

1 Classification of life on planet Earth

Maybe this is an odd title, but we can't exclude the possibility that

- a. there is life out in the universe (the field of the so called exobiology)
- b. that the beginning of life on our planet was of extraterrestrial origin. This last means however only a shift of the intriguing puzzle of how life came into existence.

The classification of living nature that we already know from the Bible is that in plants and trees, and animals (that creepeth upon the earth, and fowl and cattle), and at last: man. In fact these categories were always kept, also by the 18th century Swedish biologist Carolus Linnaeus who worked in Uppsala but also for some years in Holland.

Box: Who was Carolus Linnaeus?

A brilliant Swedish scientist (1707-1778) who had already made investigations in Sweden (going as far as Lapland) before visiting The Netherlands as a 'guest scientist'. Many Scandinavians came in the 17th and 18th century to the Low Countries where science flourished. They went for instance to two universities that have now disappeared, in Franeker and Harderwijk. In the latter Linnaeus defended his thesis that he had written in Sweden on the 'alternating fever' the mild form of malaria prevalent in Northern Europe in that time (chapter ..) after which he went to Leyden to study... medicine. His classification is still valid, and was largely created in Holland where he performed scientific research on the manor of the rich businessman Clifford, near Haarlem.

His system is a way of organizing living things. In biology, plants and animals have traditionally been classified by the structure of their bodies, in a descending hierarchy of categories; kingdom, phylum, class, order, family, genus and species. For example, human beings are classified as belonging to the animal kingdom, the phylum of chordates, the class of mammals, the order of primates, the genus *Homo*, and the species *sapiens*.

Plants and animals are usually identified merely by genus and species; thus, human beings are given the scientific name *Homo sapiens*.

The classification of the Siberian tiger and romaine lettuce shown here are presented in descending order, beginning with the broadest category. Biologists who specialize in classification (called taxonomists) are constantly refining their terms as new relationships between organisms are recognized.

Kingdom	Kingdom
Animalia (animals)	Plantae (plants)
Phylum	Division
Chordata (chordates)	Tracheophyta (vascular plants)
Subphylum	Class
Vertebrata (vertebrates)	Angiospermae (flowering plants)
Class	Subclass
Mammalia (mammals)	Dicotyledonae (dicotyledons)
Order	Order
Carnivora (carnivores)	Campanulales or Campanulatae (bellflowers, lobelias, composites)
Family	Family
Felidae (cats)	Compositae (composites)
Genus	Genus
<i>Panthera</i> (lion, tiger, leopard, jaguar)	<i>Lactuca</i> (lettuce)
Species	Species
<i>Panthera tigris</i> (tiger)	<i>Lactuca sativa</i> (cultivated lettuce)
Subspecies	Variety
<i>Panthera tigris altaica</i> (Siberian tiger)	<i>Lactuca sativa longifolia</i> (romaine lettuce)

Linnaeus' nomenclature is still valid. *Homo sapiens*, *Lupus lupus*, *Cannabis sativa*, *Streptococcus pneumoniae*. Ever the Genus (with a Capital) and species (in lower case), here respectively, man, wolf, hemp and the pneumococcus (the most important bacterium causing pneumonia). Bacterium names are normally written in *italics*, if their full name is used; viruses not, and they also don't have capitals (they are so small...). So: '*Pseudomonas aeruginosa*' and 'influenza virus'.

Micro organisms, a lot of them we will become familiar with by reading this book, were in Linnaeus' time not yet subject of classification. A small number had already been described by Anthoni van Leeuwenhoek in Delft. In 1866 they were made a separate phylum 'Protista' on the proposal of Charles Darwin's student Haeckel. So the first living creatures got their classification last.

In the course of the 19th century awareness grew that pathogens even smaller than bacteria exist. These could even pass through the pores of earthenware, but not the pores of porcelain. These are the viruses, that we now know as the causes of e.g. influenza, AIDS, mumps, measles and rubella. Nevertheless in an empirical way already long before remedies had been found, in the form of vaccines. Already in the 18th century vaccination against smallpox was performed (Montague, Jenner) and in the 19th century Pasteur introduced rabies vaccination.

The parasites we can classify according to increasing size as Protozoa, Helminthes (worms) and Arthropods.

Protozoa

- A. Rhizopoda (from ριζος = rizos = root and πους = pous = leg). They have leglike expulsions (e.g. entamoeba).
- B. Flagellatae (mastigophora) = whiplike creatures. They possess one or more threads that enables their propulsion (e.g. giardia, trichomonas, trypanosoma, leishmania).
- C. Sporozoa = spore animals. Not moving and with sexual reproduction (e.g. toxoplasma and plasmodium).
- D. Ciliata = 'eyelash' animals. Moving and not pathogenic for man; not in this book.

Helminthes

- A. Nematodes (round worms)
- B. Trematodes ('botten')
- C. Cestodes (flatworms)

Arthropods

- A. Insects (all have 6 legs).
- B. Arachnida = 'spiders' (e.g. ticks and mites).