

ATOMIC ENERGY CENTRAL SCHOOL

**BIOLOGY
STANDARD XI**

MODULE 2.2

UNIT 1

DIVERSITY IN THE LIVING WORLD

Chapter 2

BIOLOGICAL CLASSIFICATION

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The Five Kingdom System of Classification

- Very early on, scientists began grouping the living organisms under different categories.
- Some biologists classified organisms into plants and animals.
- Ernst Haeckel, Robert Whittaker, and Carl Woese are some biologists who attempted a broader system of classification.
- Amongst these, the Five Kingdom Classification proposed by Robert Whittaker stood out and is widely used.
- In 1969, Robert H. Whittaker proposed a Five- Kingdom System of Classification, in which all organisms are placed into five kingdoms.

Features of Five Kingdom System

- ✓ based on certain characters like the structure of the cell, mode of nutrition, the source of nutrition, interrelationship, body organization, and reproduction.

The kingdoms include:

- Bacteria and archaea are in the **Kingdom Prokaryotae (or Monera)**
- Algae and protozoa are in the **Kingdom Protista** (organisms in this kingdom are referred to as protists)
- Fungi are in the **Kingdom Fungi**
- Plants are in the **Kingdom Plantae**
- Animals are in the **Kingdom Animalia**

I. Bacteria

The term Bacteria was proposed by Ehrenberg in 1829. They have widespread distribution be it air, water or soil. They can survive in extreme range of temperatures like up to 78°C and -190°C.

Bacteria were discovered by Anton von Leeuwenhoek (1632-1723). He observed bacteria in 1675.

Louis Pasteur laid the foundation of Bacteriology by developing culture techniques.

II. Archaeobacteria

Archaeobacteria (Archae-ancient; bact—rod) are special since, they live in some of the most harsh habitats such as extreme salty areas (halophiles), hot springs (thermoacidophiles) and marshy areas (methanogens)..

Types of Archaeobacteria

i. Methanogens

They produce almost 65% of atmospheric methane.

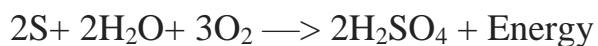
Example Methanobacterium, Methanobacillus, Methanosarcina and Methanococcus.

ii. Halophiles

Halobacterium develops purple membrane having photoreceptor pigment bacteriorhodopsin. Examples Halobacterium and Halococcus.

iii. Thermoacidophiles

These archaeobacteria can live in both extreme heat and acidic pH (around 2)



Examples Sulfobolus, Thermoplasma and Thermoproteus.

III. Eubacteria

They are called 'true bacteria' and are characterised by the presence of a rigid cell walls, and if motile, have flagellum.

Cyanobacteria

Cyanobacteria, member of this group (blue-green algae). The examples of cyanobacteria are Nostoc, Oscillatoria, Spirulina, Rivularia, Anabaena, etc. They can survive in a wide variety of habitats, such as hot springs, sea water, polluted water, etc.

IV. Mycoplasma

Mycoplasma are organisms that completely lack a cell wall.

They were discovered by Roux (1898) in pleural fluid of cattle suffering from pleuropneumonia. The organisms are often called MLOs (Mycoplasma Like Organisms) or PPLOs (Pleuropneumonia Like Organisms).

References:

1. Text book of NCERT Class – XI.
2. Concepts of Biology RL Kotpal and KN Tyagi.