ULTRA - DRYING AND CONSERVATION

Applied for native and endangered plants in seed banks

WORKSHOP
« Climate Change Impacts on Mediterranean Plant Diversity »
Mediterranensium Nationum Agriaria Universitas
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SEMCLIMED

Myriam VIREVAIRE – Conservatoire botanique national méditerranéen de Porquerolles

HISTORY OF THE METHOD

Initiated by IBPGR (now Biodiversity International) in the 1980s

- to investigate the effects of very low moisture content on seed longevity
- to develop 'low-input' alternatives for medium- to long-term cold storage of seeds (eventually to store at room temperature)
- to find a cost-efficient alternative for seed storage in cases of non reliable electricity supply
- to solve the basic question of the optimal seed moisture level in relation to storage temperature

THE RESULTS AND "*CONCLUSIONS*"

- ✓ **Only for orthodox seeds**
- ✓ **Many agricultural and horticultural species don't survive to the ultra–drying method**
- ✓ **Shift of resources to emergent technique (cryo-conservation) in order to solve the recalcitrant seeds conservation questions**

Not satisfactory for the seed banks!

WHAT'S THE INTEREST OF THIS METHOD FOR CONSERVATORY

- **History** : interest for this new method since 1992
  For a new strategy of conservation
  To overcome energy power deficiency
  For delocalization of seed storage out of Porquerolles island
- **Management of seed samples** : Alternative solution for long-term storage
  Samples of seeds divided in three parts
  Monitoring through germination tests and protocols already defined
- **Studies** : Validation and promotion of this method
  Applied research for seed bank needed at international level
  Transfer of this method towards countries with concern in conservation
  Adequacy between conservation and energy questions

STUDIES WITHIN THE CONSERVATORY

First step : Using the ultra-dry, 'old' seed (for 15 years of conservation) germination tests, and compare with seeds deep frozen (-25°C) or refrigerated (+5°C), all samples from the same date

Second step : testing the apparatus with different durations of ultra-drying and previous germination tests, then evaluation of viability through germination tests

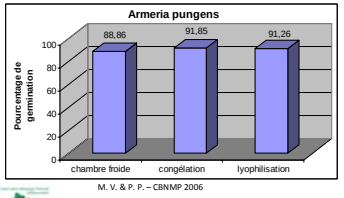
Third step : with fresh seeds, testing different durations of ultra-drying , measuring water content, and germination tests.

Presentation of the different results…

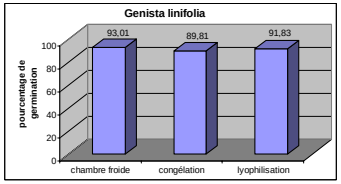
COMPARE THE THREE METHODS

We proceed with samples conserved with three methods.
With large samples (for 4 replicate of 100 seeds each).
With species who 's germinate conditions are known.

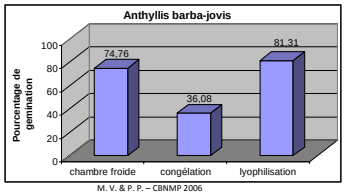
Plumbaginaceae, Chamaephyte, Anemochorie, Costal habitat
11 years old



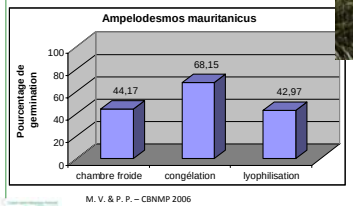
Leguminosae, Nanophanerophyte, Barochorie
15 years old



Leguminosae, Nanophanerophyte, Barochorie,
14 years old



Poaceae, Hemicryptophyte, Barochorie,
14 years old



➢ Duplicate the experiment with the same sample and other samples (different accessions)

➢ Continue the experiment with other species

✓ 800 different species samples are tested

✓Problems or artifact with some species? We must continue the experiment, but :

Needs of large number of seeds!

Time to make experiment!

Pattern of study … oxalate, green cotyledons…..

RH, TIME OF ULTRADRYING AND GERMINATION TEST

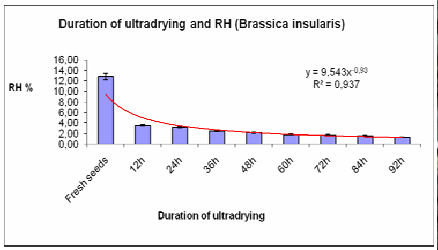
Many seeds of *Brassica insularis* were collected at the Porquerolles nursery in June 2007.

After post maturation we make RH test (ISTA) and proceed to a germination test.

In the second step we proceed at different durations of ultra-drying.

After each duration, we make a RH test and proceed to germination tests. Germination tests were with 4 replicates (100 seeds each) and at 5 different temperatures, in darkness, in Petri dishes with paper and distilled water.

Brassica insularis Moris, *Cruciferae*



4 /5 g of seeds in three replicates.

Since 1992 we make 215 germination tests on different samples of *Brassica insularis*
We know the characteristics of the germination

LIMITATIONS

Number of seeds for the native and endangered plants available for the experimentations

Staff working Time to make the experiments

NEEDS

Money! Human resources!...

We must impulse projects for endangered and native plants!

**If you can look into the seeds of time,
and say which grain will grow and which will not,
speak then to me…**

Macbeth, Shakespeare

**Thank you for your attention,
your help,
your future contributions
and…. For the planet!**

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