

Invention of the Linnaean System

- ◆ Classification - Multilevel grouping of individuals.
 - Organisms first classified by Aristotle over 2,000 years ago.
 - ◆ Eventually groups started to be formed and referred to as genera (singular, genus).
 - Starting in middle ages, names began to be systematically written down using Latin.

Invention of the Linnaean System

- ◆ Classification scheme of the Middle Ages (polynomial system) was used replaced with a binomial system by Linnaeus about 250 years ago.
 - Polynomial - Strings of latin words and phrases containing up to 12 words.
 - Binomial - Two-part name for each species.

Species Names

- ◆ Taxa - Group of organisms at a particular level in a classification system (Taxonomy).
- ◆ By convention:
 - First word of binomial name is genus and is always capitalized.
 - Second word refers to particular species and is not capitalized.
 - ◆ Together form Scientific Name, written in italics.

Higher Categories

- ◆ Species
- ◆ Genus
- ◆ Family
- ◆ Order
- ◆ Class
- ◆ Phylum
- ◆ Kingdom

Species Definition

- ◆ Biological Species Concept
(Ernst Mayr)
 - Species are groups of actually or potentially interbreeding natural populations which are reproductively isolated from other such groups.
 - ◆ Problems
 - Assumes regular outcrossing- what about asexual reproduction?
 - Assumes strong reproductive barriers
 - ◆ Hybrids ?

How to identify an Organism

- ◆ Taxonomy – Classification Keys
 - A method of identifying organisms that have been previously described.

A.

B.

C.

- 1a. The animal is multicellular 2a
- 1b. The animal is not multicellular..... C). bacteria
- 2a. The animal is bilateral symmetrical..... B)- flatworm
- 2b. The animal is not bilateral symmetrical.... 3a.
- 3a. The animal is composed of spicules..... A). Sponge
- 3b. The animal is not composed of spicules.....4a.

Kingdoms of Life

- ◆ Most Biologists use a six-kingdom system.
 - Animalia
 - Plantae
 - Fungi
 - Protista
 - Archaeobacteria
 - Eubacteria
- ◆ Domains - taxonomic level above kingdoms.

Archaeobacteria

- ◆ Extremophiles - Grow under extreme conditions.
 - Thermophiles - Heat
 - Halophiles - Salt
 - Pressure-tolerant
- ◆ Nonextreme Archaeobacteria - Grow in same environment as eubacteria.

Eubacteria

- ◆ Most abundant organisms on earth.
- ◆ Most taxonomists recognize 12-15 major groups.

Eukaryotes

- ◆ Appear in fossil record only about 1.5 billion years ago. Complex cellular organization.

- Fungi, Plants, and Animals are well-defined evolutionary groups.
 - ◆ Largely multicellular

Protista

- Diversity among protists is much greater than within or between Fungi, Plants, and Animals.

Eukaryotes

- ◆ With few exceptions, all modern eukaryotic cells possess energy-producing organelles (Mitochondria).

- Some protist phyla have also acquired chloroplasts and are photosynthetic.
 - ◆ Mitochondria and chloroplasts are both believed to have entered early eukaryotic cells by endosymbiosis.

Pond Water

Picture examples: and covered in lab exercise

- ◆ Viruses do not satisfy the basic criteria of life, thus are not living organisms.
 - Appear to be fragments of nucleic acids originally derived from genome of a living cell.
 - ◆ Infect organisms at all taxonomic levels.