

Plant Propagation Lab Exercise

Module 2



UF | UNIVERSITY of
FLORIDA



PROPAGATION OF PLANTS FROM SEED

SEED COLLECTION, CLEANING, GRADING AND STORAGE

An introduction to plant propagation laboratory exercises by:
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LAB OBJECTIVES

- **Review criteria for determining what a mature fruit looks like on an unfamiliar plant species**
- **Review steps for collection of ripe fruits**
- **Describe processes for cleaning seeds**
- **Demonstrate how to determine storage potential and describe steps for placing seeds in storage**

Harvesting and Handling procedures

- Dry fruits that do not dehisce at maturity (Beans, corn, grains & nuts)
 - Beans, corn, grains - thrashing used to separate from each other.
 - Nut crops - do not separate from outer coatings – Flootation in water often used to separate viable and nonviable seeds



Harvesting and Handling procedures

- Dry fruits that dehisce at maturity - follicles, pods, capsules & siliques
 - Often fruits are harvested prior to full maturity
 - Harvest and dry – inflorescences (fruits) or whole plants
 - Extract – dried fruits thrashed, flailed, or rolled and seed separated from chaff and fruit parts
 - Seed cleaning (conditioning) – methods to further clean the seeds from debris



Harvesting and Handling procedures

- Dry fruits that dehisce at maturity – conifer cones
 - Handled similarly to dry dehiscent fruits
 - Cones are dried which assists opening and dispersal of seed
 - Cones may be tumbled to dislodge seeds
 - Seeds are collected and dewinged
 - Seeds are further cleaned (conditioned)



Harvesting and Handling procedures

- Plants with fleshy fruits - Berries, pomes and drupes
 - Small lots - cut fruit and scoop out seeds, collect in tubs, rub through screens or wash with high pressure water streams in wire baskets (mixer or blender)
 - Larger lots – separate by maceration, fermentation, mechanical means or washing through screens.
 - Maceration – crushes fruit and mixes it with water
 - Fermentation – macerated fruit sometimes benefit from a fermentation step.
 - Chemical treatment – acid treatments or pectinase
 - Floatation - heavier good seeds sink while pulp and underdeveloped seed float.



HOW TO COLLECT FRUIT AND SEED OF AN UNFAMILIAR PLANT:

A case-study using *Crocanthemum arenicola*

1A container-grown stock plant



1B pistillate flower



2 Dry, mature capsules



3 Crushed capsules and seeds



1C Green (immature) and brown (mature) fruit (capsules)



HOW TO COLLECT FRUIT AND SEED OF AN UNFAMILIAR PLANT: A case-study using *Crocanthemum arenicola*



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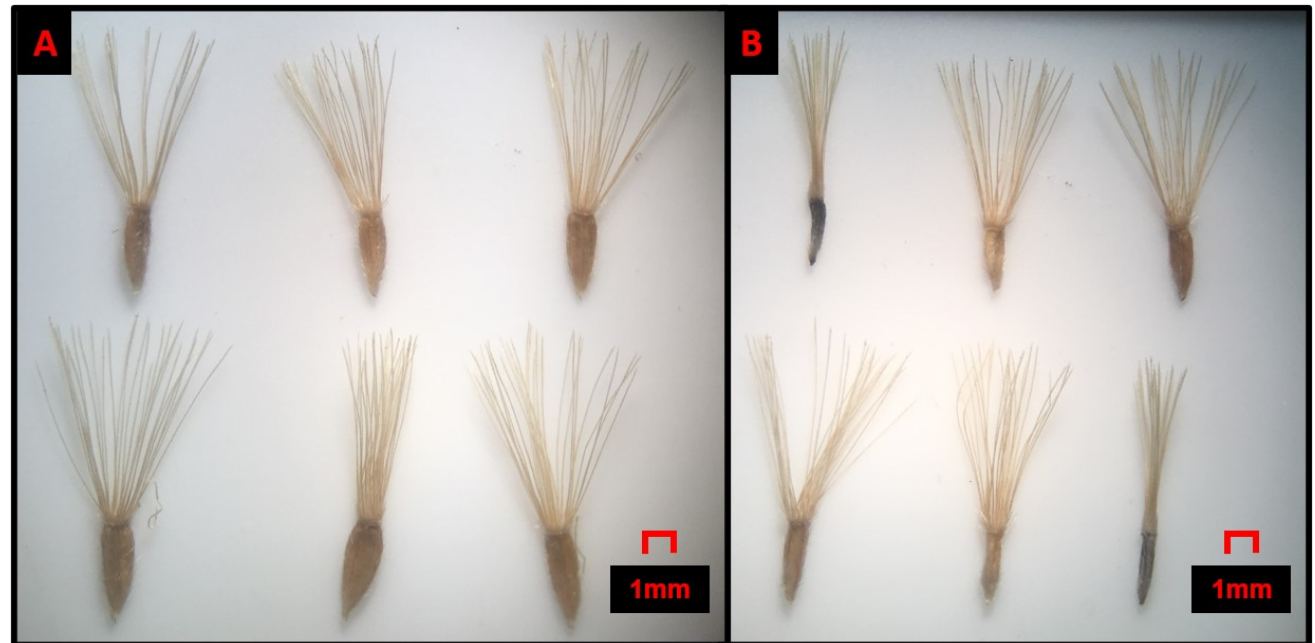
How to collect fruit and seed of an unfamiliar plant:

A case-study using *Crocanthemum arenicola*

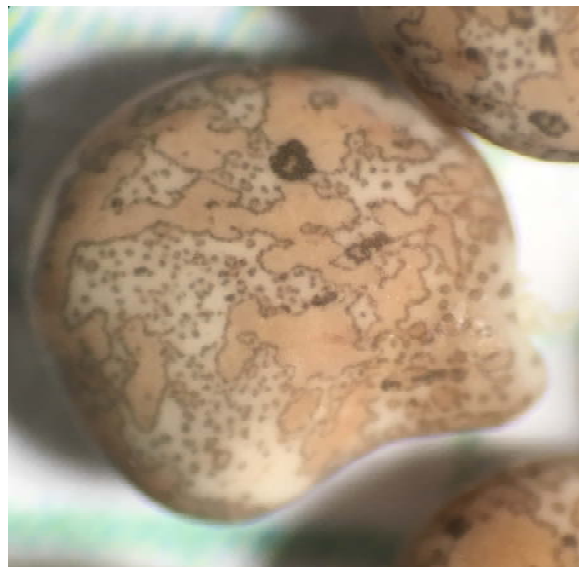
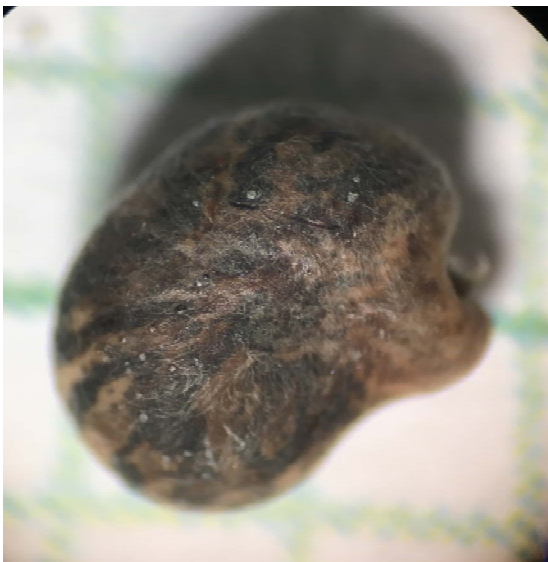
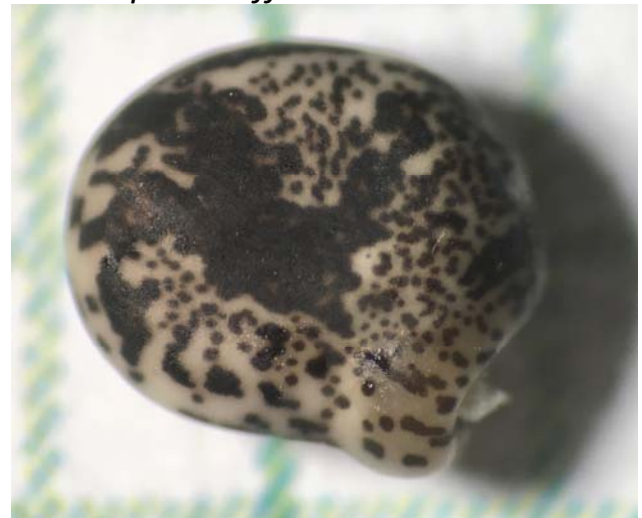
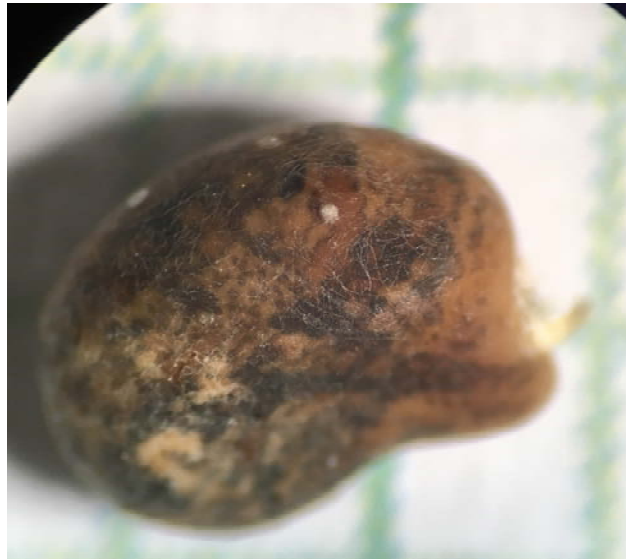
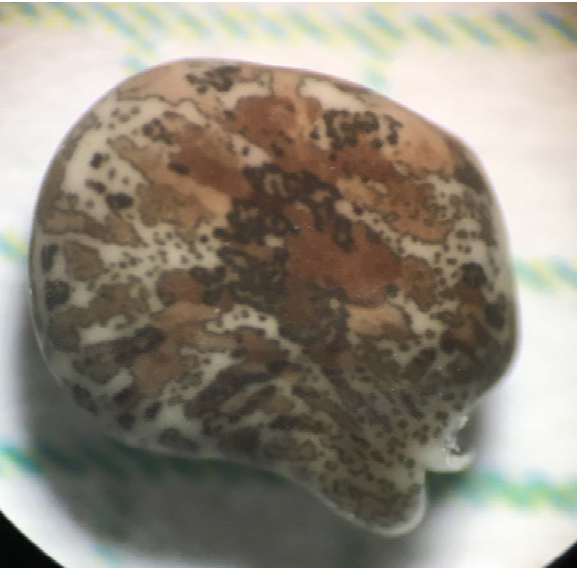


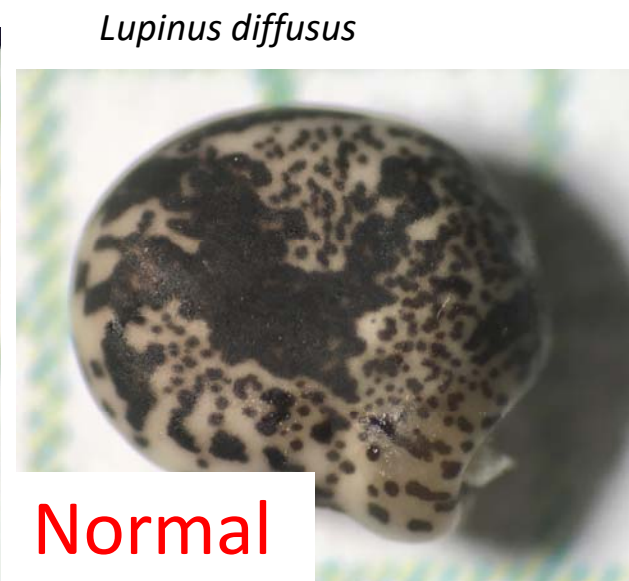
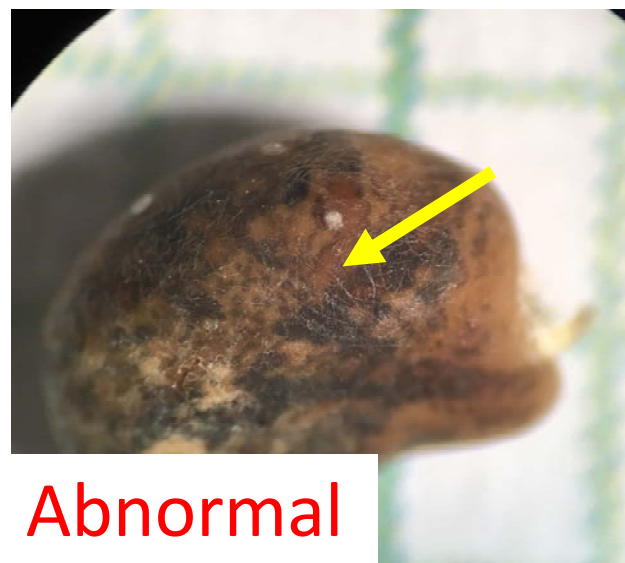
SEED GRADING

- **Seed grading** can be based on visual characteristics including
 - Shape
 - Color
 - Disease
 - Intactness



Lupinus diffusus









Review of Seed processing steps

1. Identify the plant species to understand the type of fruit/seed it will produce and potential time of harvest
2. Collect fruits based on fruit type (dry/fleshy and dehiscence)
3. Determine what is fruit tissue and what is seed
4. Remove fruit tissue
5. Process (clean) seeds
6. Grade seeds
7. Review literature to understand storage potential and drying sensitivity or requirements.

Seed storage potential

- Recalcitrant seed

- Do not tolerate significant drying after seed development.
- Most recalcitrant seeds begin to lose viability at seed moistures below 25%

Relative Storability Index

Category 1 (1-2 years)

- Orthodox seed

- Do tolerate drying after seed development and can be stored in a dry state (4 to 10% moisture) for extended periods of time.
- Seed longevity will be considerably longer under controlled low temperature and humidity storage.

Category 2 (3-5 years)

Category 3 (>5 years)

Seed storage

- Recalcitrant seed

- Do not tolerate significant drying after seed development.
- Most recalcitrant seeds begin to lose viability at seed moistures below 25%

- Orthodox seed

- Do tolerate drying after seed development and can be stored in a dry state (4 to 10% moisture) for extended periods of time.
- Seed longevity will be considerably longer under controlled low temperature and humidity storage.

Species of each seed type

- Recalcitrant seed

- avocado, cacao, coconut, jackfruit, lychee, mango, rubber, tea

- Orthodox seed

- *Citrus aurantifolia*,
Capsicum annum,
Hamelia patens, *Lantana camara*, guava (*Psidium guajava*), Cashew (*Anacardium occidentale*) and most grains and legume types

Lab exercise

- Locate a plant from a garden or natural area and determine the type of fruit it produces.
- Collect fruit or harvest inflorescences as appropriate for the species.
- Separate seeds from fruit using the most appropriate method.
- Process (clean) seeds
- Grade seeds as normal and abnormal (photograph examples of each)
- Count normal and abnormal seeds

Lab report

- Provide a descriptive summary report with supporting photographs of your subject plant and fruits.
- Include a description of your steps for collection, separation, cleaning and grading and include supporting photographs.
- Your descriptive report should conclude with an assessment of your choices for achieving each step and it should indicate the number of seeds in your abnormal and normal seed lots.
- Retain both lots of seeds and bring them to your next lab for use in Seed Testing experiments.