

How Seed Storage Affects Germination and Growth Rates

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MISSOURI
BOTANICAL
GARDEN



Background

- The accelerated rate of human urbanization is causing diverse environmental communities to be completely decimated¹.
- Researchers at the Missouri Botanical Garden (MoBOT) are currently creating a seed bank for every plant species in Missouri.
- Although this project is underway, there is some uncertainty surrounding which storage method will result in the most viable seeds.
- MoBOT is either refrigerating or freezing the collected seeds. However, there is currently no discernible data reporting which storage method is optimal for seed germination.²

Questions

- How does the seed storage method affect the germination rates within and between species?"
- How does seed storage method affect the height of prairie species?"

Methods

- We placed approximately 450 seeds (3 species x 50 fridge x 50 freezer x 50 control) on agar and stratified for 30 days to induce germination.
- We put agar plates in growth chamber to germinate — to quantify germination, we counted how many seeds sprouted roots and/or cotyledons
- We transplanted viable seeds to pots with sterile soil to promote growth.
- We chose 15 individuals of each species from each treatment and measured plant height, length, and width approximately every two weeks from 1 month – 4 months.

Acknowledgements

We thank... Missouri Botanical Gardens, Kate Wynne, Prairie Moon Nursery, Svalbard Global Seed Vault, ¹Di Giulio et al. (2009). *Journal of Environmental Management*, Newbold et. al. (2016). *Science*, ²Tchokponhoué et. al.(2019). *BMC Plant Biology*.

Results

Germination:

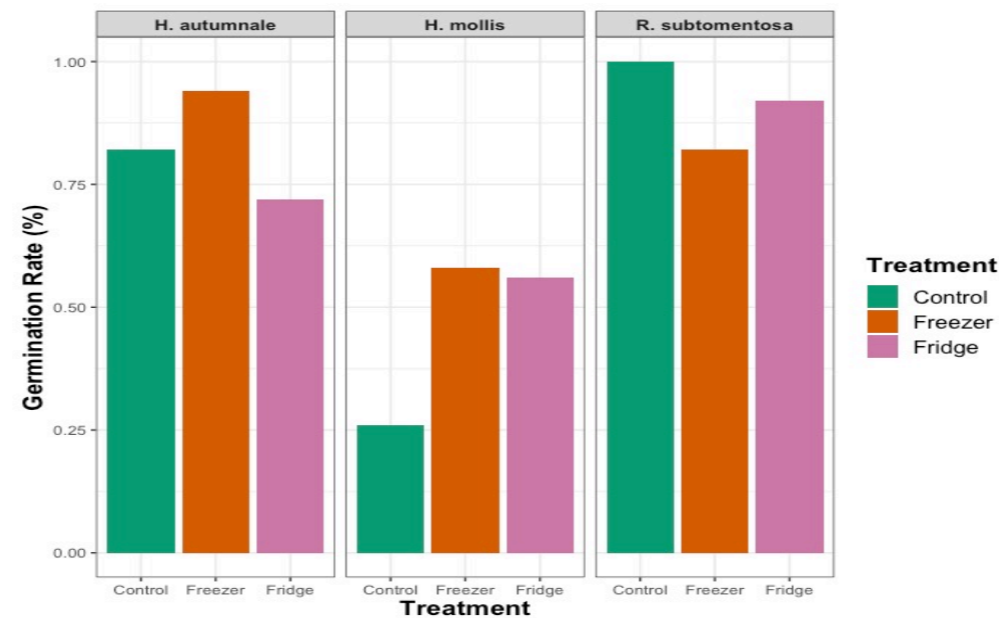


Fig. 1. Regarding germination, we found *H. mollis* had a higher germination in the fridge and freezer treatment compared to the control. *H. autumnale* germinated slightly less in the fridge treatment compared to freezer and control; and *R. subtomentosa* germinated well in every treatment.

Growth:

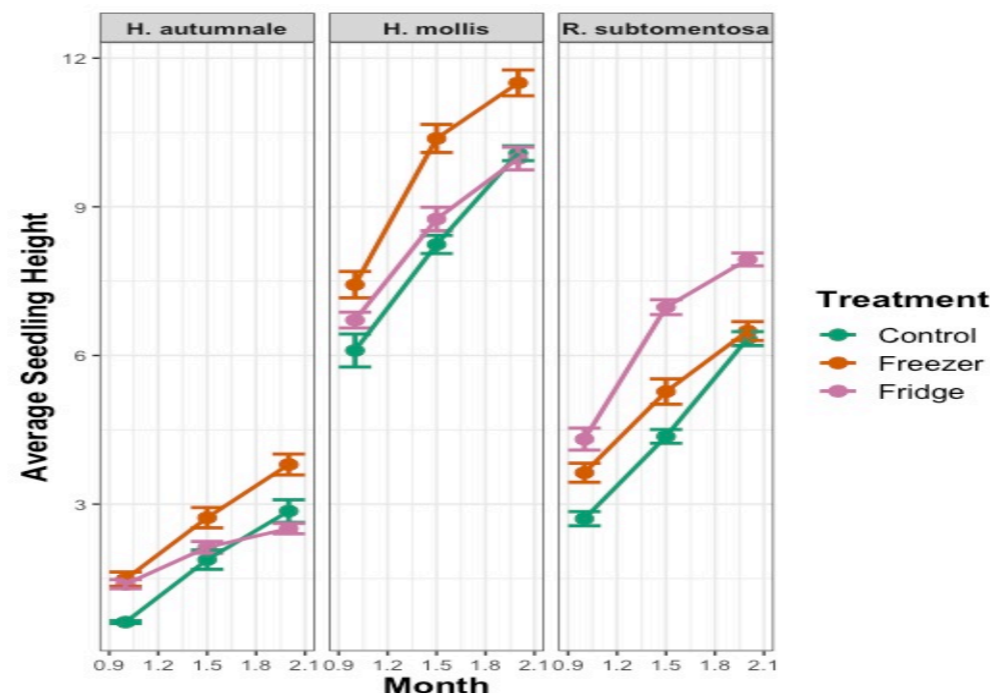


Fig. 2. Regarding height, there was a clear interaction between germination treatment and species; and for all species, height increased through time.

Species Used



Helenium autumnale
Common sneezeweed

Helianthus mollis
Ashy sunflower



Rudbeckia subtomentosa
Sweet coneflower

Conclusion

- For germination we saw a significant interaction between treatment and species, meaning species had different germination rates in different treatments.
- Regarding height, we saw significantly different trends in height based on species and storage method — meaning each species responded differently to each storage method.
- This provides strong evidence that the most effective storage method for these prairie plants is species-specific.