

# Introduction to Plant Propagation

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# Purposes for Plant Propagation

- Multiply the number of a species
- Perpetuate a species
- Maintain the youthfulness of a plant



# Types of Propagation

- Sexual (seed)
  - Involves floral parts of the plant
  - Union of pollen and egg
- Asexual (vegetative)
  - Regenerate part of a parent plant into a new plant
  - Genetically identical to its one parent
  - Involves stems, roots, or leaves



# Seed Advantages

- Produce large number of seedlings from a single parent plant
- May store seeds for future propagation
- Breed for new varieties and hybrid vigor
- Avoid transmission of certain diseases



# Seed Disadvantages

- Genetic material may not be uniform
- Cannot save seeds from hybrids
- Long time to sizable plant
  - Woody plants and shrubs
- Irritants in fleshy covering (palms, etc.)





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# Seed Storage

- Keep in sealed container
- Refrigerate @ 40°F
- Low humidity
- Viability can approach 5 years
  - Varies with species
  - Viability will decline
- Check germination % of stored seeds prior to planting



# Factors that affect Germination

- Water – imbibition
- Oxygen – respiration takes place in all viable seeds
- Light
  - requires light: impatiens, petunias, lettuce
  - requires dark: pansy
- Temperature
  - some seeds have optimal temperatures for germination



# Seedling Media Requirements

- Particle size should be fine and uniform
- Well drained
- Free of insects, disease, & weed seeds
- Low in total soluble salts
- Avoid soil from the garden
  - Heavy, not sterile





# Transplanting Seedlings

- When young plants less susceptible to shock (transplant shock)
- Usually when 1<sup>st</sup> true leaves appear
- Can be left longer when grown in cell packs or individual containers
- After transplanting, wait 1-2 weeks before fertilizing at a low rate





Cotyledon

Endosperm

Tap root



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# Questions?



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# Asexual (Vegetative) Propagation

- Cuttings
  - Rooting a severed piece from a parent plant
- Layering
  - Rooting a stem while attached to the parent plant
- Division
  - Separation of multi-crown plants
- Grafting & Budding
  - Joining of 2 plant parts
- Tissue Culture
  - Aseptic culture of meristematic tissue



# Vegetative Advantages

- Larger, fuller plant produced faster
- Genetically, same as the parent
- Only way to propagate some species
- Bypasses juvenile characteristics



# Vegetative Propagation Concerns

- Time spent collecting and preparing vegetative material
- May need structures and water





# Cuttings

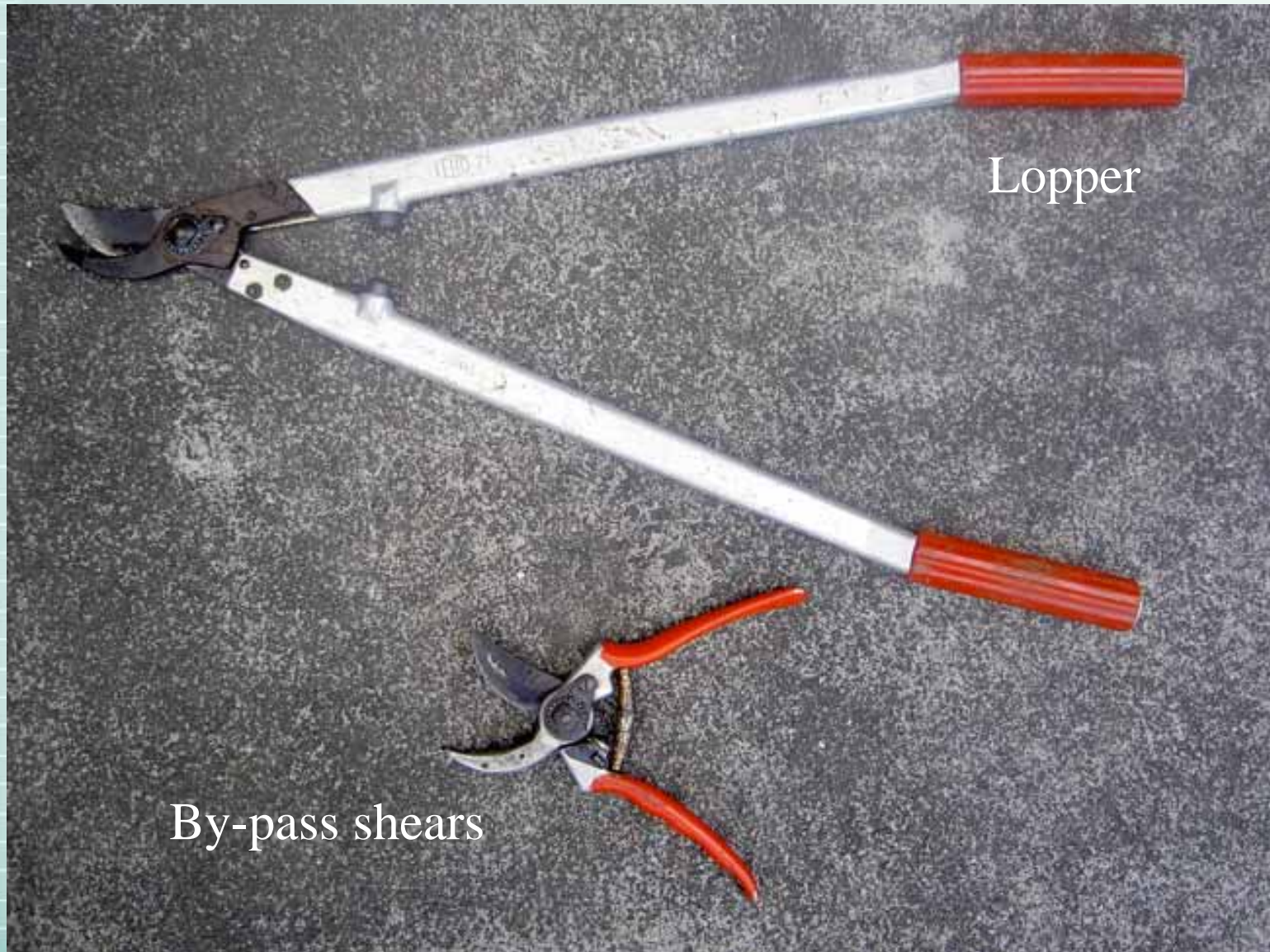
- Many new plants from few stock plants, in a limited space
- Need structure and water
  - Can be simple
- Some plant material are difficult to root
  - Wounding
  - Rooting hormone



# Tools and Materials

- Shears
- Saw (Depends on size of stock plant)
- Container (Tray, pots, sleeves, etc.)
- Media





Lopper

By-pass shears





Fixed blade - 16"



Folding saw - 9"







# Media

- Sterile
  - Low fertility
  - Well-drained
  - Retains moisture
- 
- Peat/perlite (1:1 mix)
  - Vermiculite/perlite (1:1 mix)







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# Propagation Structures

- Simple
  - Plastic bag over a container with moist peat
- Backyard
  - Covered structure with mist system
- Large
  - Saran
  - Plastic covered
  - Mist system







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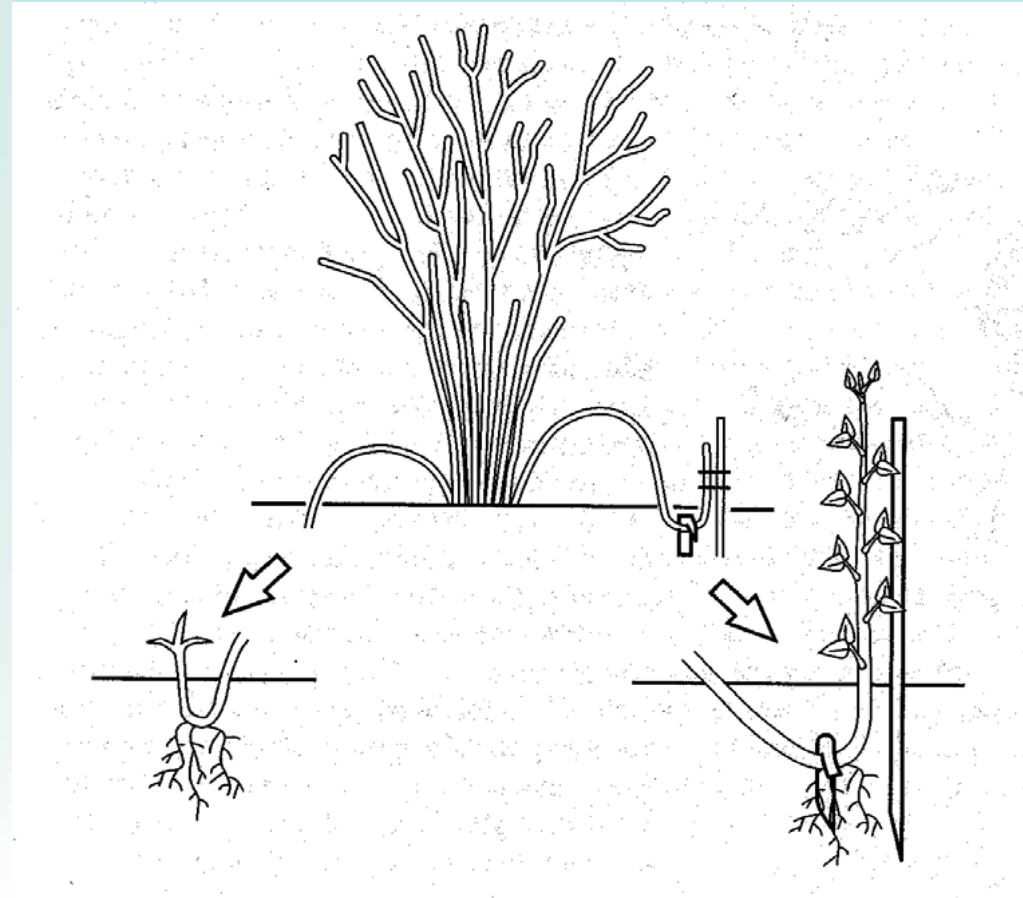
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# Layering

- Used on difficult to root plants
- Results in larger rooted material
- No special structures needed
- Less propagation material per plant
- Time spent to do the layering



# Simple Layering







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# Air Layering Materials

- Sharp knife
- Sphagnum moss - wet
  - May use other materials like peat
- Aluminum foil or plastic sheet
- Parent plant in good, vigorous growing condition.
  - Branch pointing upwards at 45<sup>0</sup>







Bark

Cambium  
Layer



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Select a branch growing upwards at 45<sup>0</sup>





2 deep cuts around the branch, 1”  
apart



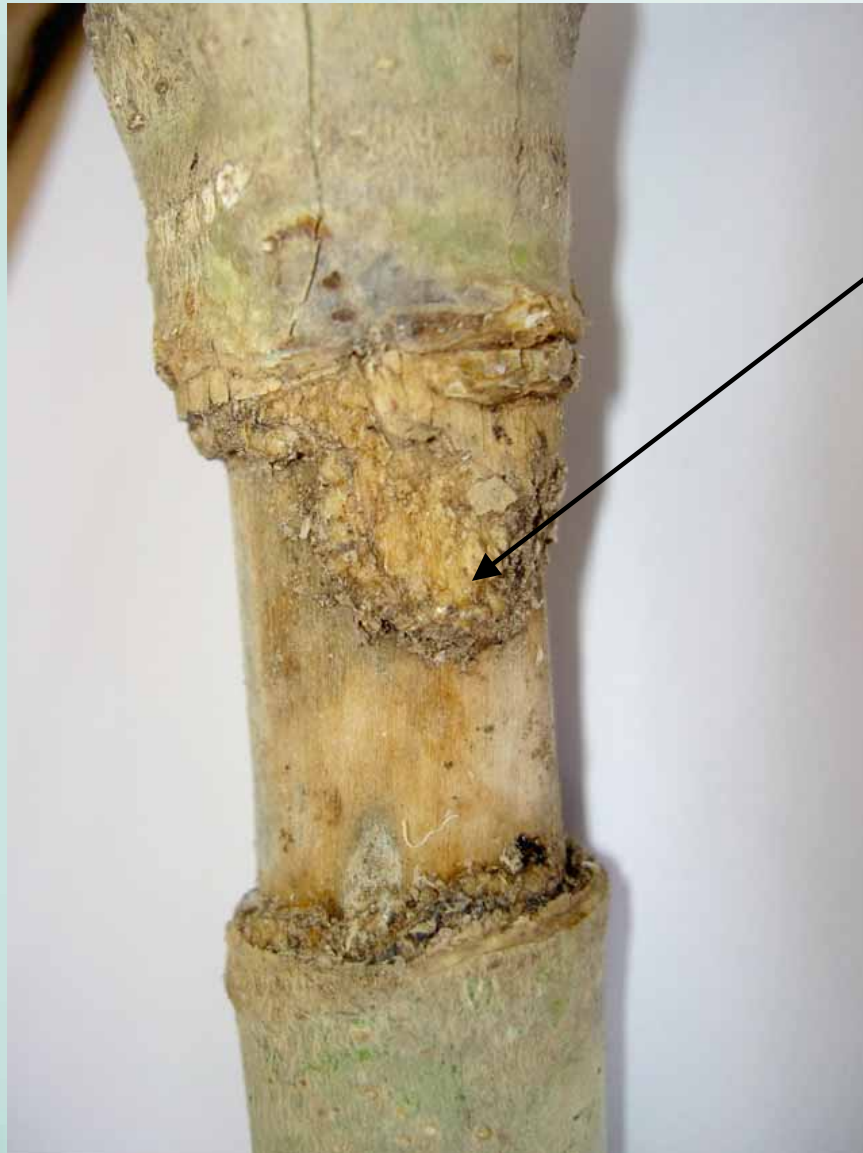
# Peel off the bark





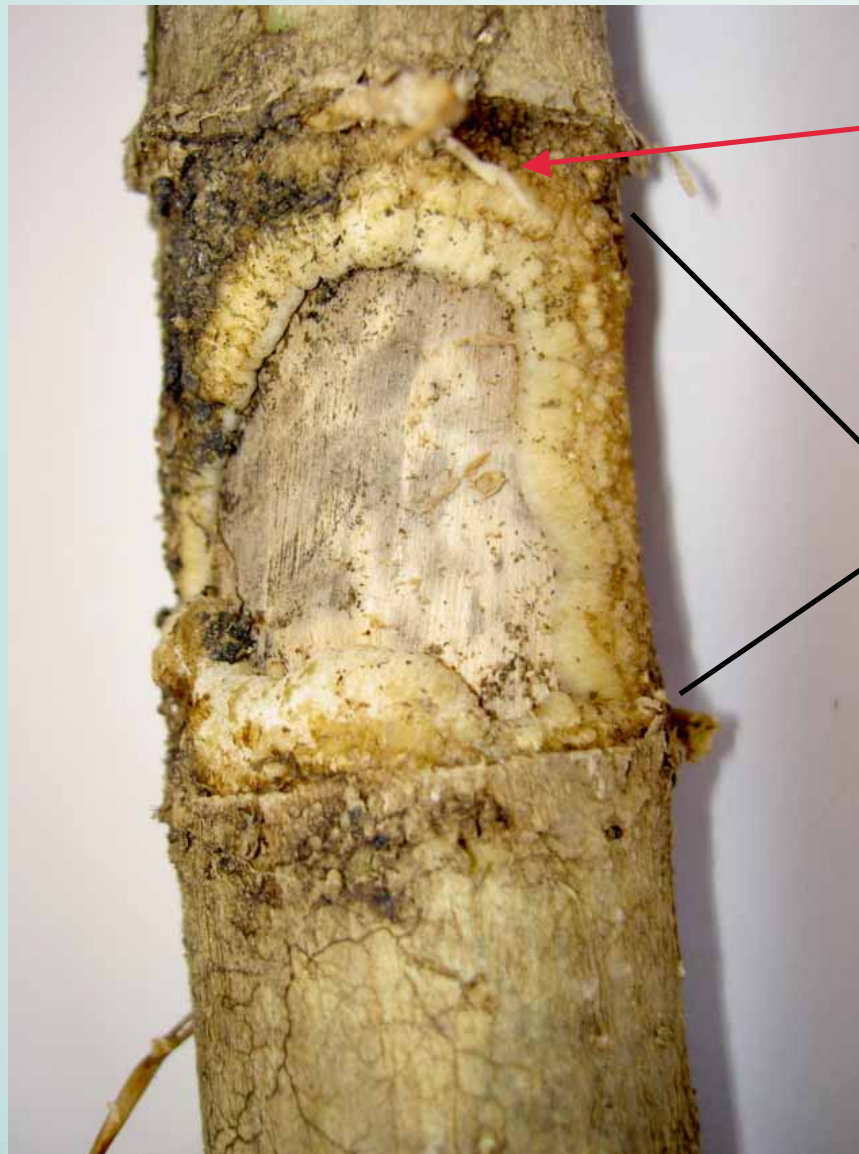
# Disrupt cambium





Phloem layer with  
cambium starting to heal





Root

Phloem tissues have reconnected. Layer will probably fail.







# Wet sphagnum moss





# Moss on foil; cover cut







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# Division

- Severing of rhizomes, tubers, & tuberous roots
- When bulblets or cormels detach naturally it is called separation





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# Grafting and Budding

- Joining of plant parts
  - fruit trees
- Utilized when other propagation methods fail
- Rootstock
  - Provides vigor for better quality
  - Disease resistance
  - Characteristics extended to grafted scion wood.
- Budding –when only single bud utilized





# Conditions for a Successful Graft

- Scion & Rootstock
  - Cambiums must be aligned with each other
  - Be compatible
  - Be at proper physiological stage (buds dormant)
- Graft union kept moist
  - wrapped with grafting tape, waxed, etc.



# Budding

- Shield or T-Bud
  - Inverted T-Bud

## Materials

- Sharp knife
- Tape
- Melted wax





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# Cleft Graft: Cut into rootstock





# Scion prep: Single stroke



# Insert scion into rootstock



# Wrap scion







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# Grafting and Budding Questions?



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# Cloning

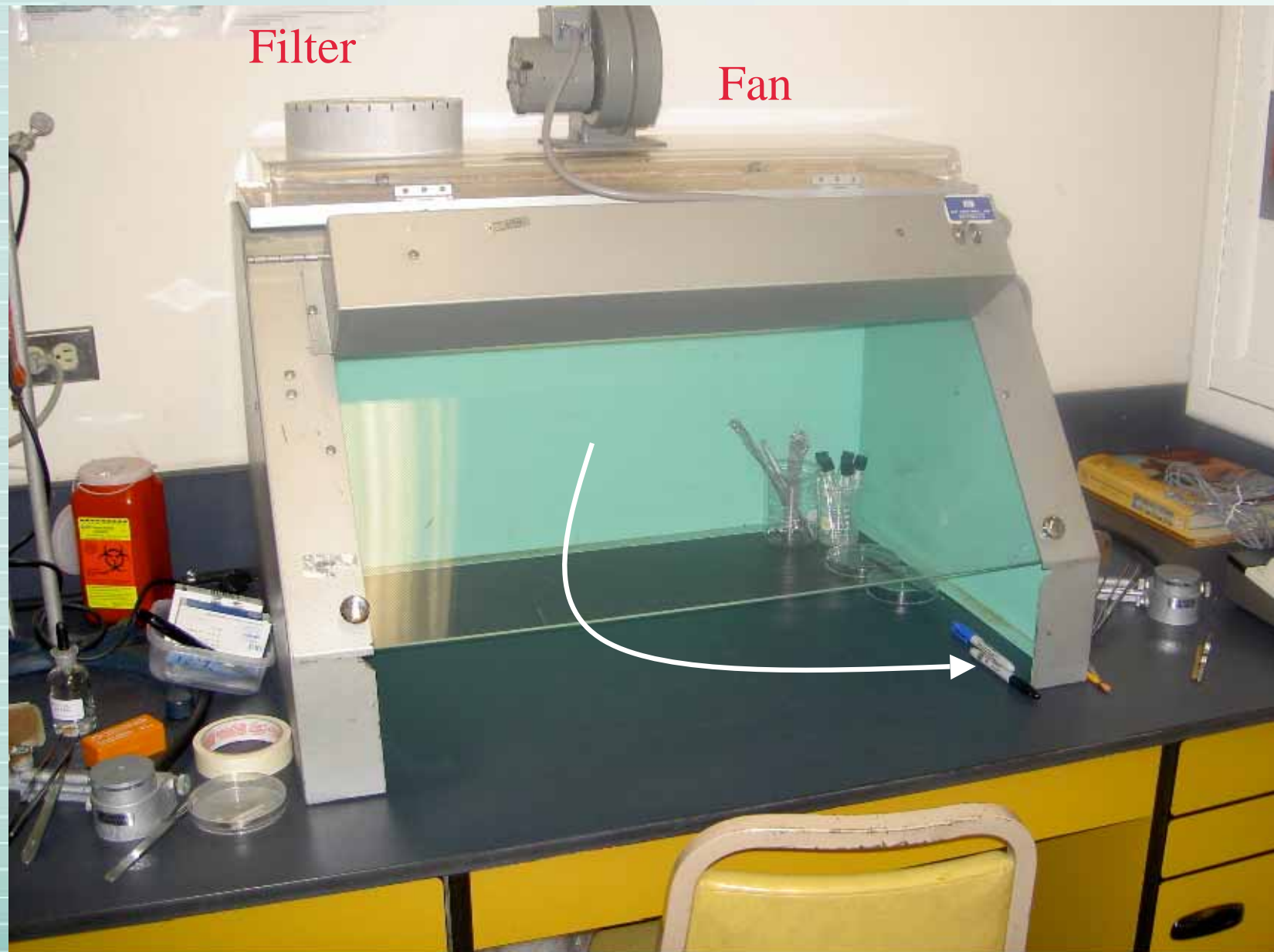
- Aseptic culture of meristematic tissue
  - Propagation in a sterile environment
- Mostly used in orchid industry
- Needs specialized equipment and technique
- Able to produce large numbers of plants from a single parent
- May have some genetic alteration
  - Individual plantlets







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# What are you propagating?



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