2/4/02 Lecture Notes: Classification and Plant Diversity

Lecture outline

- The five kingdoms
  - Prokaryotes vs. eukaryotes
- Classifying diversity
- Plant diversity

- Prokaryotes
  - Most primitive
  - 3.8 BYA – first fossils
  - Single cells
  - DNA "loose"
  - No complex internal structure
  - Often bacteria

- Eukaryotes
  - Newer
  - 2.6 BYA – early protists
  - Single/ multicellular
    - 10 times larger
  - DNA in chromosomes
  - Cell organelles

Classifying diversity

Carl Linnaeus (1707-1778)

- "father of taxonomy"
- 1735 - *Systema Naturae*
- "Binomial nomenclature" –
  - "*2 name naming system*"
  - Hierarchical classification

Example: leopard

Kingdom, phylum, class, order, family, genus, species

Homology vs. analogy

- Homology: similar structure due to common ancestry (mammals)- *divergent evolution*
- Analogy: similar structure due to *convergent evolution* (similar environment) – *not* ancestry

Biodiversity

- How many species?
- 1.5 - 2.0 million described
- 5 - 30 million total

Diversity of flowering plants

- Angiosperms (flowering): 260,000 species
    - Radiation 65 MYA
    - Orchids: 20,000 species
    - Why?

Why so many species?

- **Plate tectonics**-> Continental drift -> geographic separation
    - Lots of allopatric speciation, lots of space!
    - **Example: Australia**

- **Climate fluctuates**
    - Glaciation and recession are common!

- **Mass extinctions**
    - Mass extinctions relieve competition for resources!

Finding new species/ genera

- *How Are New Plant Genera Found?*
    - Occasionally in wild
    - More frequently in lab using DNA (look alike but different genetically)

- *How Often are New Genera Found ?*
    - "it depends"
    - new genus of mammals: rare
    - new genus of bacteria: more common
    - Estimate: 1/1000 new species plants/ new genus

Plant diversity- Why do we care?