

Evolution and Systematics  
Chapters 11 & 12

The Process of Evolution  
(from Chapter 11)

- variation
- natural (or artificial) selection
- adaptation
- changes may occur rapidly
- species concepts
  - biological species concept
  - morphological species concept
  - phylogenetic species concept
- speciation in plants
- role of asexual reproduction

Systematics

- study of biological diversity and evolutionary history
- taxonomy
- hierarchical classification
  - International Code of Botanical Nomenclature
  - binomial nomenclature
    - *Genus species*
    - subspecies or variety

Herbaria

- where plant specimens are stored for reference
- type specimen
- Botanical Research Institute of Texas

Hierarchical Classification

- originally kingdom was most inclusive unit
- other groups included families, classes, orders
- phylum=division
- all plant families end in *-aceae*
- all plant orders end in *-ales*

Methods of Classification

- outward similarities
- phylogenetic analysis
  - molecular systematics

#### Current Classification

- three domains of life
  - *Bacteria*
  - *Archaea*
  - *Eukarya*

#### Origin of the Eukaryotes

- endosymbiosis
- within *Eukarya* relationships not well defined

#### *Eukarya*

- four kingdoms
  - *Fungi*
  - *Protista*
  - *Plantae*
  - *Animalia*

#### Kingdom *Fungi*

- unicellular and filamentous multicellular
- lack plastids and photosynthetic pigments
- absorb nutrients from living or dead organisms
- usually asexual and sexual reproduction
- relationships with plants

#### Kingdom *Animalia*

- multicellular
- lack cell walls, plastids, photosynthetic pigments
- most use ingestion to obtain energy
- usually sexual reproduction
- relationships with plants

#### Kingdom *Protista*

- unicellular, colonial, simple multicellular
- protozoa, algae, water molds, slime molds
- autotrophs, heterotrophs, myxotrophs
- reproduction by cell division and sexual
- relationships with plants

### Kingdom *Plantae*

- multicellular
- ancestors: specialized green algae
- cells contain vacuoles
- cell walls of cellulose
- nutrition through photosynthesis
- reproduction primarily sexual through alternation of generations
- many also grow vegetatively

### Life Cycles and Diploidy

- types of meiosis
- alternation of generations

### Summary

- process of evolution
- particulars related to plants
- systematics and taxonomy
- Domain *Eukarya*