

Science lecture #4: Scientific Classification--Systematics

Names allow us to talk about and communicate the places we have been, the people we have met, and the things we have seen. Biologists use a naming system that also provides insight into the nature of an organism and its relationships with other life in the world around. One of the most important things when naming something is to be as specific as possible so that two people will be certain they are discussing the same organism and not just using the same name for two different life forms.

Science has developed a classification system called Taxonomy. This method of naming identifies organism in ever more specific categories until a unique name is determined for that particular life form. The classification starts with the category Kingdom which is the most general ordering of life and continues to define the organism in ever more narrow groupings in an association with a Phylum, a Class, a Family, and finally a unique two part Genus and Species name that is unique to a single life form on Earth.

A species is defined by its' constant or regular appearance and size, it's habitat and behavior, and often as a population in nature that will only reproduce sexually with each other. In most cases there is a biological reason, for example a mouse and an elephant. Other times there is an environmental cause, due to isolation from physical separation by mountains or oceans, or an environmental difference like freshwater and saltwater fish. Occasionally, with there is a behavioral division, like close social units or non-matching pollination times. There are some shortcomings of this definition and the most difficult task of the taxonomist is drawing the line where one species ends and a second very similar species begins. On these occasions subspecies names have been used to note differences in two separate populations.

The Kingdom classification is the place to start, the most general grouping where the taxonomy would seem to be much simpler, for the most part. The five most accepted Taxonomic Kingdoms are MONERA-bacteria, PROTISTA-microorganisms, FUNGI-mushrooms, mold, and yeast, PLANTAE-plants, ANIMALIA-animals.

These categories divide all the forms of life on Earth into five major groups. But as scientists continue to learn more about the different lives of the thousands of microscopic Monera and Protista species they find their biology and life histories to be as different as plants and animals

Taxonomic Kingdoms and Their Traits

MONERA-bacteria	Single celled with no defined nucleus; split in to two Kingdoms do to different trophic (eating) strategies.
PROTISTA-microorganisms, seaweeds	Single celled or multi-celled with a membrane bound nucleus includes most seaweeds and microbes.
FUNGI-mushrooms, yeast, mold and rust	Mushrooms are the fruiting body of some of the more common Fungi Kingdom that includes mold and rust.
PLANTAE-plants	Trees and flowering plants, mosses, ferns..ect. cell walls are cellulose and cells are organized into distinct tissue.
ANIMALIA-animals	Animals with distinct tissue and digestive nutrition (Ah! the stomach), locomotion, and did I mention we eat a lot.

are to us prompting the creation of new Kingdom classifications subdividing these two Kingdoms even further.

The Kingdom Animalia contains a familiar English word “animal” but has a Latin sounding ending. The names used by Carl Linnaeus, the father of modern taxonomy and an eighteenth century botanist, often contained Greek or Latin words to describe the organism and a convention of using the languages developed that is still observed today. Frequently, when naming new species, a common word or even a name is changed by adding an ending from Latin to create a new and unique name for a species.

When we use taxonomic names to identify plants and animals in our environment we become part of a large community of scientists, governments and industries world wide that use this, the most popular system of naming. However the use of common names and those names from indigenous cultures, like the Hawaiian culture, are also part of the organism’s identity and role in our lives and may describe the relationships between life differently; they are also important to learn. Sometimes these names also contain information about a species or will allow you to communicate with a different community of people.

EXAMPLE 1: Taxonomic classification of two different species

Taxon	Animal: Human being	Plant: White Oak
Kingdom	Animalia	Plantae
phylum	Chordata	Magnoliophyta
Class	Mammalia	Magnoliopsida
Order	Primates	Fagales
Family	Hominidae	Fagaceae (beech)
Genus	Homo	Quercus
Species	Homo sapiens	Quercus alba