The impact of short-term storage conditions on germination of *Viola pedatifida*

Ashlyn Lythgoe[1], Sam Kilgore[2], Andrea Kramer[3]
[1]Purdue University, [2]Northwestern University, [3]Chicago Botanic Garden
alythgoe@purdue.edu, samkilgore94@gmail.com, akramer@chicagobotanic.org

Viola pedatifida: a native in danger

Figure 1. A flower of *Viola pedatifida*. Source: (c) Joshua Mayer, some rights reserved (CC BY-SA)

Figure 2. The regal fritillary butterfly is dependent on *V. pedatifida* for reproduction.

- *V. pedatifida* is a high quality native prairie plant important to many threatened pollinators.
- Germination rates in restored habitats are low, an issue compounded upon by the ballistic method of seed dispersal that makes collection difficult.
- Germination is impacted by long-term storage conditions, while short-term storage conditions are often overlooked in studies.

Figure 3. Seeds were collected from *V. pedatifida* in two different Chicago Botanic garden greenhouses.

Figure 4. Undeveloped seeds on the left versus developed seeds on the right.

- **A. Room Temperature (Control)** *23°C / 54%RH*
- **B. Hot / Dry** *30°C / 22%RH*
- **C. Hot / Humid** *30°C / 74%RH*
- **D. Cold / Humid** *3°C / 48%RH*
- **E. Seed Bank** *-20°C / ~0%RH*

Do temporary storage conditions affect germination?

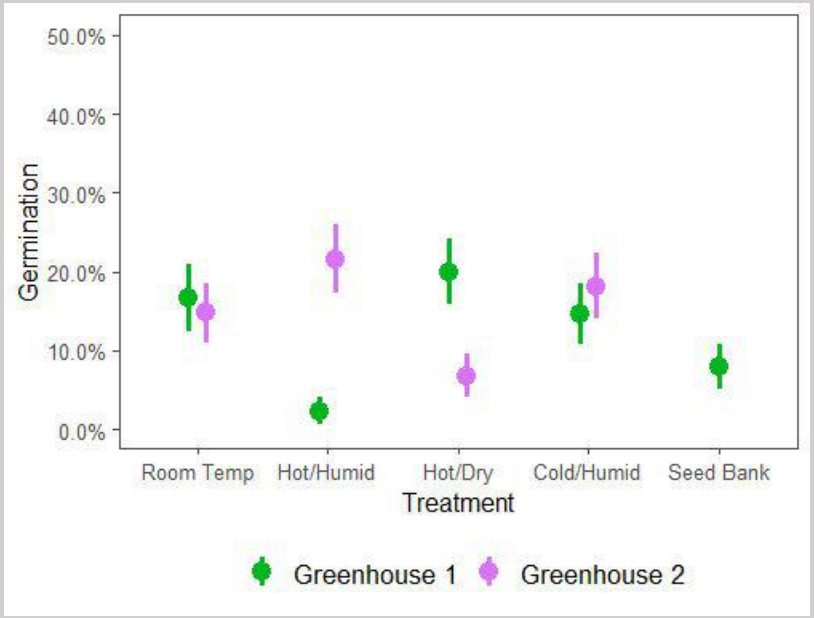

Figure 6. In Greenhouse 1, the only treatment significantly different from the control was the hot/humid treatment ($p<0.005$). Greenhouse 2 showed the only significantly different treatment was hot/dry ($p<0.05$).

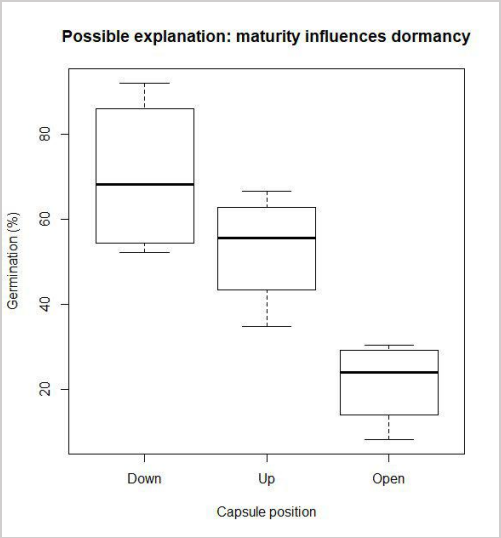

Figure 7. Seeds collected earlier in development had the highest germination, while using the standard protocol of collecting seeds at with upright or open capsules resulted in the lowest germination.

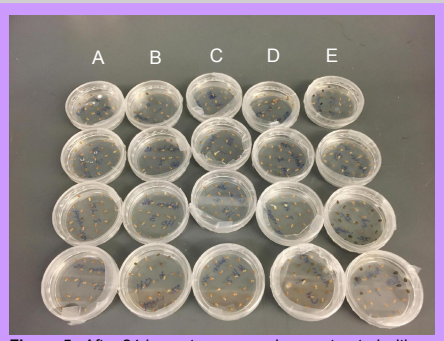

Figure 5. After 24-hour storage, seeds were treated with gibberellic acid and then plated and placed in an incubator, where germination was recorded every 2-3 days. Seeds were separated by greenhouse and underwent separate rounds of the experiment.

Depends on the conditions!

- The least risky conditions involve collecting early and avoiding hot temperatures while in storage.
- The difference between the two hot treatments suggests an environmental, maternal factor that affects ideal conditions for the seed.
- Future study should be conducted on how different maternal environments may affect germination while implementing short-term storage conditions, in order to inform restoration efforts and help with further establishment of *V. pedatifida*.

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