NCERT solutions for class 11 biology chapter 2 Biological Classification

Q1. Discuss how classification systems have undergone several changes over a period of time?

Answer:

The classification systems keep on changing as the new species are found and classified. Till now, the classification system has undergone several changes. The first-ever classification was given by Aristotle who divided plants into herbs, shrubs and trees based on their habit and animals based on presence or absence of red blood. Later on, this classification system was rejected because it was misleading. Linnaeus then classified all organisms into two large kingdoms i.e. plants and animals. Since, this system could not distinguish between eukaryotes or prokaryotes, unicellular or multicellular organisms, it was rejected. Further, three kingdom and four-kingdom classification were proposed by Earnst Haeckel and Copeland respectively. These were soon replaced by five kingdom classification by R.H Whittaker. In this system, organisms were divided into five kingdoms namely monera, protista, fungi, plantae and animalia. Even this classification system was not up to the mark, so corrections are being made in this. Thus, we can conclude that classification systems have undergone several changes over a period of time.

Q2. State two economically important uses of: (a) heterotrophic bacteria (b) archaebacteria

Answer:

(a). Economically important uses of heterotrophic bacteria

1. Some heterotrophic bacteria are decomposers and they help in humus formation

2. Heterotrophic bacteria like *Rhizobium* also aid in fixing of nitrogen for plants.

3. Heterotropic bacteria like Lactobacillus help in the formation of curd

(b). Economically important uses of archaebacteria

1. Archaebacteria such as Methanobacterium and some others are used in the production of gobar gas which is used as fuel.

2. Ceratin archaebacteria are used in bioleaching of minerals also

3. Archaebacteria such as *Thermus aquaticus i* s used to obtain Taq polymerase enzyme which is used in recombinant DNA technology.

NCERT solutions for class 11 biology chapter 2 biological classification:

Q3. What is the nature of cell-walls in diatoms?

Answer:

The cell wall of diatoms is composed of two, thin overlapping shells which fit together in such a way that they look like a soap case. The cell wall is impregnated with silica in characteristic patterns. Diatom cell walls are almost indestructible and on accumulation, they form diatomaceous earth.

Q4. Find out what do the terms ‘algal bloom’ and ‘red-tides’ signify.

Answer:

Algal bloom- An algal bloom is a term used for excessive growth of algae over a water body causing discolouration of the water body. Algal blooms result in the death of fishes and other aquatic organisms.

Red tides- Red tide is the red colouration of sea water due to the presence of dinoflagellate*Gonyaulax.* This dinoflagellate produces toxins that lead to the death of fishes.

Q5. How are viroids different from viruses?

Answer:

Viroids are different from viruses in following aspects

1. Viroids are smaller in size than viruses.

2. Viruses are made up of protein encapsulating the genetic material whereas viroids are free RNA particles.

3. Viroids cause diseases in plants whereas viruses infect both plants and animals.

Q6. Describe briefly the four major groups of Protozoa.

Answer:

All protozoans are single-celled, cell-wall lacking, heterotrophic organisms that live as predators or parasites. Protozoans are considered to be primitive relatives of animals. Protozoa are divided into four groups based on their organ of motility.

1. Amoeboid protozoa- This type of protozoa are found in fresh water, sea water or moist soil. They can move and capture their prey with the help of pseudopodia. The pseudopodia are the extensions of the cell membrane. Example: *Amoeba*

2. Flagellated protozoa- These protozoa can be parasitic or free-living. They use their flagella for movement. Example *Trypanosoma* causing sleeping sickness.

3. Ciliated protozoa- These protozoa possess a number of cilia all over their bodies for movement. Ciliated protozoa are characterised by the presence of two nuclei i.e. macronuclei and micronuclei. Example: *Paramoecium*

4. Sporozoa- These protozoa include organisms that have an infectious spore-like stage in their life cycle. Sporozoans do not possess cilia or flagella. They are mostly endoparasites. E.g. *Plasmodium.*

Solutions for NCERT class 11 biology chapter 2 biological classification:

Q7. Plants are autotrophic. Can you think of some plants that are partially heterotrophic?

Answer:

Plants are autotrophic organisms as they prepare their own food materials by converting light energy into chemical energy. However, there are plants which can adopt the heterotrophic mode of nutrition for some specific requirements. For example, Pitcher plant (*Nepenthes*) is green and autotrophic but it grows in nitrogen deficient soil. So, in order to fulfil its nitrogen needs, it preys upon insects. The leaf of Nepenthes is modified into a pitcher like structure. In this structure, insects get trapped and are digested by

strong digestive enzymes present in it. Since here plant is performing photosynthesis and itis carnivorous only for obtaining nitrogen, it is said to be partially heterotrophic.

Q8. What do the terms phycobiont and mycobiont signify?

Answer:

Phycobiont and mycobiont are parts of a lichen. A lichen refers to a symbiotic association of algae and fungi. In this association, fungi derive nutrition from algae while provides shelter to algae. The term phycobiont signifies the algal component of a lichen whereas mycobiont signifies the fungal component of lichen.

Q9. Give a comparative account of the classes of Kingdom Fungi under the following:
(i) mode of nutrition
(ii) mode of reproduction

Answer:

A comparative account of the classes of Kingdom Fungi is as follows:

	Phycomycetes	Ascomycetes	Basidiomycetes	Deutromycetes
Mode of nutrition	These are obligate parasites or saprotrophs i.e. grow on dead,	These are saprophytic, decomposers, parasitic and coprophilous (	These have saprotrophic nutrition. They are	Deutromycetes can be saprophytic, decomposers or parasitic.

	decaying matter.	growing on dung)	decomposers also.	
Mode of reproduction	Asexual reproduction takes place through the formation of zoospores (motile) or aplanospores (non-motile). Sexual reproduction takes place via gametangial copulation.	Asexual reproduction takes place through conidia formation. Sexual reproduction takes place by ascospore formation	Asexual reproduction is absent. Sexual reproduction occurs via basidiospore formation.	Mode of reproduction is always asexual through the formation of conidia. Sexual reproduction has not been identified in this group.

Q10. What are the characteristic features of Euglenoids?

Answer:

Characteristic features of Euglenoids

1. Euglenoid is a group of unicellular protists with mixotrophic nutrition (both autotrophic and heterotrophic).

2. Euglenoids lack a cell wall. Their bodies are covered by a proteinaceous membrane called pellicle.

3. Euglenoids contain chlorophyll pigment, so they are photoautotrophic. However, in the absence of light, they behave like heterotrophs. Thus, they have mixotrophic nutrition.

4. Euglenoids possess two flagella at the anterior surface.

5. Euglenoids have both plant-like and animal-like characters. For example, the presence of chlorophyll is a plant character while the absence of a cell wall is animals character.

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Q11. Give a brief account of viruses with respect to their structure and nature of genetic material. Also, name four common viral diseases.

Answer:

Viruses are acellular, nucleoprotein entities which are able to utilize the synthetic machinery of a living cell of another organism for its multiplication. It infects a variety of plants, animals and microbes.

Structure of viruses- A virus consists of two parts i.e. a nucleoid and capsid. An envelope is present in some cases. A few enzymes are also found.

1. Nucleoid- It represents the viral chromosome or genetic material of chromosomes. Nucleoid is made of a single molecule on nucleic acid that can be linear or circular. It is the infection- causing part of the virus. The genetic material of the virus can be either DNA or RNA. The DNA containing viruses are called deoxyviruses while RNA containing viruses are called riboviruses. The nucleic acid can be double-stranded DNA, double-stranded RNA, Single-stranded DNA or single-stranded RNA.

2. Capsid- It refers to the proteinaceous covering around the virus which protects the nucleoid from physical and chemical damage. The capsid contains a number of subunits called capsomeres.

3. Envelope- A loose membranous covering found in some animal viruses. It is rarely seen in plants and bacterial viruses. Based on the presence or absence of envelope, viruses can be enveloped or naked. The envelope consists of viral proteins, lipids, carbohydrates etc. It possesses subunits called peplomeres. The surface of the envelope may have outgrowths called spikes.

4. Enzymes- Viruses contain enzymes such as lysozyme, RNA polymerase, RNA transcriptase, reverse transcriptase etc.

Some common viral diseases are common cold, AIDs, swine flu, hepatitis.

Q12. Organise a discussion in your class on the topic – Are viruses living or nonliving?

Answer:

Viruses are considered to be intermediates between living and non-living entities. They resemble living beings in the following aspects:

1. Viruses are made up of organic macromolecules which is a characteristic of only living beings.

2. Viruses possess genetic material.

3. In the presence of a suitable host, viruses reproduce or multiply.

4. Viruses show the presence of enzymes like transcriptase, vitamins like riboflavin etc.

5. Viruses can show mutations, antigenic properties, infectivity, host specificity etc.

Thus, on the basis of these features, viruses must be categorised as living. However, viruses also resemble non-living things in the following aspects:

1. Viruses lack protoplast

2. Viruses are unable to live independently as a living cell.

3. Viruses do not show respiration, energy storing system, growth, division etc.

4. Viruses can be crystallized.

Thus, based on these features viruses can be classified as non-iving things. Hence, the status of the virus as living or non-living is controversial.