

# Overcoming Seed Dormancy of *Ceanothus velutinus* and *Cercocarpus montanus*

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## Introduction

- Native plants are useful for a wide range of conservation practices from ecological restoration to the rehabilitation of disturbed lands.
- Ceanothus velutinus* (snowbrush ceanothus) and *Cercocarpus montanus* (Alder leaf mountain mahogany) are two Utah native plants and have potential for use in water-efficient landscape.
- Little information is available on their propagation methods.

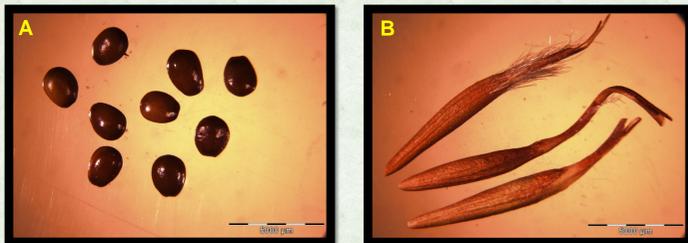
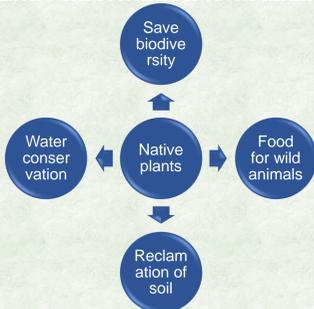


Fig. 1: *Ceanothus velutinus* seeds (A) and *Cercocarpus montanus* seeds (B).

## Objectives

- Determine the effective scarification temperature, stratification time, and suitable gibberellic acid (GA<sub>3</sub>) concentration for breaking the double dormancy (physical and physiological) of *C. velutinus* seeds.
- Determine the optimal stratification time and the effective GA<sub>3</sub> concentration for breaking the physiological dormancy of *C. montanus* seeds.

## Materials and Methods

### Experiment I: Seed germination of *Ceanothus velutinus*

- Collected at an elevation of 975 meter, Lincoln county, Montana (Native Seed Foundation)
- Experimental conditions:
  - Completely randomized design (CRD)
  - Number of petri dishes as replication
- Seed germination test:
  - Environmental growth chamber at 25 °C and a 16-hour photo period for 2 weeks

#### Treatments

Scarification temperature	50, 70, and 90 °C
Gibberellic acid (GA <sub>3</sub> )	0, 50, 250, and 500 mg/l
Stratification time	30, 60, or 90 days

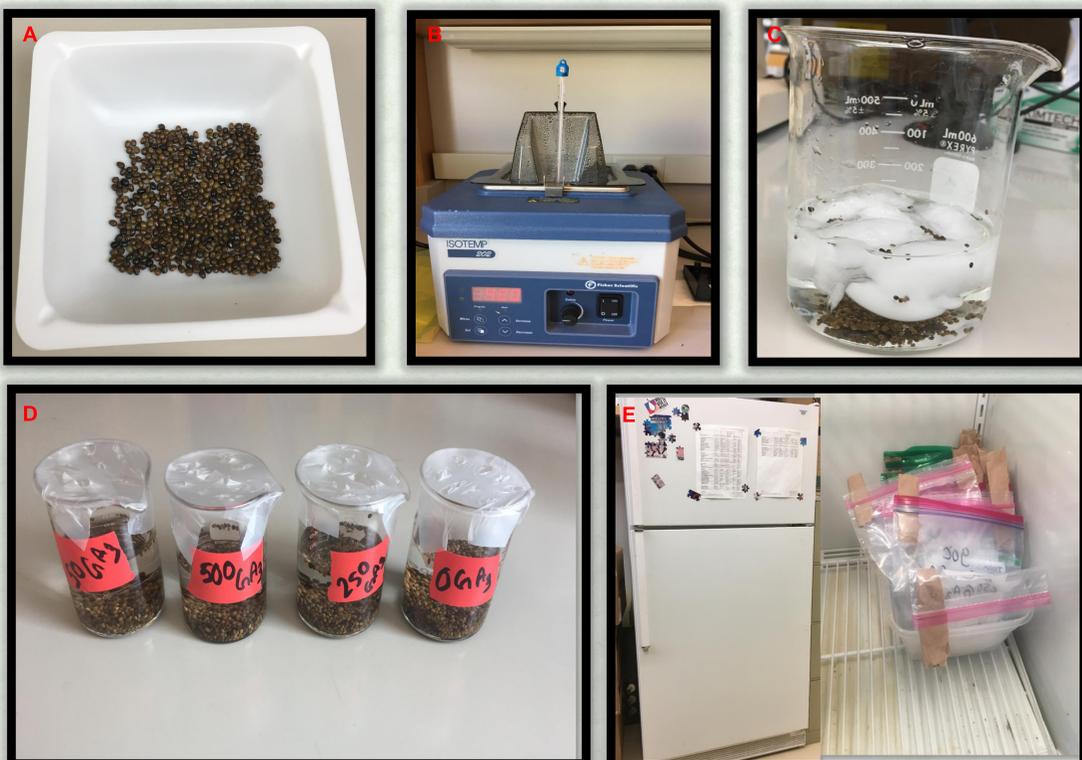


Fig. 2: Cleaned *C. velutinus* seeds (A), scarification using a hot water bath (B), seeds in ice water (C), GA<sub>3</sub> treatment (D), and cold moist stratification (E).

### Experiment II: Seed germination of *Cercocarpus montanus*

- Collected from Colorado (Sheffield's Seed Co)
- Similar methods to experiment I except scarification was not performed

#### Treatments

Gibberellic acid (GA <sub>3</sub> )	0, 50, 250, and 500 mg/l
Stratification time	30, 60, or 90 days

## Results

### Experiment I: Seed germination of *Ceanothus velutinus*

- Germination percent increased with the scarification temperature ( $p < 0.0001$ ).
- Stratification time and GA<sub>3</sub> treatment also had positive effect on seed germination ( $p < 0.0001$ ).
- Scarification at 90 °C, 60 days stratification, and 500 mg/l GA<sub>3</sub> had the greatest germination percent of 74.2 ± 2%.

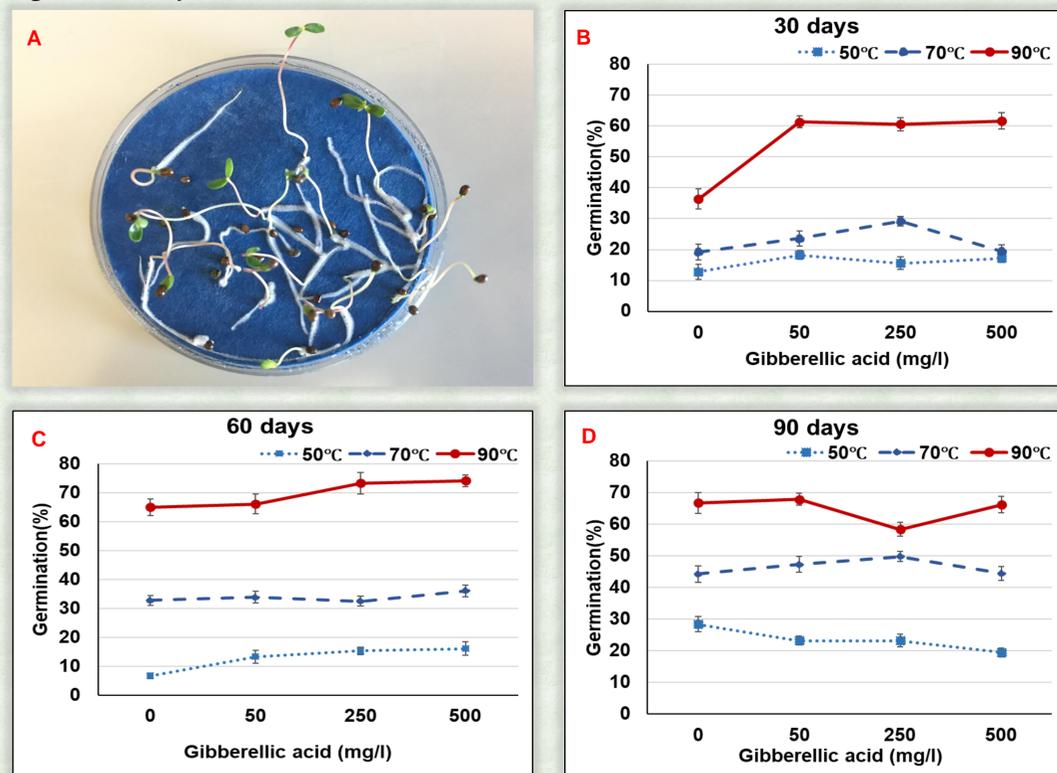


Fig. 3: Germinated *C. velutinus* seeds (A), germination after scarification, GA<sub>3</sub> treatment and stratification for 30 (B), 60 (C), and 90 days (D).

### Experiment II: Seed germination of *Cercocarpus montanus*

- Stratification for longer period ( $p < 0.0001$ ) and gibberellic acid treatment ( $p < 0.0321$ ) increased the germination percent.
- Seeds dipped in 50 mg/l of GA<sub>3</sub> and stratified for 60 days had the greatest germination percent of 64.3 ± 3.6%.

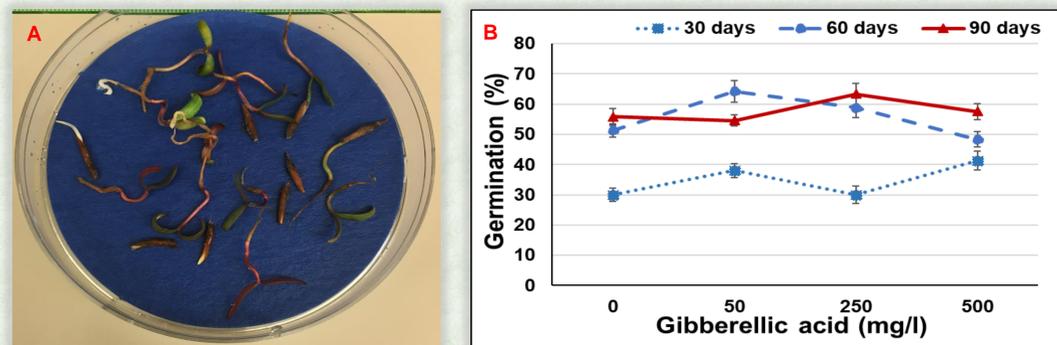


Fig. 4: Germinated *C. montanus* seeds (A), germination after scarification, GA<sub>3</sub> treatment and stratification for 30 (B), 60 (C), and 90 days (D).

## Conclusions

- Hot water treatment at 90 °C and stratification for 60 or 90 days was effective in breaking seed dormancy of *C. velutinus*. Furthermore, GA<sub>3</sub> also helped to increase seed germination rate.
- For *C. montanus* seeds, stratification for 60 days and GA<sub>3</sub> treatment at 50 mg/l was helpful to break seed dormancy.
- This experiment established a successful method for optimizing seed germination which is crucial to introduce native plants in the landscape and conserve our most important natural resource, water.

## References

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