

CPC Collection

The Center for Plant Conservation (CPC) is a network of ecologists that aims for the conservation and restoration of rare, and imperiled plants¹. In collaboration with the CPC, CBG seed bank holds over 200 accessions.

Accessions are periodically tested for viability.

Seeds will go through:

- Cleaning
- Count and weigh
- Viability tests
- Transfer to greenhouse

Species used for this project:

Leafy Prairie Clover <i>Dalea foliosa</i> Federal Status: Endangered	Lakeside Daisy <i>Tetraneris herbacea</i> Federal Status: Threatened
--	--

Cleaning

Before the seeds can be used or stored, they must be cleaned. Many people and different tools are used to separate the seeds from the rest of the plant material, or chaff.

Tools

- SilPat
- Rubber pad
- Rubber stopper
- Sand-paper
- Wood mallet
- Sieve
- Cutting board
- Column blower



Count and Weigh

COUNT METHOD	estimated count
WEIGHT/REP	# Seeds/Rep: 20 seeds
(1)	0.0105 g
(2)	0.01 g
(3)	0.0107 g
(4)	0.0104 g
(5)	0.0123 g
ESTIMATED SEED COUNT	19116 seeds
Half seeds:	9558 seeds

After the seeds are cleaned, they must be counted and weighed. The total weight of the accession and five sets of 20 seeds are weighed and used to estimate total seed count.

Acknowledgments

This research was conducted on the lands of the Council of Three Fires —the Ojibwa, Ottawa, and Potawatomi—as well as the Miami, Ho-Chunk, Menominee, Sauk, and Meskwaki peoples. We would like to acknowledge that our presence here was paved through a system of discriminatory and racist practices. We are committed to honoring and respecting the perspectives of these and other Indigenous Peoples. We would like to thank Sarah Hollis for her mentorship, guidance, and support. Additional thanks to David Sollenberger, Becky Barak, Sarah Jones, Cael Dant, Jeremy Fant, Maria Figueroa, Rafael Urbina-Casanova, Hector Ortiz, and other REU interns (2024) for their encouragement. We'd like to thank NSF-REU grant DBI-2149888 for support.

References

1. *Saving endangered plants*. Center for Plant Conservation. (2024, May 24). <https://saveplants.org>
2. Lewis-Jones, K. E. (2019). "The first step is to bring it into our hands:" Wild seed Conservation, the stewardship of species survival, and gardening the anthropocene at the Millennium Seed Bank Partnership. *Culture Agriculture Food and Environment*, 41(2), 107–116. <https://doi.org/10.1111/cuag.12238>
3. Science. Seed Bank | Chicago Botanic Garden. (n.d.). <https://www.chicagobotanic.org/research/seed-bank>
4. FAO. 2014. Genebank Standards for Plant Genetic Resources for Food and Agriculture. Rev. ed. Rome.

Seed Bank

Seed banks are facilities that store seeds long term at low temperatures. They enable us to preserve genetic diversity, ensure future ecological resilience, and facilitate research on plant genetics, habitat change, and biodiversity². The Dixon National Tallgrass Prairie Seed Bank (DNTPSB) is found at the Chicago Botanic Garden (CBG), and it is home to wild collected seeds of over 1,800 native species from tallgrass prairie, woodland, and wetland ecosystems³. The focus of DNTPSB is conservation and restoration, with the goal of being able to use the banked seeds for research, germination, and restoration.

The Life Cycle of Seed Bank Seeds

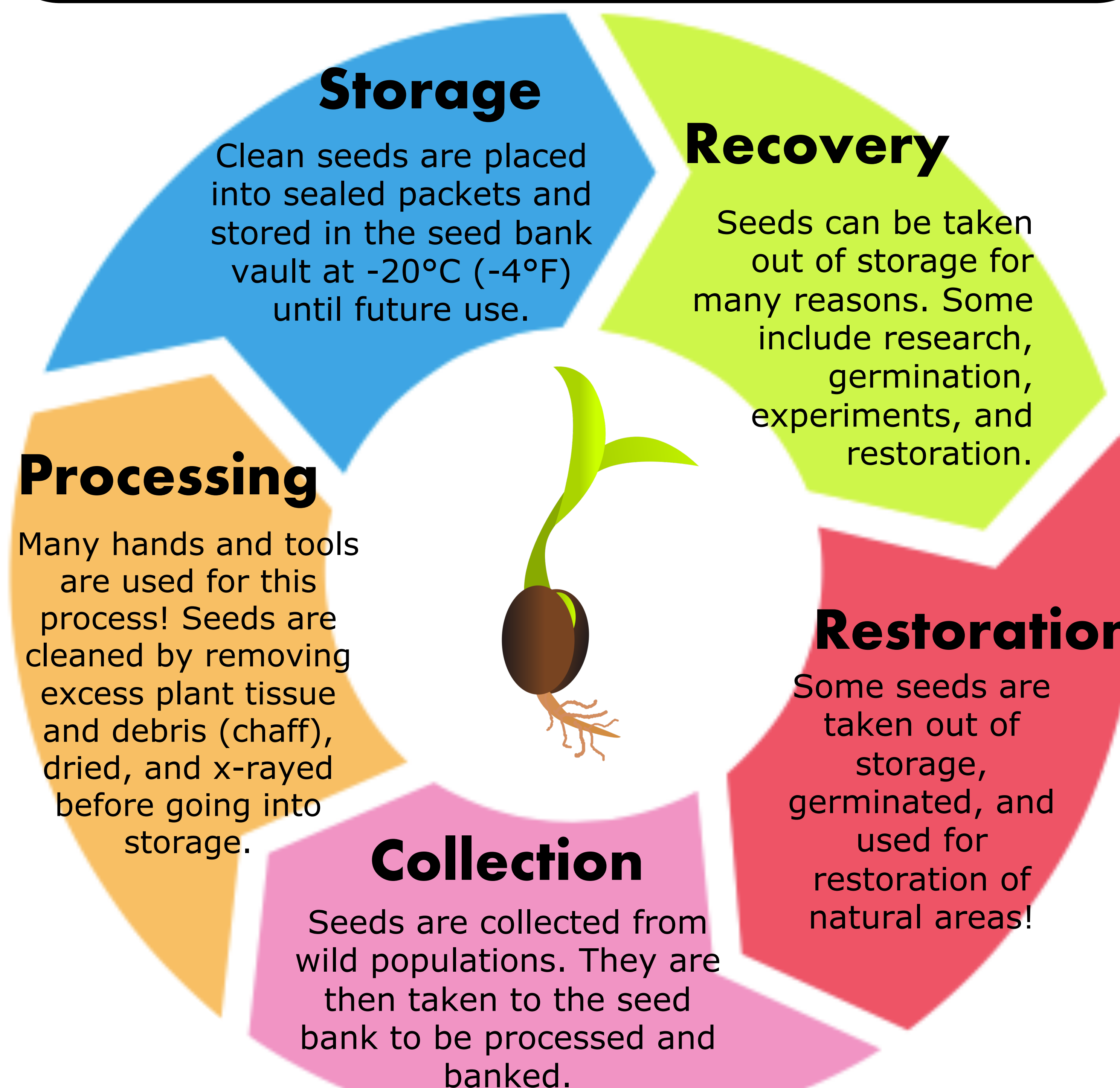


Diagram created for Scientists in the Garden to communicate the seed bank process to CBG visitors.

Science Communication

Communicating the ins and outs of the seed bank brings awareness to who we are, what we do, and why it is important.



Discussion

Viability tests proved to be successful for both *Dalea foliosa* and *Tetraneris herbacea*, meaning efforts put into a seed bank are justified. While sometimes misunderstood, the seed bank is a multifaceted and dynamic lab that works towards the conservation of biodiversity and natural habitat.

Viability Tests

Viability tests are examinations that are done on the seeds to determine the health of the seed embryos, and whether they are viable to germinate. These were done on an accession of *Dalea foliosa* from 1996 and one of *Tetraneris herbacea* from 1997.

Are 30-year-old seeds viable?

X-Ray

The images taken by the x-ray machine show us whether a seed is filled or empty. Filled seeds means the seed is fully developed and healthy, while an empty seed can be damaged, underdeveloped, or hollow.



Dalea foliosa
50 filled
0 empty

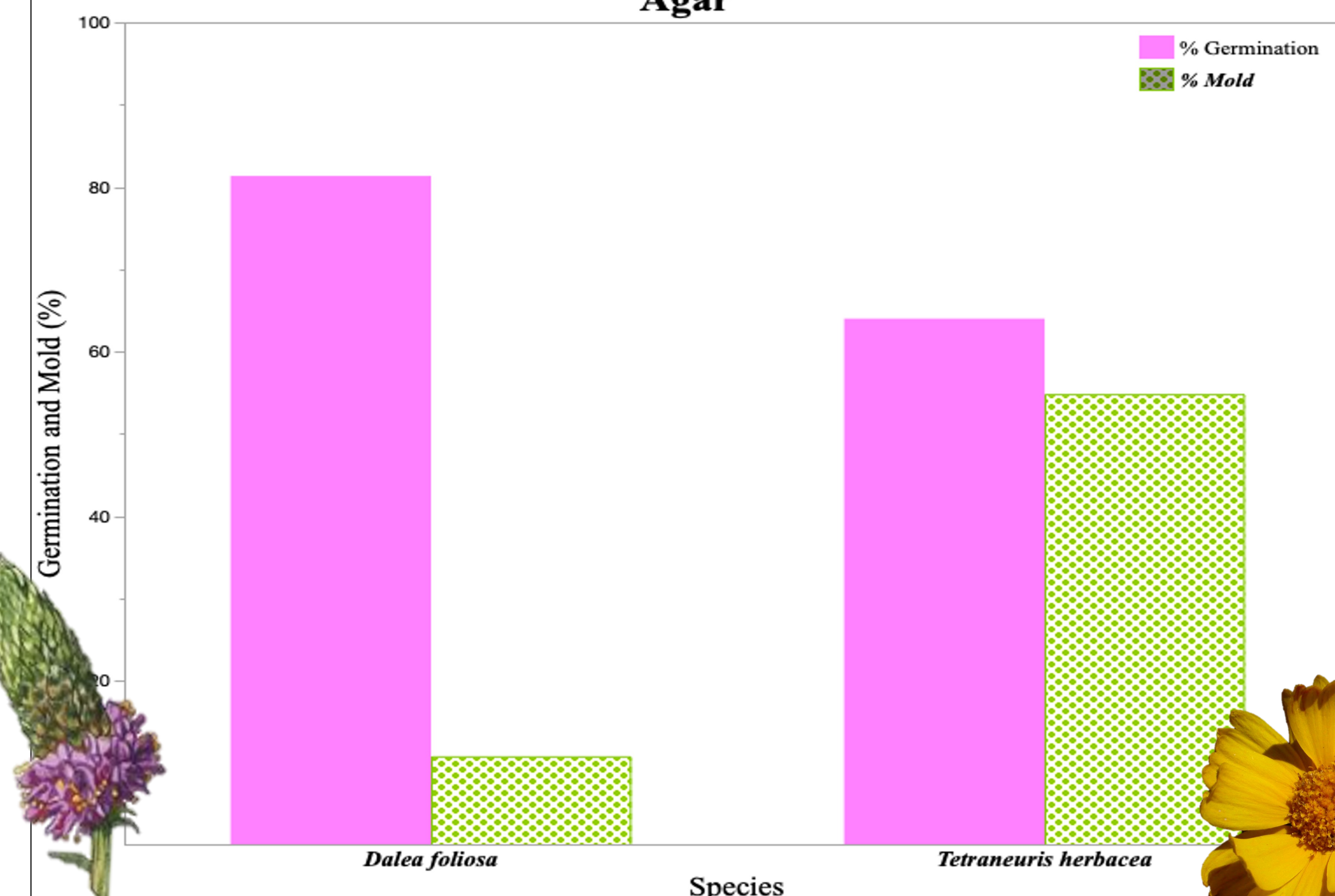


Tetraneris herbacea
47 filled
3 empty

Germination

Germination trials are important to testing seeds for viability because they provide an insight to the seeds' ability to develop into seedlings and adult plants⁴. In a sterile environment, seeds were placed on agar plates, sealed, and incubated at 25°C /15 °C day/night for 11 days. Mold can grow during this process, so it was also recorded.

Germination and Molding of *Dalea foliosa* and *Tetraneris herbacea* on Agar



Dalea foliosa
81.33% germination
10.67% molding

Tetraneris herbacea
64% germination
54.67% molding

Soil Transfer



Dalea foliosa
57 seedlings transferred
43 plug counts
75% survival after 2 weeks



Tetraneris herbacea
44 seedlings transferred
34 plug counts
77% survival after 2 weeks