Seed Dormancy

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Presentation Outline

- Introduction
- What is dormancy?
- Types of dormancy
- Why do we try to break dormancy?
- How to break dormancy?

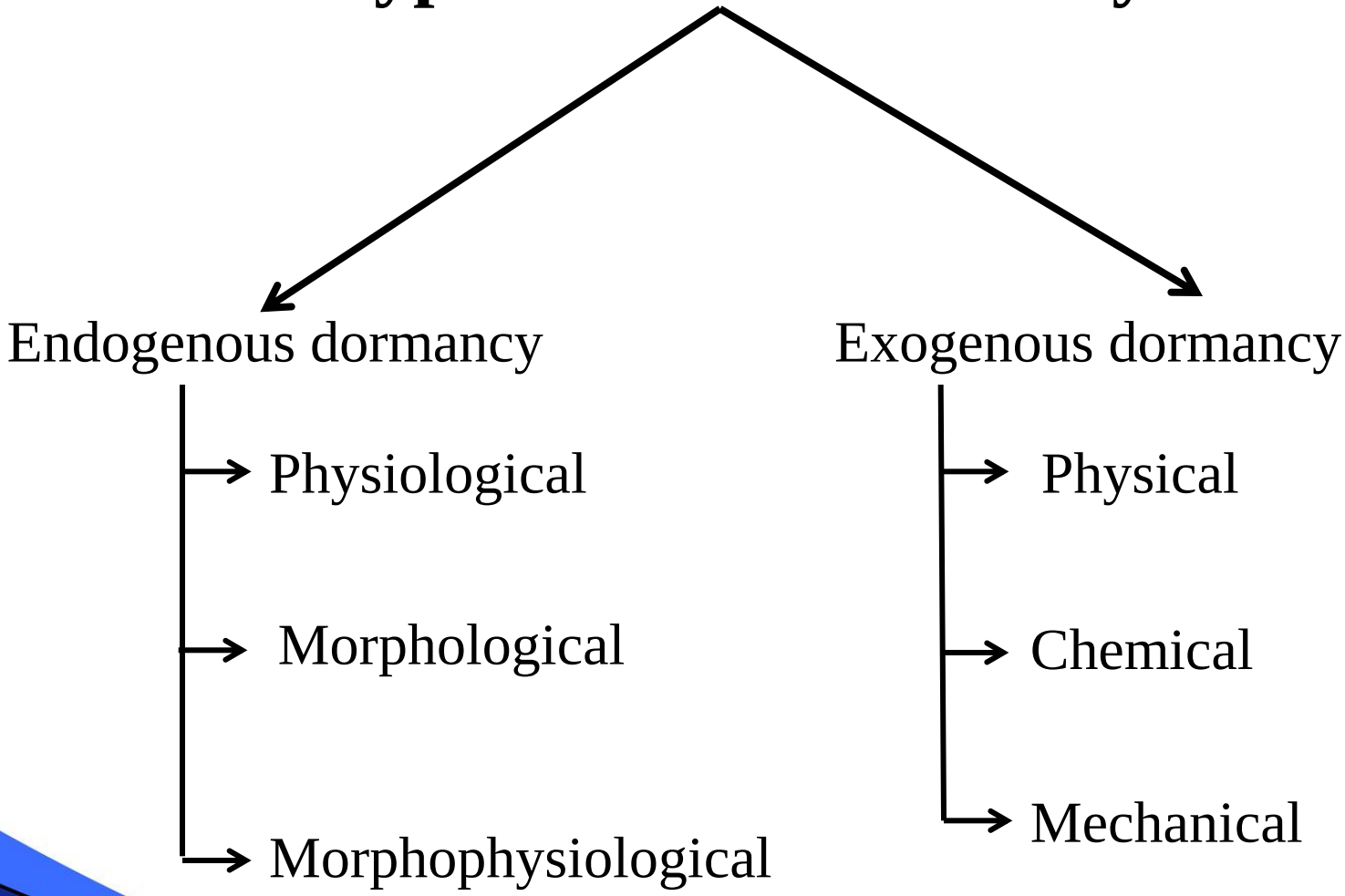
INTRODUCTION

- Collection of **ripened seeds** is important in seed biology studies, as immature seeds will not germinate and quickly become covered with fungi.
- A good general rule is to collect seeds when **natural dispersal begins**.
- Checking for imbibition of water categorizes seeds into hard/impermeable and permeable seeds
- Certain pre-treatments are given artificially to hard/impermeable seeds to break dormancy.
- A germination test period has to be long enough to allow seeds sufficient time for germination.

What is dormancy?

- Seed requires- water, air, light, optimum temperature to grow
- All favourable conditions- Healthy mature seed does not grow- seed might be dormant
- **Definition**: A dormant seed does not have the capacity to germinate in a specified period of time under any combination of normal physical environmental factors (Temperature, light/dark) that is otherwise favorable for its germination (Baskin and Baskin, 2004c)

Types of Seed Dormancy



Endogenous Dormancy

Some characteristics of the embryo prevents dormancy

- Physiological Dormancy- Some chemical inside the seed prevent germination
- Morphological Dormancy- Caused by underdeveloped embryo
- Morpho-physiological Dormancy- Caused by chemicals and underdeveloped embryo

Exogenous Dormancy

Some characteristic of structures, including endosperm, seed coats, or fruit walls, covering the embryo prevent germination

- Physical Dormancy- caused by seed (fruit) impermeable to water
- Chemical Dormancy- Caused by germination inhibitors
- Mechanical Dormancy- Hard woody fruit wall restricts growth

Why do we try to break dormancy?

- Dormancy is a survival mechanism of nature in adverse climatic conditions
- To propagate important native plants for use in re-vegetation programs

How to break dormancy?

Type of Dormancy	Broken by
Physiological	Warm and/ or cold stratification, Treatment with growth hormones
Morphological	Appropriate conditions for embryo growth/germination
Morpho-physiological	Warm and/ or cold stratification
Physical	Scarify hard seed coat
Chemical	Removal of pericarp or leaching of the fruit
Mechanical	Warm and/ or cold stratification

Based on Nikolaeva's classification (1977)

Germination Test

- Germination test is carried out in controlled condition
- If the seeds are dormant, they are subjected to pretreatments

➢ Scarification
  - Mechanical Scarification
  - Acid Scarification

➢ Stratification
  - Cold stratification
  - Hot stratification
    - Dry heat
    - Wet heat

➢ Boiling water treatment

➢ Chemical treatment

Germinating seeds on filter paper

Germinating seeds in soil

Few pre-treatments

- **Mechanical Scarification** (Physical dormancy):
  Eg:Astragalus
  - Scarified with sand paper
- **Acid Scarification** (Physical dormancy):
  Eg: Convolvulus
  - Treated with concentrated acid for various duration
- **GA 3 Treatment** (Physiological dormancy):
  Treatment with GA3 for various duration

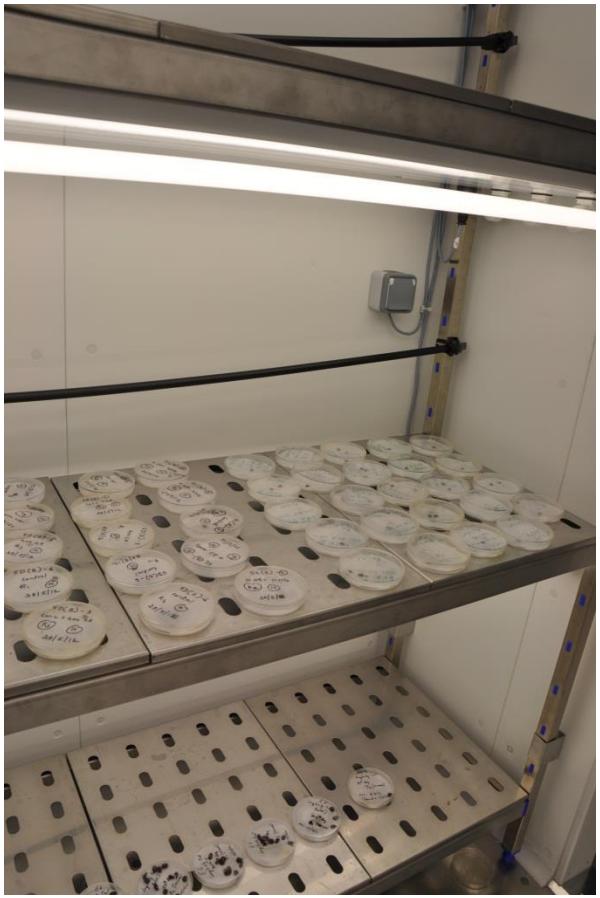
Facilities in BTE for Seed Biology

Growth Chamber- Plants and seeds can placed in a controlled environment inside a growth chamber.

Seed X-Ray Cabinet- seed viability inspection, infestation, damage or contamination, peel thickness of fruit, seed development can be determined.

Oven for dry heat treatment and to determine seed moisture content

Walk –In Growth Chamber

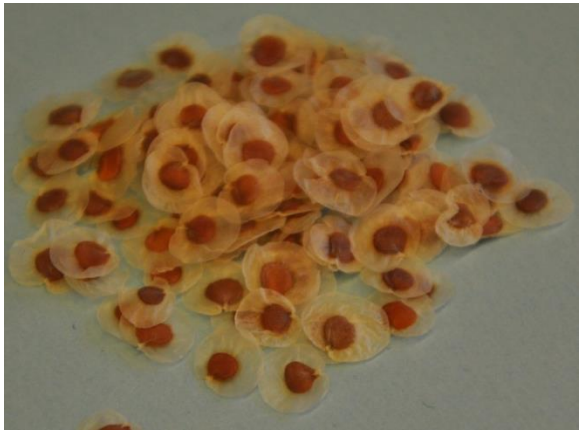


Plants and seeds can placed in a controlled environment inside a growth chamber

Seed Storage

M.T.S. -Walk-in cold storage room (4º C)

L.T.S. – Freezer-small amount Storage at -18º C



Thank You