

Biology NCERT Class 11 Chapter 2 – Biological Classification

1. Discuss how classification systems have undergone several changes over a period of time.

Solution:

Aristotle was the first to introduce scientific classification. He used simple morphological characters to classify plants into trees, shrubs, and herbs. He divided the animals into two groups, one with red blood and one without.

Linnaeus introduced a two-kingdom classification, which includes Plantae and Animalia, respectively, of plants and animals. But this classification does not classify eukaryotes and prokaryotes, single-celled and multicellular organisms, photosynthetic (green algae) and non-photosynthetic (fungal) organisms. Therefore, the system was found to be less significant as it did not include more features.

Thus, the classification of living organisms has undergone several changes. R.H. Whittaker introduced a five-kingdom classification, including Monera, Protista, Fungi, Plantae and Animalia. Some of the characteristics included in this classification are the structure of cells, body organisation, mode of nutrition, mode of reproduction, and phylogenetic relationship to classify organisms. Subsequently, a three-domain system was proposed, which divided Kingdom Monera into two domains, leaving the remaining eukaryotic kingdoms in the third domain, thereby classifying the six kingdoms.

2. State two economically important uses of:

(a) heterotrophic bacteria

(b) archaeobacteria

Solution:

a) Heterotrophic bacteria are used in the production of vitamins, antibiotics, cheese and curd.

They help fix nitrogen and are used in the formation of humus.

b) Archaeobacteria are used in Biogas production.

They are used in the bioleaching of mines.

3. What is the nature of cell walls in diatoms?

Solution:

In diatoms, cell walls are embedded with silica imparting characteristic patterns onto the walls and are indestructible. These diatoms leave large amounts of cell wall deposits in their habitat to accumulate to form the diatomaceous earth.

4. Find out what the terms ‘algal bloom’ and ‘red tides’ signify.

Solution:

Algal blooms are found in contaminated water. They are an overgrowth of algae, especially blue-green algae (cyanobacteria). Their growth leads to water pollution. They inhale carbon dioxide and exhale oxygen.

Rapid multiplication of red-pigmented dinoflagellates, such as *Gonaulax*, gives the sea a red colour, a phenomenon known as red tides. These algae produce toxins that kill fish and other aquatic organisms.

5. How are viroids different from viruses?**Solution:**

(i) Viroids are small infectious agents with single-stranded RNA without a protein coat, but viruses have single-stranded or double-stranded RNA bound with a protein coat.

(ii) Viroids are very small in size compared to viruses.

(iii) Viroids infect only plants, while viruses infect plants, animals, and microorganisms.

6. Describe the four major groups of Protozoa briefly.**Solution:****Four major groups of Protozoa are as follows:**

Amoeboid protozoans: Found in the aquatic environment, they move and catch their prey using pseudopodia.

Flagellated protozoans: These protozoans are free-living or parasitic. Their locomotory structure is flagella.

Ciliated protozoans: They live in aquatic environments, and the presence of cilia makes them actively moving.

Sporozoans: They contain a wide variety of organisms, producing infectious spores throughout their life cycle. Their spore-like phase helps them move from one host to another.

7. Plants are autotrophic. Can you think of some plants that are partially heterotrophic?**Solution:**

Insectivores and carnivorous plants are partially heterotrophic; these organisms are green and autotrophic, but they prey on and digest small components for their nitrogen supply.

Ex; *Utricularia*, *Drosera*, *Nepenthes*.

8. What do the terms phycobiont and mycobiont signify?

Solution:

Lichens are a symbiotic association of fungi and algae. Phycobiont is part of algae and part of mycobiont fungi. Mycobiont provides structural cover that protects the algae from unfavourable conditions. Similarly, phycobionts prepare food through the process of photosynthesis, which is used by both organisms.

9. Give a comparative account of the classes of Kingdom Fungi under the following:

(i) mode of nutrition (ii) mode of reproduction

Solution:

	Phycomycetes	Ascomycetes	Basidiomycetes	Deuteromycetes
Mode of nutrition	Saprophytic or parasitic	Decomposers, Saprophytic or parasitic or coprophilous	Saprophytic	Decomposers, Saprophytic or parasitic
Mode of reproduction	Asexual reproduction by zoospore (motile) and Aplanospore (non-motile) Sexual reproduction – zygote can be similar or dissimilar in morphology	Through asexual spores called conidia, and sexual spores are known as ascospores	By vegetative reproduction through budding. The fusion of two somatic cells for the formation of basidiospores is Plasmogamy	Through asexual spores called conidia.

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10. What are the characteristic features of Euglenoids?

Solution:

The typical features of Euglenoids are:

- (i) Absence of cell wall.
- (ii) Their body is flexible because there is a protein-rich layer called a pellicle.
- (iii) Two flagella of different lengths are found.
- (iv) They are autotrophic in the presence of sunlight and heterotrophic in the absence of sunlight.

11. Give a brief account of viruses with respect to their structure and nature of genetic material. Also, name four common viral diseases.

Solution:

Viruses are infectious agents that crystallise in structure when found outside the host cell. The genetic material is either DNA or RNA (never both), and they are located within the protein core. If the virus that infects plants has single-stranded RNA, then the viruses that infect animals are single or double-stranded DNA or RNA. The capsid is their protein coat, which in turn is made up of small subunits called capsomers, which protect nucleic acid.

Common viral diseases are Influenza, AIDS, Herpes and Rabies.