

Preregistration

Impacts of experimental warming on alpine tundra plant flowering phenology

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STUDY INFORMATION

1. Title

1.1 Impacts of experimental warming on alpine tundra plant flowering phenology

2. Authors

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3. Description

This study uses data from Carbognani et al., 2018* accessed from Dryad to plot phenological development of three alpine plant species as a function of air temperature. In this study, temperature was manipulated using experimental warming to simulate climate warming of 1-3 degrees C. Data was collected in the Italian Alps during the 2010-2014 growing seasons. An improved understanding of how species will react to warming is imperative in tundra environments where climate warming is driving rapid shifts in vegetation.

*Carbognani, Michele, Marcello Tomaselli, and Alessandro Petraglia. "Different temperature perception in high-elevation plants: new insight into phenological de-

velopment and implications for climate change in the alpine tundra.” *Oikos* 127.7 (2018): 1014-1023.

4. Hypotheses

4.1 Phenological development will advance with warming, though responses will be species specific.

DESIGN PLAN

5. Study Type

5.1 Experimental data.

6. Blinding

No blinding is involved in this study.

7. Is there anything blinding in this study

No.

Study Design

This study used a randomized blocked design.

SAMPLING PLAN

10. Existing data

Registration prior to analysis of data.

11. Explanation of existing data

Data were accessed from Dryad (<https://datadryad.org/stash>). Data were not explored prior to this analysis.

12. Data collection procedures

N/A

13. Sample size

- *Cardamine alpina* = 687
- *Leucanthemopsis alpina* = 671
- *Veronica alpina* = 494

ANALYSIS PLAN

I will use a linear model to examine the impact of air temperature on phenological development for three tundra plant species. Data will be plotted by species.