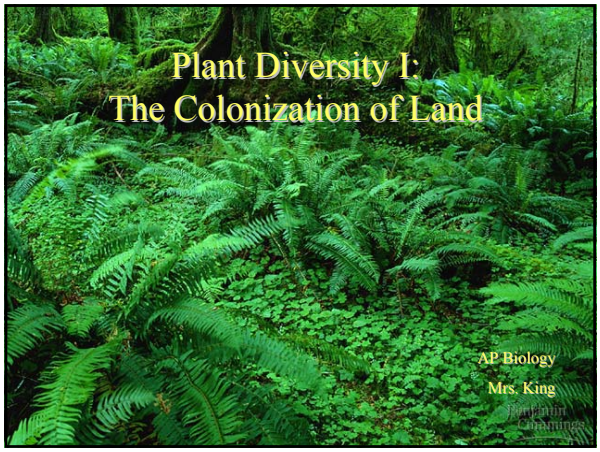


We'll Discuss…

- The Origins of Plants
- Bryophytes
- The Origin of Vascular Plants
- Seedless Vascular Plants

Classification of life: appendix 3 …pg. 1250-1251

The Origin of Plants

- Common ancestor with green algae
  - based on similarities of cell walls and chloroplasts
- Alternation of generations may have evolved from a delayed meiosis
- Shallow water existence pre-adapted plants for a terrestrial lifestyle
  - cuticle
    - polyesters and waxes
  - protected gametes
  - protected embryo

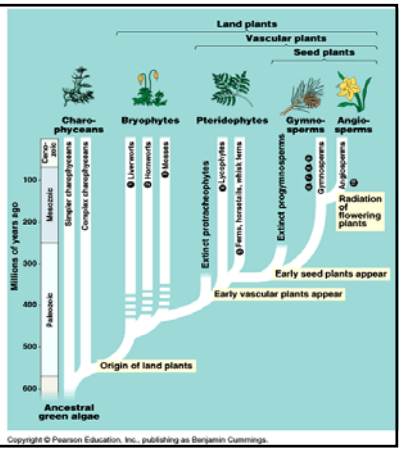
Plant Phylogeny

Bryophytes
- Mosses

Pteridophytes
- Ferns

Gymnosperms
- Pines/ cone-bearing

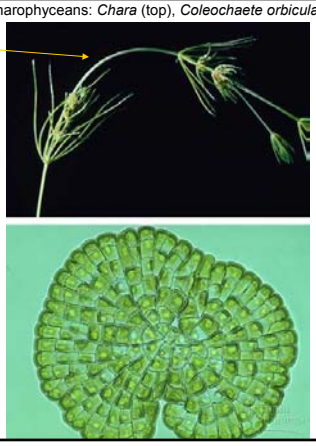
Angiosperms
- Flowering plants



- Common characteristics:
  - chloroplasts with pigments
  - cell walls of cellulose
  - plastids
- Development of embryophytes
- Alternation of generations
  - Haploid (Gametophyte) & diploid (Sporophyte)
- Nonvascular and vascular forms

Figure 29.2 Charophyceans: *Chara* (top), *Coleochaete orbicularis* (bottom)

Distance between whorls is a single cell



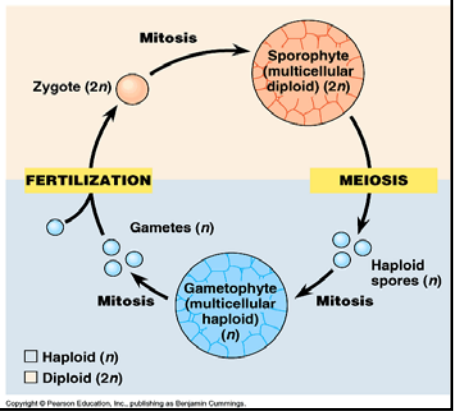
Closest relatives to the animal kingdom

Chara

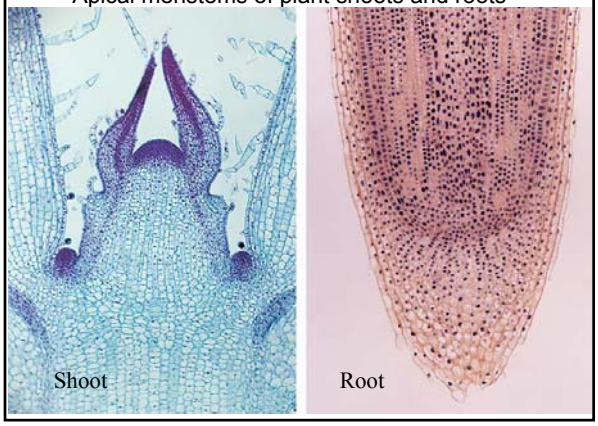
Alternation of Generations

Both stages are represented by multicellular bodies

Different than animals- **single cell** gamete



Apical meristems of plant shoots and roots



Apical Meristem

- Shoots and roots
- Maximize exposure to environmental resources

Embryos of land plants: *Marchantia* (left), Shepherd's purse (right)

Develop from zygotes

Embryo-special placental transfer cell

Bryophytes

- Mosses, liverworts, and hornworts
- Non-vascular plants
  - Lacks vascular tissue
  - But, water–conducting tubes in some
- Key evolutionary development
  - protected gametes
  - Survive extreme conditions for long periods of time (months).
- **Gametophyte**
  - Dominant generation
  - Larger, more noticeable
- Sporophyte
  - Dependent generation
  - Sporangia produce spores
- Spores
  - Dispersal mechanisms
  - Polymer: sporopollenin

Bryophytes

The Origin of Vascular Plants

pteridophytes, gymnosperms & angiosperms

- **Sporophyte**
  - Dominant generation
- Seeds (in some)
- Pollen (in some)
- Two major lines
  - seeds
  - Seedless
- Regional specialization of the plant body
  - roots, leaves, etc.
- Structural support
- Vascular system
  - **Xylem:** water pipes
  - **Phloem:** distribute sugars, amino acids and other organic products

Seedless Vascular Plants

- Pteridophytes
  - Phylum Lycophyta
    - lycophytes
  - Phylum Pterophyta
    - Ferns, whiskferns, and horsetails
- True roots
- Still require water for fertilization
- Dominant sporophyte
- Spores
  - dispersal mechanisms
  - Homospores
    - Produces single type of spore
  - Heterospores
    - Megaspores develop in female gaametophytes
    - Microspores develop in male gametophytes
- Formed coal forests during Carboniferous period

Pteridophytes

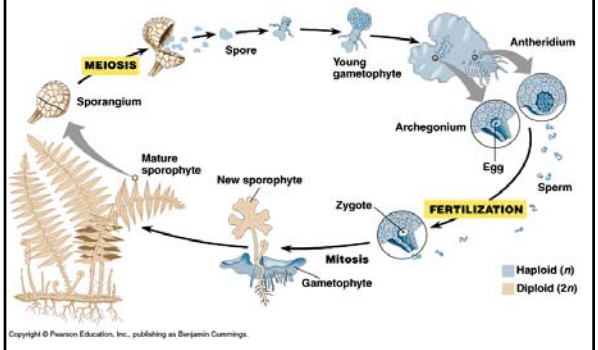
Phylum Lycophyta

- Lycophytes
  - Giant lycophytes **extinct**
  - Smaller lycophytes exist today as epiphytes
    - Use trees as substrates, not hosts.

Phylum Pterophyta

- Ferns, whiskferns, and horsetails
  - Wiskferns considered living fossil

Life Cycle of a Fern



Fern sporophyll, a leaf specialized for spore production

Life cycle of a fern: sorus

Fern sporophyll, a leaf specialized for spore production