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 (GA₃) concentration for breaking the double dormancy (physical and physiological) of *C. velutinus* seeds.
- Determine the optimal stratification time and the effective GA₃ 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**

<table>
<thead>
<tr>
<th>Scarification temperature</th>
<th>50, 70, and 90 °C</th>
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<tbody>
<tr>
<td>Gibberellic acid (GA₃)</td>
<td>0, 50, 250, and 500 mg/l</td>
</tr>
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<td>Stratification time</td>
<td>30, 60, or 90 days</td>
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**Experiment II: Seed germination of *Cercocarpus montanus***

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

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Results

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

- Germination percent increased with the scarification temperature ($p < 0.0001$).
- Stratification time and GA₃ treatment also had positive effect on seed germination ($p < 0.0321$).
- Scarification at 90 °C, 60 days stratification, and 500 mg/l GA₃ had the greatest germination percent of 74.2 ± 2%.

**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 GA₃ and stratified for 60 days had the greatest germination percent of 64.3 ± 3.6%.

Conclusions

- Hot water treatment at 90 °C and stratification for 60 or 90 days was effective in breaking seed dormancy of *C. velutinus*. Furthermore, GA₃ also helped to increase seed germination rate.
- For *C. montanus* seeds, stratification for 60 days and GA₃ 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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