

UNIT-I

Chapter-2 Biological Classification

Very Short Answer Questions

1. What is the nature of cell walls in Diatoms?

A: In diatoms cell walls form two thin overlapping shells, epitheca over hypotheca which fit together as in soap box.

Cell walls are embedded with silica.

2. How are Viroids different from Viruses?

A: Viroids contain only nucleic acid and no protein coat. Nucleic acid is RNA.

Viruses contain both nucleic acid and protein. Nucleic acid is DNA or RNA.

3. What do the terms phycobiont and mycobiont signify?

A: Lichens are symbiotic association between algae and fungi.

Phycobiont is algal component of lichens-- which synthesize food.

Mycobiont is fungal component of lichens—which provide shelter and absorb minerals and water for the plant.

4. What do the terms ‘algal bloom’ and red tides signify?

A: ‘Algal bloom’ indicates the pollution of water bodies. Water is not potable.

‘Red tides’ is an indication of toxic nature of sea water. It can kill fish.

5. State two economically important uses of heterotrophic bacteria?

A: 1. In the preparation of curds.

2. In the production of antibiotics.

6. What is the principle underlying the use of cyanobacteria in agricultural fields for crop improvement?

A: Cyanobacteria can fix atmospheric nitrogen into ammonia with the help of specialized cells called heterocysts. So these are used as biofertilizers to improve the nitrogen content of the soil for better yields.

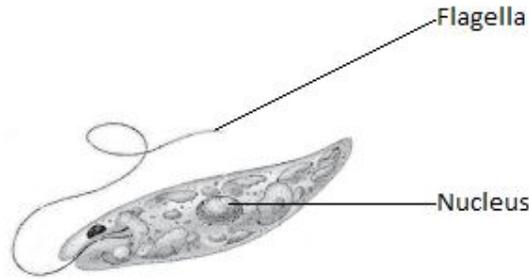
7. Plants are autotrophic. Name some plants which are partially heterotrophic?

A: *Nepenthes*, Venus fly trap (*Dionaea*), Bladderwort (*Utricularia*), *Cuscuta*, *Striga*, *Orbanche*.

8. Who proposed five kingdom classifications? How many kingdoms of this classification contain eukaryotes?

A: R.H. Whittaker

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9. Give the main criteria used for classification by Whittaker?

A: Cell structure, thallus organization, mode of nutrition, reproduction and phylogenetic relationships.

10. Name two diseases caused by Mycoplasmas?

A: Witches broom in plants.

Pleuropneumonia in cattle.

Mycoplasma urethritis in humans.

11. What are slime molds? Explain what is meant by plasmodium with reference to slime molds?

A: Slime molds are saprophytic protists.

The aggregation of these multinucleated mass of protoplasm covered by plasma membrane is called as plasmodium.

Short Answer Questions

1. What are the characteristic features of Euglenoids?

- A:
1. Majority of the Euglenoids are fresh water organisms found in stagnant water.
 2. Instead of a cell wall, they have a protein rich layer called pellicle which makes their body flexible.
 3. They have two flagella, a short and a long one.
 4. They are photosynthetic in the presence of sunlight.
 5. In the absence of sunlight they behave like heterotrophs by preying on other smaller organisms.
 6. The pigments of euglenoids are identical to those present in higher plants.

Example: *Euglena*.

2. What are the advantages and disadvantages of two kingdom classification?

A: Advantages

1. A single criteria for the classification of the living organisms. i.e. presence or absence of Cell wall.
2. It reflects the conventional thinking of the people with basic knowledge in biology.
3. Criteria at various hierarchical levels are mostly morphological.
4. Easy to understand as the criteria based on morphology.
5. Easy to remember as criteria based on few characters.
6. Widely popular due to simplicity.
7. Easy to identify a plant using this classification.

Disadvantages

1. It is inadequate as the number of organisms increasing day by day.
2. Difficulty in classification of certain groups like virus and Lichens.
3. Understanding interrelationships between taxa is not possible.
4. With advancement of science variations within groups at different levels are clearly visible.
5. New information cannot be incorporated freely into the system.
6. Widely different groups are placed in closely related levels.

3. Give salient features and importance of Chrysophytes?

A:



Diatoms



Desmids

1. Chrysophytes includes diatoms and golden algae (desmids).
2. They are found in fresh water as well as in marine environments.

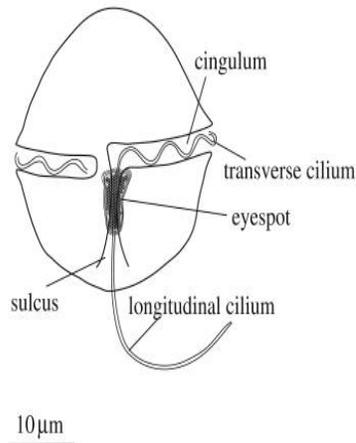
3. They are microscopic and float passively in water currents (plankton).
4. Most of them are photosynthetic.
5. In diatoms the cell walls form two thin overlapping shells, which fit together as in a soap box.
6. The walls are embedded with silica and thus the walls are indestructible.

Importance

1. Diatoms leave behind large amount of cell wall deposits in their habitat; this accumulation over billions of years is referred to as 'diatomaceous earth'.
2. Being gritty this soil is used in polishing, filtration of oils and syrups.
3. Diatoms are the chief 'producers' in the oceans.

4. Give a brief account of Dinoflagellates?

A:



1. Dinoflagellates are mostly marine and Photosynthetic.
2. They appear yellow, green, brown, blue or red depending on the main pigments present in their cells.
3. The cell wall has stiff cellulose plates on the outer surface.
4. Most of them have two flagella; one lies longitudinally and the other transversely in a furrow between the wall plates.
5. They undergo binary fission.
6. Very often, red dinoflagellates undergo such rapid multiplication that they make the sea appear red (red tides).
7. Toxins released by such large numbers may even kill other marine animals such as fishes.

Example: *Gonyaulax*

5. Write the role of fungi in our daily life?

A: They are used as

Food: Many common edible mushrooms belong to fungi e.g *Agaricus*, *Pleurotus*, *Volvariella* etc. Many fungi are eaten for their food value. They are low in fats. They contain many minerals. They are collected wild or cultured. *Agaricus* or white button mushrooms are much sought after mushrooms.

Antibiotics: Many fungi produce secondary metabolites which show antibiotic nature. The famous penicillin is extracted from fungi *Penicillium* belonging to Ascomycetes. This is the first antibiotic discover that saved millions of lives around the world.

Brewing: In manufacturing alcoholic beverages like beer, whisky etc yeasts are used in the fermentation process.

Enzymes, amino acids etc: In pharmaceutical industry and food industry fungal products are used. Digestive enzymes are produced from fungi.

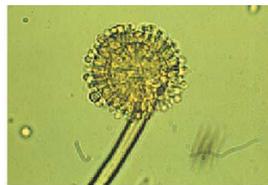
Biodegradation: Dead plants and animals are degraded by many soil fungi and helps in mineralization of the organic matter.

Pathogens; Many fungi are pathogenic to plants, animals and on human beings. *Puccinia* causes rust disease on wheat.

Long answer Questions

1. Give the salient features and comparative account of different classes of fungi studied by you?

A:



1. Phycomycetes

1. Members of phycomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants.

2. The mycelium is aseptate and coenocytic.
 3. Asexual reproduction takes place by zoospores (motile) or by aplanospores (non-motile).
 4. Spores are endogenously produced in sporangium.
 5. Zygospores are formed by fusion of two gametes.
 6. Gametes are similar in morphology (isogamous) or dissimilar (anisogamous or oogamous).
- Some common examples are *Mucor*, *Rhizopus* (the bread mould) and *Albugo* (the parasitic fungi on mustard).

2. Ascomycetes

1. Commonly known as sac-fungi.
 2. The ascomycetes are unicellular, e.g., yeast (*Saccharomyces*) or multicellular, e.g., *Penicillium*.
 3. They are saprophytic, decomposers, parasitic or coprophilous (growing on dung).
 4. Mycelium is branched and septate.
 5. The asexual spores are conidia produced exogenously on the special mycelium called conidiophores.
 6. Conidia on germination produce mycelium.
 7. Sexual spores are called ascospores which are produced endogenously in sac like asci (singular ascus).
 8. These asci are arranged in different types of fruiting bodies called ascocarps.
- Some examples are *Aspergillus*, *Claviceps* and *Neurospora*. *Neurospora* is used extensively in biochemical and genetic work. Many members like morels and buffles are edible and are considered delicacies.

3. Basidiomycetes

1. Commonly known forms of basidiomycetes are mushrooms, bracket fungi or puffballs.
2. They grow in soil, on logs and tree stumps and in living plant bodies as parasites, e.g. rusts and smuts.
3. The mycelium is branched and septate.
4. The asexual spores are generally not found, but vegetative reproduction by fragmentation is common.
5. The sex organs are absent, but plasmogamy is brought about by fusion of two vegetative or

somatic cells of different strains or genotypes. The resultant structure is dikaryotic which ultimately gives rise to basidium.

6. Karyogamy and meiosis take place in the basidium producing four basidiospores.

7. The basidiospores are exogenously produced on the basidium (pl.: basidia). The basidia are arranged in fruiting bodies called basidiocarp.

Some common members are *Agaricus* (mushroom), *Ustilago* (smut) and *Puccinia* (rust fungus).

4. Deuteromycetes

1. Commonly known as imperfect fungi because only the asexual or vegetative phases of these fungi are known.

2. When the sexual forms of these fungi were discovered they were moved into classes they rightly belong to.

3. It is also possible that the asexual and vegetative stage have been given one name (and placed under deuteromycetes) and the sexual stage another (and placed under another class). Later when the linkages were established, the fungi were correctly identified and moved out of deuteromycetes.

4. Once perfect (sexual) stages of members of deuteromycetes were discovered they were often moved to ascomycetes and basidiomycetes.

5. The deuteromycetes reproduce only by asexual spores known as conidia.

6. The mycelium is septate and branched.

Some members are saprophytes or parasites while a large number of them are decomposers of litter and help in mineral cycling. Some examples are *Alternaria*, *Colletotrichum* and *Trichoderma*.