Maternal effects in grassland restoration using *Elymus elymoides*

**Rosemary Frederick**¹, ² and Dr. Elizabeth Leger¹

¹University of Nevada-Reno, 1664 N Virginia St., Reno NV 89557
²Contact email: rfrederick@nevada.unr.edu

**Background**
- Drought, wildfire, and invasive species inhibit seedling establishment in grassland restoration.
- Agricultural production conditions used for native seed increase in restoration projects may confer detrimental maternal effects to offspring.
- Maternal effects occur when a mother’s phenotype influences her offspring’s phenotype independent of her genetic contribution to that offspring.

**Methods**
- Collect *Elymus elymoides*, a common restoration species, from two populations: one wild collection (LV) and one previously increased at an agricultural facility (SO).
- Grow under an extreme range of environments using 6 experimental treatments: varying water, fertilization, inter & intra specific competition.

**Preliminary Findings**
- Agriculturally grown field-collected seeds the largest, followed by resource-rich nursery growing conditions.

**Research Questions**
**How is the competitive ability of *Elymus elymoides* affected by its maternal growing environment?**
- a) Which aspects of the maternal growing environment most strongly affect seedling performance?
- b) Which seedling traits are most strongly affected by maternal growing environment?
- c) How does seed source affect these interactions?

**Potentially Adaptive Traits**
We will compare potentially adaptive traits and drought tolerance among seeds from different maternal environments.
- **Maternal plant traits**
  - Measure maternal plant size
  - Track phenology
- **Seed traits**
  - Weigh seeds
  - X-Ray seeds and process Images
- **Germination & drought trials**
  - Track germination timing
  - Drought trials after 6 weeks

**Discussion**
By quantifying these effects in restoration populations, we can provide direct recommendations to restoration growers to improve seed characteristics by optimizing maternal environmental conditions.

**Acknowledgements**
We thank The Northern California Botanists, The University of Nevada-Reno, UNR Graduate Student Association, and the Society for Ecological Restoration for supporting this research; as well as the Walker Basin Conservancy and the Leger laboratory team members (Alison Agerney, Tessa Bartz, Leah Prescott, Laura Shriver, Cathy Siliman, and Mandy Fuller) as well as Scott Huber for their research help.

**Literature Cited**