

## Abstract

*Ex situ* seed banks aim to conserve plant species seeds and can support ecosystem restoration projects. In storing seeds at a low temperature of  $-20^{\circ}\text{C}$ , the choice of packaging containers is crucial for maintaining seed moisture content and viability. The objective of this study was to assess seed moisture and germination ability after seed storage in four types of packaging containers for one month. The tested species were *Turpinia pomifera* (Roxb.) DC., *Diospyros glandulosa* Lace and *Toxicodendron rhtsoides*. The seeds were placed in four packaging treatments: (1) paper bags (control group), (2) zip-lock bags, (3) vacuum-sealed plastic bags, and (4) vacuum-sealed foil bags. The seeds were then stored in a freezer at  $-20^{\circ}\text{C}$  and germination was monitored over 12 weeks. The results indicate that paper bags are the least effective in maintaining seed moisture, while zip-lock bags, vacuum-sealed plastic bags, and vacuum-sealed foil bags perform similarly, as there is no statistically significant difference among them. Regarding seed germination, the types of packaging did not significantly affect percent germination. The findings suggest that airtight packaging can effectively preserve moisture without negatively impacting seed germination.

## Introduction and Objectives

- Storage conditions in seed banks:  $-20^{\circ}\text{C}$
- Suitable seed equilibrium relative humidity to be stored:  $< 15\%$  to maintain their viability for a long period.
- An important factor affecting storage: The type of packaging bags.

### Objective

To assess seed moisture and germination ability after seed storage in 4 types of packaging containers after for 1 month of storage.



## Materials and Methods

**Species selection** : Three species with orthodox seeds are native tree species in Northern of Thailand.

*Turpinia pomifera*  
(Roxb.) DC.



*Diospyros glandulosa*  
Lace



*Toxicodendron rhtsoides*



### Experiment

Seed collection  
(Doi Suthep – Pui and Ban Mae Sa)

Seed extraction  
(cleaning and drying)

Measuring initial seed moisture content and eRH

Drying until eRH  $< 15\%$

Packing seeds into all 4 types of packaging

Storing seeds at  $-20^{\circ}\text{C}$  for 1 month in a freezer

Measuring seeds moisture content

Seed germination tests

### Packaging type



Paper bags



Zip-lock bags



Vacuum-sealed plastic bags



Vacuum-sealed foil bags

## Results

Moisture content after 1 month of storage

Seed germination after 1 month of storage

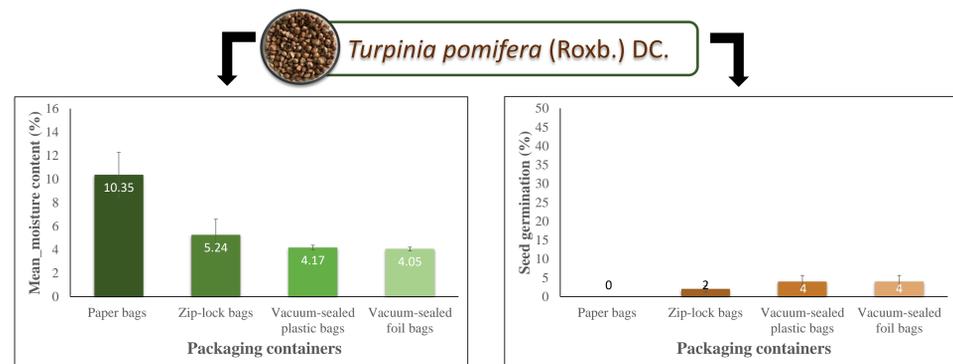


Figure 1

Figure 2

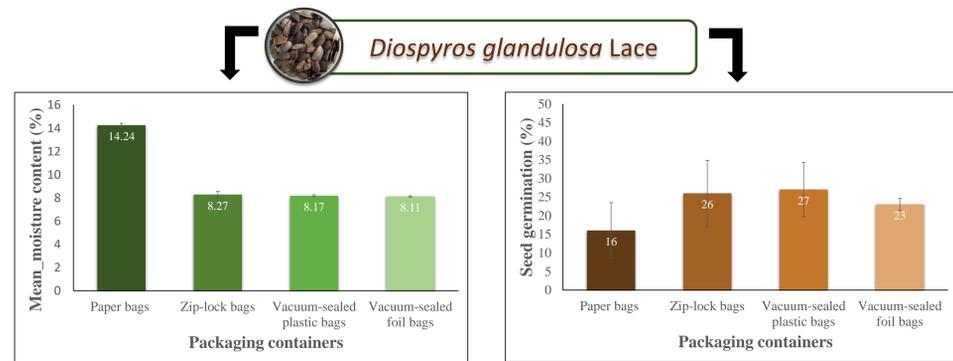


Figure 3

Figure 4

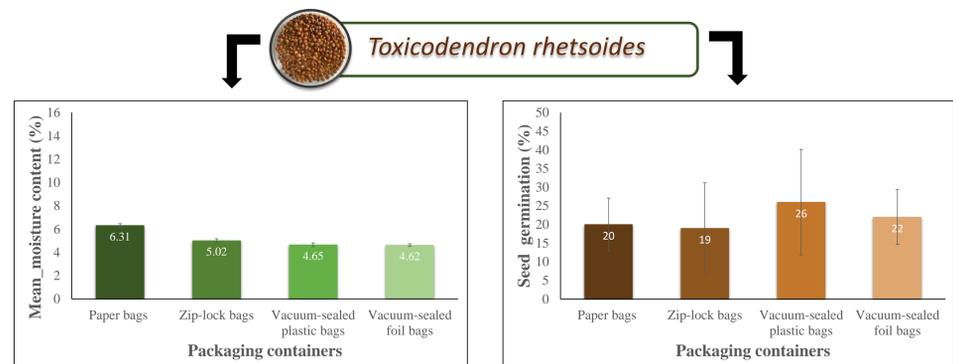


Figure 5

Figure 6

Zip-lock bag, vacuum-sealed plastic bags, and vacuum-sealed foil bags help retain moisture and maintain seed quality.

## Conclusions

- Airtight packaging can effectively preserve moisture without negatively impacting seed germination.

## References

- [1] Gold, K., & Manger, K. (2014). Selecting containers for long-term seed storage (Technical Information Sheet\_06). Royal Botanic Gardens, Kew.
- [2] P.C. Van Welzen & K. Chayamarit. 2014. Staphyleaceae. In: Flora of Thailand. T. Santisuk and H. Balslev (Eds.), vol. 11 part 4: 662. Forest Herbarium, National Park, Wildlife and Plant Conservation Department, Bangkok.
- [3] Van der Linden, B. L. (1960). Flora Malesiana - Series 1. *Spermatophyta*, 49-59.