Botanic Gardens Conservation International

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BGCI

Plants for the Planet

Module 4: Post Collection – Cleaning, Drying & Storage



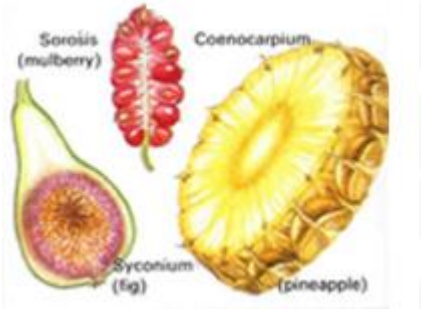

Fruit Types

Dry dehiscent fruit

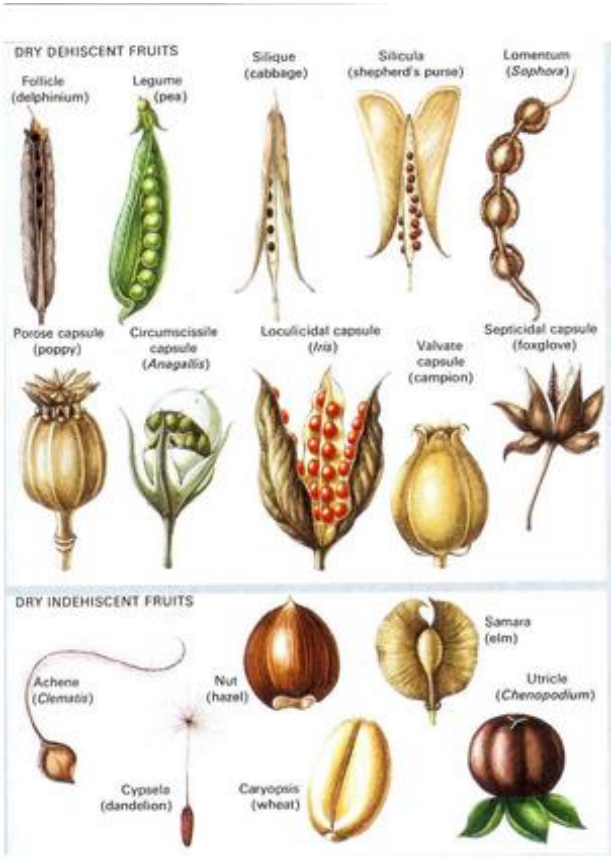
Dry indehiscent fruit

Fleshy fruits derived from a single flower

Fleshy multiple fruits derived from an inflorescence



Flowering plants of the World Heywood, V.H.



Fruit

<u>Dry fruit</u>

<u>Fleshy fruit</u>

Wash fleshy fruit in a sieve to remove fruit pulp. If hard cut open and remove seed

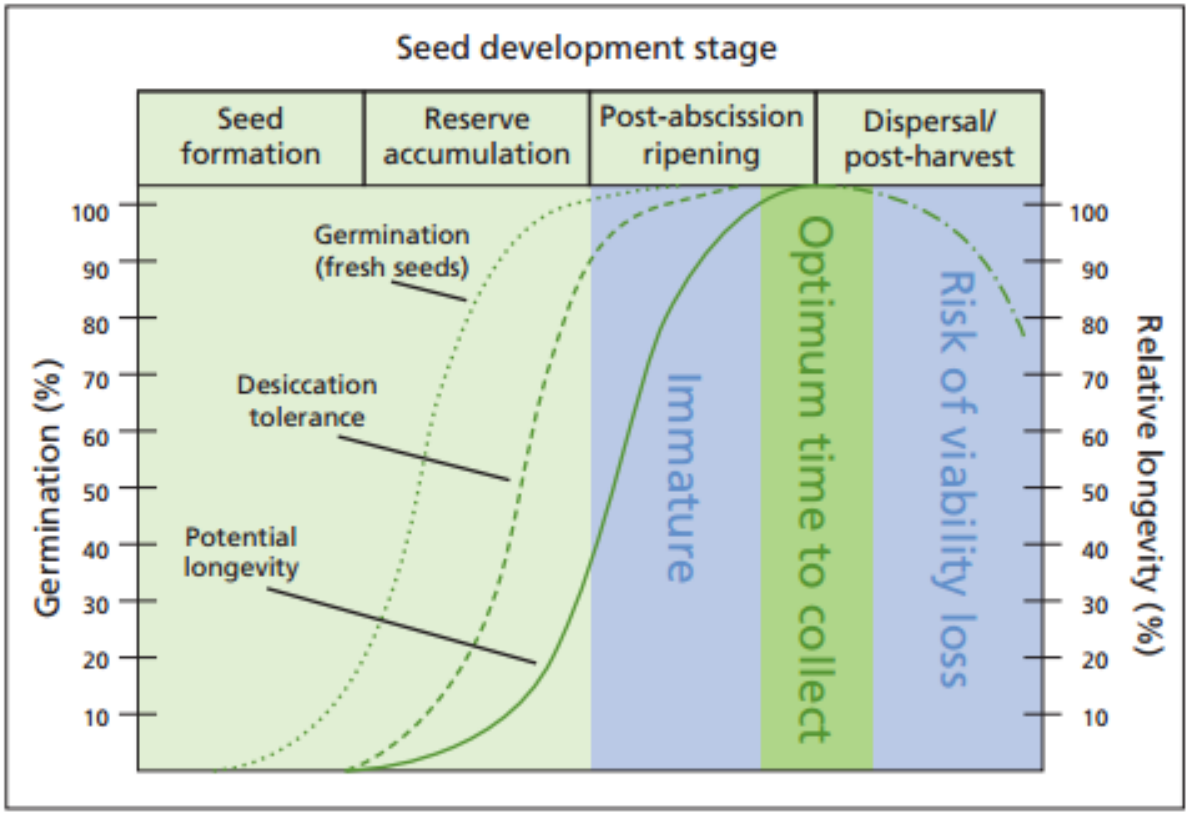
Dry slowly in ambient conditions for up to two weeks

Clean

Re-dry, package and store

Seed Quality

Aim: To collect healthy seed. Collect seed when it is ready



Developmental Variation

- Flowering and fruiting times can be widely spread
- Seed collections may include a range of maturities
- Careless handling could reduce the storability of the collection
- Remove seeds from fleshy fruits as soon as morphological signs (e.g. fruit colour) indicate that they are fully ripe.

- Slow drying enables continued ripening

Hymenocardia ulmoides

Seed cleaning techniques

Using sieves of different mesh sizes, and a rubber bung to separate seeds from debris

Using a seed aspirator to remove empty/infested seeds or debris

Hand removing debris one fruit at a time

Keep safe!

Use masks, gloves and eye protection for toxic species.

Seed drying

- Seed longevity doubles for every 1% reduction in mc or 10% reduction in RH
- Seed longevity doubles for every 5°C drop in temperature

In a seedbank low moisture content and low temperature are used to extend longevity, postpone germination and prevent pest attacks.

Typically seeds are dried to 3-7% mc 10-15% eRH and then stored at -20°C

Seed drying

Properties of air

- What is moisture content (Mc)?

This is the amount of water in a given amount of substance.

- What is relative humidity (RH)?

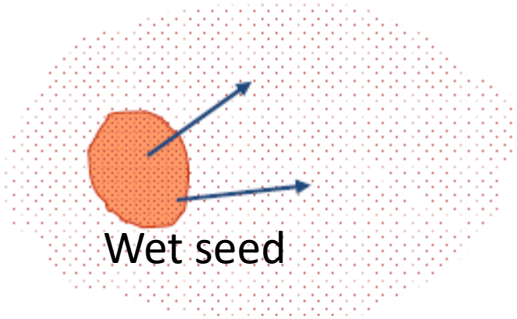
Air holds water vapour and is shown as a percentage. This is called relative humidity (RH)

What is equilibrium relative humidity (eRH)?

The measured relative humidity when the loss and gain of moisture between a substance and the surrounding air is in equilibrium

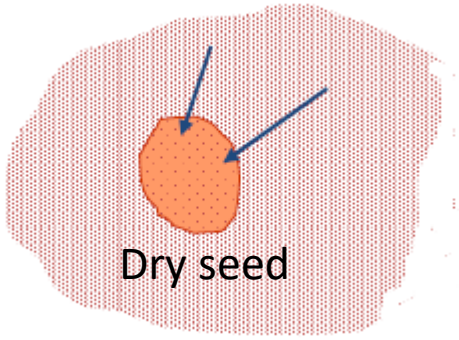
Seed drying

Seeds are hygroscopic - absorb and lose moisture from the surrounding air.



Dry air

Moisture moves from the seed to the air



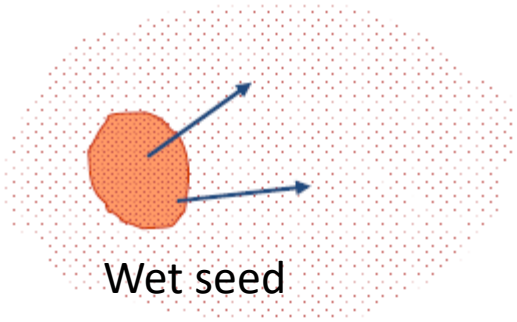
Wet air

Moisture moves from air to the seed

Seed drying

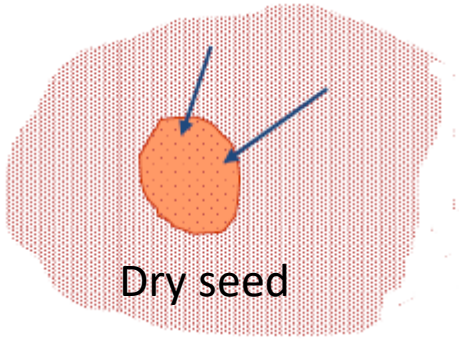
Seeds are hygroscopic - absorb and lose moisture from the surrounding air.

Drying seed



Dry air

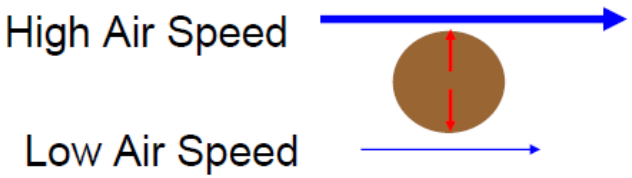
Moisture moves from the seed to the air



Wet air

Moisture moves from air to the seed

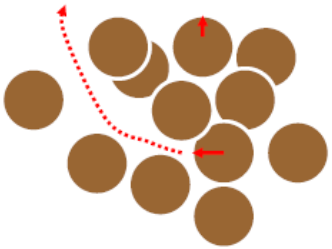
Seed drying



Quicker air movement, quicker drying

Aim to increase air speed

Large seed (moisture has distance to migrate to boundary layer)



Aim to increase the amount of air that is in contact with seed

Small seed deep in bag - moisture migration equivalent to that in large seed

Seed drying

- Seeds need to be placed in porous bags or spread in thin layers
- Temperature of 10-25°C is recommended for seed drying
- Relative humidity of the air should be 10-15% RH

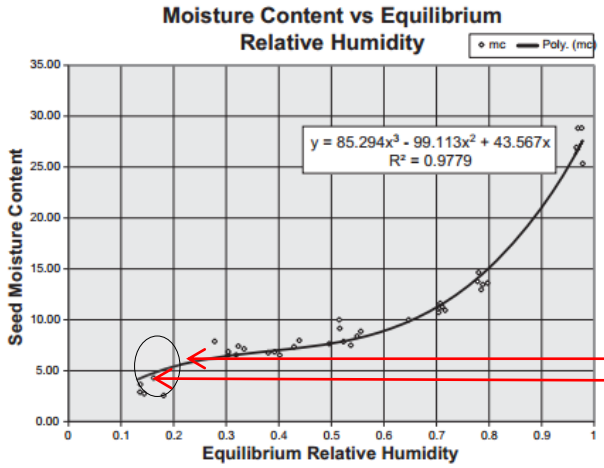


Figure 6. ERH of green ash (*Fraxinus pennsylvanica*) plotted against moisture content.

Freshly collected seed

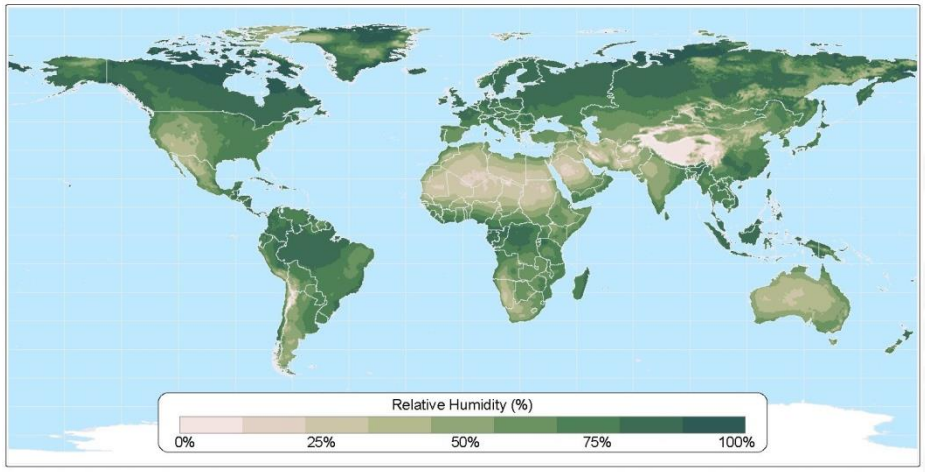
Optimum eRH and Mc

Lower is detrimental

Taken from Karrfalt, 2010

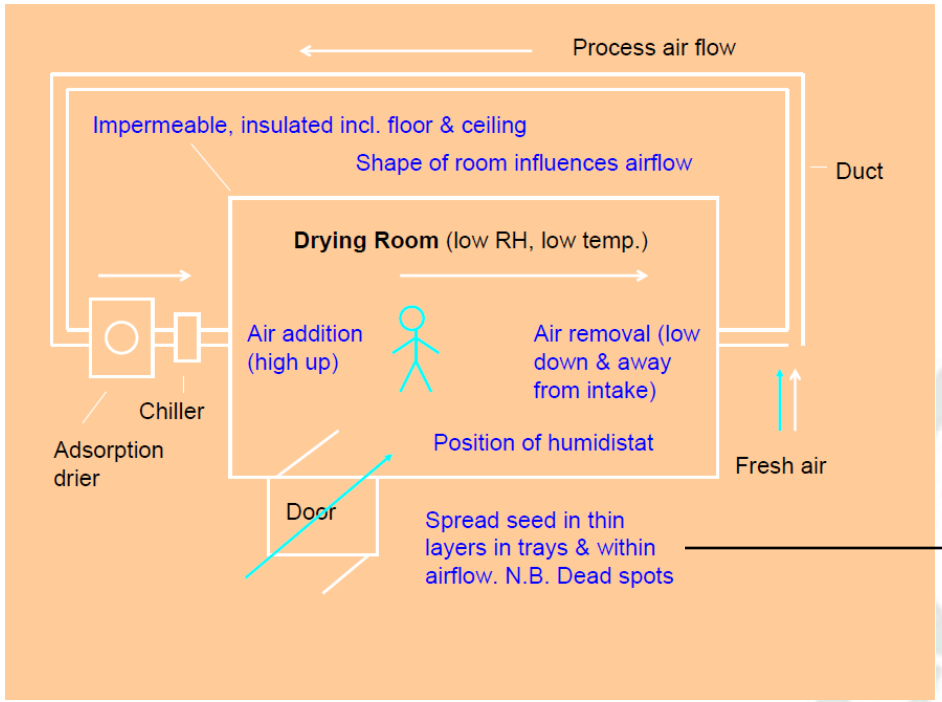
Ambient drying

- In dry warm regions (Australia, North Africa, West North America) seeds can be dried in ambient conditions in the shade



- MC increases over night and when it rains. Seeds should be raked together and covered
- Seeds should be spread out during the day

Dry Room



Essential for large quantities of material.

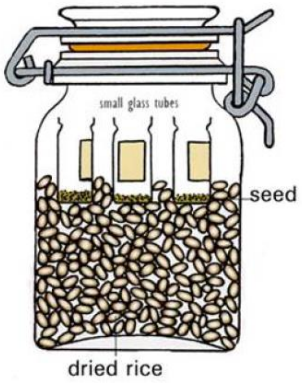
Incubator Drying

Incubators set to 18C can achieve an internal humidity of 15% RH

Seed should be placed in porous bags so that moisture can leave the seed

Using Desiccants

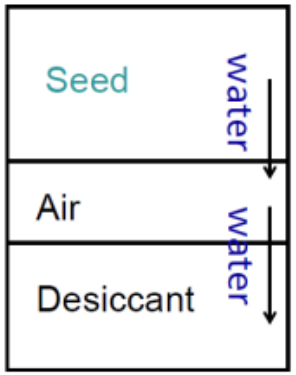
Rice



Drying seed in a Kilner jar

Charcoal

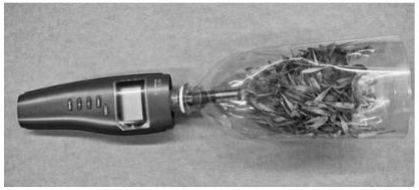
Silica gel



Re-usable if oven dried

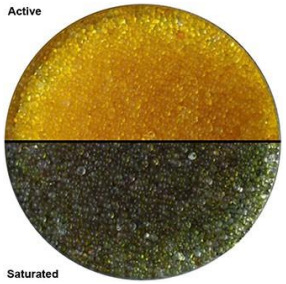
Measuring dryness

Field hygrometer



Electronic Hygrometer

Indicator silica gel



Yellow = dry
(<20-25% RH)

Green = wet
(>20-25% RH)

If nothing else remember that:

dry seed is the key to good storage

Storage

Seeds should be banked as soon as possible after drying to equilibrium with 15% RH ± 3%

Collections should be held in air tight containers

Collections are stored at -20C ± 3C

Collections are duplicated at a geographically-separate facility.

Storage containers

Pros	Cons
Tri-laminate foil	
Light weight. Can be vacuum sealed to remove air	Sharp seed needs to be wrapped in cardboard
Glass	
Can use self indicating silica gel to test for leaks	Heavy, breakable, vary in quality
Paper	
Not as expensive as the other options	Not air tight

Storage containers

Pros	Cons
Tri-laminate foil	
Vacuum sealing removes air and keeps seed dry	Sharp seed needs to be wrapped in cardboard
Glass	
Can use self indicating silica gel to test for leaks	Heavy, breakable, vary in quality
Paper	
Not as expensive as the other options	Not air tight

Storage space

Short term/long term?

- No. of collections per year.
- Container height + width foil or glass jars
- Number of containers per collection (small or large seed)
- Width of shelving = (0.5M)
- Number of years collecting = (Y)

= Freezer or cold room

Freezer

Cold room

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End of Module Four (Post Collection)

Why not try the quick quiz?

Then, go to Module Five (Germination and Dormancy)

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Plants for the Planet

Connecting People • Sharing Knowledge • Saving Plants

Our Mission is to mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet

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