the Native Plant Society's mission, and my research has the potential to drive positive change and inform conservation and restoration efforts. It is a privilege to be part of a project that supports the society's goals and contributes to the broader understanding of native plant ecosystems

8. Any other conclusions., lessons learned, benefits to you, the community or the environment hopefully result from your work as assisted by this grant.

From the preliminary experiment, it became evident that the biomass of the plants was greater in treatments that included both mesquite litter and microbial inoculum. Additionally, the number of seedlings that thrived was higher in pots containing blue grama grass and in pots with a mix of native plants with microbial inoculum.

Final Instructions

Please send your completed form as pdfas an email attachment to cartergrantapps@gmail.com by December 1.

** To remain in good standing for any future funding from the Native Plant Society of New Mexico, we ask that you educate our membership more fully in some way. This could be an article (250 words minimum, at least 1 high resolution illustration or photo) for our newsletter, **ora** paper or electronic copy or link to a published article connected with the past year's work, **or**by making an educational and visual presentation to one of our chapters. Contact information for our 7 area chapters is found on our website at www.npsnm.org under the Chapters tab.*

What are your intentions in this regard? I plan to provide presentation of my finding during Spring of 2024 to NPSNM.

This year end report is submitted by (Type your name) Parikrama Sapkota

My typed name is equal to my handwritten signature in testifying to the accuracy and truth of this report to the best of my knowledge today.

eMail address psapkota@miners.utep.edu

Date Nov 10,2023

Please contact us again at cartergrantapps@gmail.com if you have any questions or alternate suggestions.