

Chapter 2 Biological Classification

Exercise Questions

Page number - 28

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

Solution:

Aristotle was the first person to introduce scientific classification. He used simple morphological characters to classify plants into trees, shrubs and herbs. He also divided animals into two groups, those which had red blood and those that did not.

Linnaeus introduced two-kingdom classification which includes Plantae and Animalia i.e., plants and animals respectively. But this classification did not classify eukaryotes and prokaryotes, unicellular and multicellular organisms, photosynthetic (green algae) and non-photosynthetic (fungi) organisms. Hence this system was found to be less significant as it did not include many more characteristics.

Thus, classification of living organisms underwent several changes. R.H Whittaker introduced five-kingdom classification which includes Monera, Protista, Fungi, Plantae and Animalia. Some characteristics that were included in this classification are - cell structure, body organization, nutrition mode, mode of reproduction and phylogenetic relationship to classify the organisms.

After this, the three-domain system was proposed which divided Kingdom Monera into two domains, leaving the remaining eukaryotic kingdoms in the third domain and thereby a six kingdom classification.

2. State two economically important uses of:

- (a) heterotrophic bacteria
- (b) archaeobacteria

Solution:

a) Heterotrophic bacteria are used in the production of vitamins, antibiotics, production of cheese and curd. They help in fixing nitrogen and are used in the formation of Humus.

b) Archaeobacteria is used in the production of Biogas. They are used in 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. Because of this diatoms leave behind large amount of cell wall deposits in their habitat which accumulates to form 'diatomaceous earth'.

4. Find out what do the terms 'algal bloom' and 'red-tides' signify

Chapter 2 Biological Classification

Solution:

Algal blooms are found in polluted water. They are the excessive growth of algae, especially blue-green algae (Cyanobacteria). Their growth results in pollution of water. They inhale carbon dioxide and expel out Oxygen.

Rapid multiplication of red-pigmented dinoflagellates such as *Gonyaulax* imparts a red colour to the sea, this phenomenon is called as red tides. These algae produce toxins which kills fish and other aquatic entities.

5. How are viroids different from viruses?

Solution:

- Viroids are short infectious agents having a single-stranded RNA without protein coat whereas viruses have a single-stranded or double-stranded RNA encapsulated with a protein coat.
- Viroids are very small in size compared to viruses.
- Viroids infect only plants whereas viruses infect both plants, animals and microorganisms.

6. Describe briefly the four major groups of Protozoa

Solution:

Four major groups of Protozoa are as follows

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

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

Ciliated protozoans: They live in an aquatic environment and presence of cilia makes them move actively.

Sporozoans: They include diverse organisms, producing infectious spores in their lifecycle. Their spore-like phase helps them to get transferred from one to another host.

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

Solution:

Insectivores and carnivores plants are partially heterotrophic, these beings are green and autotrophic but for their nitrogen supply, they prey and digest small entities. Ex; *Utricularia*, *Drosera*, *Nepenthes*.

8. What do the terms phycobiont and mycobiont signify?

Chapter 2 Biological Classification

Solution:

Lichens are the symbiotic association of fungi and algae. Phycobiont is algae part and mycobiont is fungi part of the association. Mycobiont provides a structural covering that protects algae from the unfavorable condition. Similarly Phycobiont prepares food by the process of photosynthesis, which will be utilized by both the 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 reproduction	Asexual reproduction by zoospore (motile) Aplanospore (nonmotile) 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. Fusion of two somatic cells for the formation of basidiospores is Plasmogamy	Through asexual spores called conidia.
Mode of nutrition	Saprophytic or parasitic	Decomposers, Saprophytic or parasitic or coprophilous	Saprophytic	Decomposers, Saprophytic or parasitic

10. What are the characteristic features of Euglenoids?

Solution:

Characteristic features of Euglenoids are as follows:

- Absence of a cell wall
- Their body is flexible due to the presence of protein-rich layer called pellicle.
- Two flagella are found that are of different length.
- 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 the infectious agents which are crystalline in structure when found outside the host cell. Genetic material will be either DNA or RNA (never both) which are present inside the protein core. The virus that infects

Chapter 2 Biological Classification

plants has single-stranded RNA whereas viruses that infect animals are either single or double-stranded DNA or RNA. The capsid is their protein coat that inturn is made of smaller subunits known as capsomeres, guarding the nucleic acid.

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

12. Organise a discussion in your class on the topic – Are viruses living or nonliving?

Solution:

Living Characters

- They are host-specific
- Presence of genetic material
- Ability to multiply
- They have antigenic properties
- They are obligate parasites
- Mutations occur

Non-living Characters

- The cellular structure is absent
- They can be stored in bottles like crystals
- Energy storing or energy liberating systems are absent
- They cannot grow or multiply outside the host.