Seed and seedling functional trait variation across life history and experimental growth media

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1 Introduction

- Seed and seedling traits have implications for germination and recruitment[1,2] and indicate adaptations for different conditions or life histories/strategies (ex. annual, perennial, herbaceous, woody, etc.)[3]
- Seedlings are vulnerable[4]
- Seed and seedling traits varied across life history strategies
- Hypothesis 1: seed and seedling traits will vary across life histories
- Hypothesis 2: seed and seedling traits will vary across experimental growth media

2 Study Design

- Study taxa selected as pairs within a genus, one perennial and one annual species:
  - *Festuca californica, F. microstachys*
  - *Phacelia californica, P. campanularia*
  - *Hordeum brachyantherum, H. intercedens*
- Seeds (n=8) measured for mass and dimensions, then sterilized and sown
- Germination in a growth chamber (14/10 light cycle, 20°C day/13°C night)
- Observed daily for germination
- Harvested seven days post-germination
- Seedlings dissected and measured for traits (fresh and dry mass, leaf surface area, stem/root diameter/length,
- Roots analyzed with WinRhizo, stems and leaves analyzed with ImageJ

3 Results

Result 1: seed and seedling traits varied across life histories
Result 2: seed and seedling traits did not vary across experimental growth media

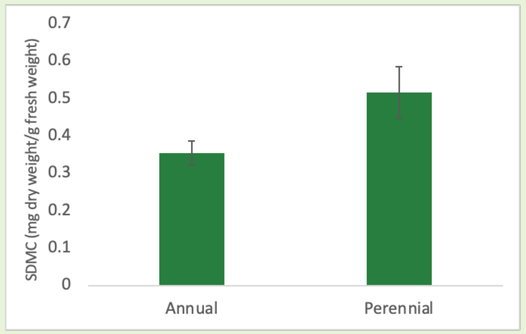

Figure 1: shoot dry matter content across life histories (p=0.042).

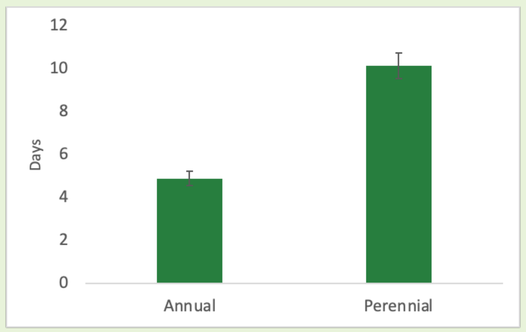

Figure 2: days to germination across life histories ($p<0.001$).

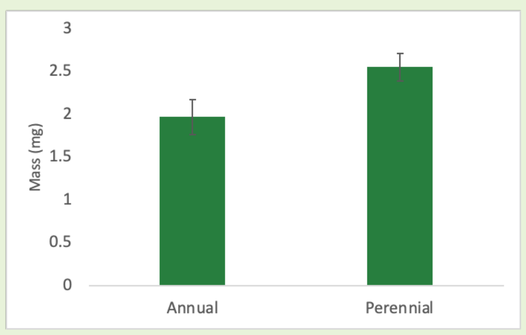

Figure 3: seed mass (mg) across life histories (p=0.027).

4 Discussion

- Variation across life history indicates genetic and phylogenetic basis for traits with major roles in germination and recruitment
- Although perennial species are commonly used for restoration in CA[5], annual species can establish faster for projects that need to meet goals more quickly or where the risk of further invasion by nonnative species needs to be mitigated by the quick establishment of native cover[6]

References

[1]Larson et al. 2015, *Oecologia*
[2]Saatkamp et al. 2018, *New Phytologist*
[3]Luong et al. 2021, *Journal of Applied Ecology*
[4]Larson et al. 2019, *Functional Ecology*
[5]Luong, Press, Holl 2023, *Biological Conservation*
[6]Pearson et al. 2016, *Biological Conservation*

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