• Lose viability very quickly
• Represents the condition of seeds of Coffee arabica, Cocus nucifera, and Quercus species
• At maturity, retain an excess of 20% moisture or more
• Do not store well. Need to germinate right away or die

• Orthodox
  • Tolerate maturation drying
  • Represent crop seeds
  • Tomatoes
  • When they’re mature- most of the moisture is gone from the seed. 3-8% of weight is moisture

• Viability
  • Float test- if there is an embryo and nutrients the seeds will sink
  • Sample germination- put in germination paper- does it germinate?
  • Tetrazolium Stain- if seeds turn red, the seed is viable. If nothing happens, they are not viable
  • Excised embryo test- hard seed coat species (peach)

Seed Dormancy
• Seed Coat dormancy- Hard outer shell. So hard that water can not be absorbed into it.
  • Scarification tmt- Damage or break seed coat so that water can be absorbed. ex. notching, tumbler with sandpaper lining, throw seed in sulfuric acid
  • Seed needs water to germinate
  • Scarification helps overcome seed coat dormancy
• Embryo Dormancy- Something preventing embryo to germinate. Will not germinate without being exposed to some type of condition
  • Often this is a chilling exposure
  • Stratification- hold seed in cool moist condition
• Double dormancy- have both hard seed coat and embryo dormancy
• Rudimentary embryos- embryo is so small it hasn’t completed its development
• Chemical inhibitors- Chemicals in seed coat- Seeds will wait for a good rain to wash away chemicals before it germinates
• Secondary Dormancy- Haven’t provided specific water, air etc. Not as easy to overcome as primary dormancy

Quiescent- Environmental factors influencing germination

Quiescent Seed- Will not germinate until exposed to favorable environmental factors
• Water
• Temperature
Cytokinins- originally meant cell division
- Zeatin- natural one
- Synthetic
  - Kinetin (1st one)
  - BAP- 6-benzyladenine (useful in tissue culture)
  - Thidiazuron (TDZ)

Activities
- Promotes cell division
- Cell enlargement
  - Tissue differentiation (combination with auxins)
- Dormancy
  - phases of flowering
- Found in embryos, germinating seeds and young developing fruit

Commercial Activities
PRIMARY USE: is in micropropagation systems
- Stimulate axially branching
- Stimulate development of buds in calli
- Clonal propagation
- Use in overcoming apical dominance and stimulate lateral bud development

Ethylene- a gas
- Activity
- Produced naturally in:
  - Actively growing meristems
  - ripening and senescing fruit
  - germinating seeds
  - response in plant tissues due to bending, wounding, bruising

- One of the most productive hormones used commercially
- Commercial Applications:
  - Fruit ripening (first identified in banana boats. If they kept the windows closed, the fruit tended to ripen quicker in the holes of the ship)
  - Flower initiation
    - Eliminates fr/fls in ornamentals and turf
  - Changing sex expression cucumbers
  - Degreening citrus
• Phytoplasma- micro-organism. This stimulates branching, overcomes apical dominance. This is something that turns out to be ok in poinsettias.
• Come in lots of different colors now- white, pink, red, jingle bell, mixed

Azeleas- Rhododendron obtusum
• Outdoor flowering spring plant, sold in the holiday season through spring.
• Needs a year to year and a half before you can sell it
• Pinch them every 6 weeks.
• Buds are initiated at warm temperatures
• Flowers open upon cold temperatures
  • Requires a chilling treatment to overcome bud dormancy- 6 weeks (ish)
• Woody plant, has to be rooted
• Set flowers rather easily. To keep them vegetative, they pinch the buds till they reach the size they want.
• Sold generally when buds have started to open or have fully opened
• Acid loving plant

Geranums- Pelargonium x hortorum
• Many regions had their own varieties
  • Ex. Colorado had a “CSU Red” variety
• Often they use to take cuttings for propagations
• NOW they propagate from seeds. They don’t have to worry about all the issues that come with cutting propagation (clean stalk, eliminating infections in the mother block) You can keep them growing in a greenhouse longer from seeds.
• Also added different types of geraniums
• Clonal originally- moved to seed types
• Grown potted geraniums and sened geraniums and ivy geraniums.
• Not about day or night- just how much light they have

Easter Lilies- Lillium longiflorum
• Bulb propagated- Scaling- They can pull the scales off and put them in well drained media- the bud will produce a adventitious bud. Two years growing in field
• Most come from oregon bulb company
• Bigger bulb= more flowers
• Have to handle them very carefully- very fleshy bulb, can damage easily, when they are dug they already have roots,
• Can’t let them dry out
• Vernalization- a cold treatment to induce flowering
  • done in a case with a lot of lily bulbs
  • planted in growing media
C3 (Barley) has a lower photosynthetic capacity than C4 (Corn) has a very high photosynthetic capacity.

Respiration – The series of chemical reactions in which one molecule of glucose is broken down and converted to other chemicals which results in the production of many molecules of ATP.

Glycolysis

Influenced by temperature

Photorespiration – occurs in presence of light

Breakdown of sugars in a way that the energy is not efficiently captured

C3 plants not C4

Does not lead to ATP production

Dark respiration

Occurs irregardless of light in mitochondria

Drives the system (grow the plant)

Mitochondria

Where respiration occurs

Double membrane system

Inner membrane – pathway for the breakdown of sugars

DNA is located here

Glycolysis

The process that initially uses energy (ATP) to convert glucose to glucose 6phosphate

NADH is produced as well as some ATP

Splitting glucose into 2-3 carbon compounds

Occurs in the cytoplasm itself

TCA (tricarboxylic acid cycle) Krebs/Citric acid cycle (Mitochondria directly)