Chapter -Biological Classification

Synopsis

KINGDOM PROTISTA

- ✓ All single-celled eukaryotes are placed under Protista, but the boundaries of this kingdom are not well defined.
- ✓ Members of protista are primarily aquatic. This kingdom forms a link with the others dealing with plants, animals and fungi. Being eukaryotes, the protist cell body contains a well defined nucleus and other membrane-bound organelles. Some have flagella or cilia.
- ✓ Protists reproduce asexually and sexually by a process involving cell fusion and zygote formation.
- ✓ It may be photosynthetic, holotropic, saprotrophic, parasitic and symbionts. Some have mixotrophic nutrition (holotropic + saprobic).
- ✓ The photosynthetic, floating protists are collectively called phytoplankton. The free-floating, holozoic protozoans are collectively termed zooplankton.
- ✓ Unicellular protists have been broadly divided into three major groups :
- ✓ Photosynthetic protists : e.g., dinoflagellates, diatoms, euglenoids.
- ✓ Consumer protists : e.g., slime moulds or myxomycetes.
- ✓ Protozoan protists : e.g., zooflagellata, sarcodina, sporozoa, ciliata.

CHRYSOPHYTES

- ✓ This group includes diatoms and golden algae (desmids).
- ✓ They are found in fresh water as well as in marine environments. They are microscopic and float passively in water currents (plankton).
- ✓ The reserve food material is oil and a polysaccharide-chrysolaminarin (or leucosin).
- ✓ In diatoms, the cell walls form two thin overlapping shells, which fit together as in a soap box. The walls are embedded with silica and thus, the walls are indestructible. Thus, diatoms have left behind large amounts of cell wall deposits in their habitat; this accumulation over billions of years is referred to as ‘diatomaceous earth’. Being gritty, this soil is used in polishing, filtration of oils and syrups. Diatoms are the chief ‘producers’ in the oceans.

DINOFLAGELLATES

- ✓ These organisms are mostly marine and photosynthetic.
- ✓ They appear yellow, green, brown, blue or red depending on the main pigments present in their cells. The cell wall has stiff cellulose plates on the outer surface.
- ✓ Most of them have two flagella; one lies longitudinally and the other transversely in a furrow between the wall plates. Very often, red dinoflagellates (Example: Gonyaulax) undergo such rapid multiplication that they make the sea appear red (red tides). Toxins released by such large numbers may even kill other marine animals such as fishes.
- ✓ The reserve food material is starch in fresh water forms and oil in marine forms.
- ✓ Dinoflagellates reproduce asexually through cell division or by the formation of zoospores and cysts.

- ✓ If sexual reproduction occurs, it is isogamous or anisogamous. Two cells conjugate by a conjugation canal where the two amoeboid gametes fuse to form a diploid zygote. Life cycle involves zygotic meiosis (e.g., Ceratium, Gymnodinium etc.) or gametic meiosis (e.g., Noctiluca).

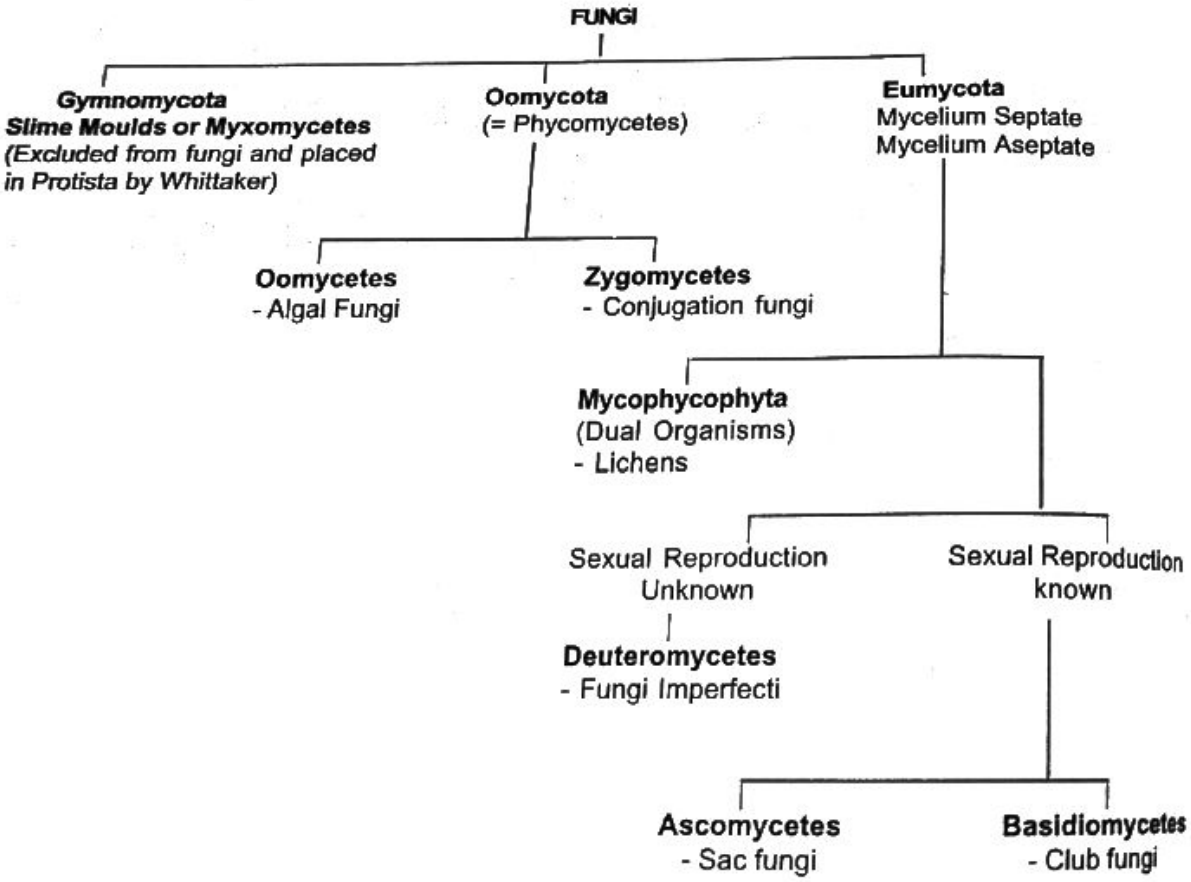
EUGLENOIDS

- ✓ Majority of them are freshwater organisms found in stagnant water.
- ✓ These protists are devoid of cellulose cell walls. The body is covered by a thin and flexible pellicle.
- ✓ They have two flagella, a short and a long one. Though they are photosynthetic in the presence of sunlight, when deprived of sunlight they behave like heterotrophs by predating on other smaller organisms.
- ✓ Interestingly, the pigments of euglenoids are identical to those present in higher plants. Example: Euglena.
- ✓ Sexual reproduction has not yet been definitely proved. Under favourable conditions, euglenoids multiply by longitudinal binary fission.
- ✓ Euglena is a connecting link between animals and plants.

KINGDOM FUNGI

- ✓ The fungi are a group of eukaryotic microorganisms that lack chlorophyll, are unable to synthesize their own food and are therefore heterotrophic.
- ✓ The branch of science that deals with the study of fungi is called Mycology.
- ✓ Fungi possess all eukaryotic organelles and reserve food particles (glycogen, lipids etc.)
- ✓ With the exception of yeasts which are unicellular, fungi are filamentous. Their bodies consist of long, slender thread-like structures called hyphae. The network of hyphae is known as mycelium. Some hyphae are continuous tubes filled with multinucleated cytoplasm – these are called coenocytic hyphae. Others have septate or cross walls in their hyphae.
- ✓ The cell walls of fungi are composed of chitin and cellulose. While chitin is a polymer of N-acetyl glucosamine, cellulose is a polymer of D-glucose.
- ✓ Those fungi that depend on living plants and animals are called parasites. They can also live as symbionts – in association with algae as lichens and with roots of higher plants as mycorrhiza.
- ✓ Fungi possess true nucleus having definite nuclear envelope. The nuclear envelope persists during nuclear division.
- ✓ The fungi reproduce by all the three methods - vegetative, asexual and sexual.
- ✓ Reproduction in fungi can take place by vegetative means – fragmentation, fission and budding.
- ✓ Asexual reproduction is by spores called conidia or sporangiospores or zoospores, and sexual reproduction is by oospores, ascospores and basidiospores. The various spores are produced in distinct structures called fruiting bodies.
- ✓ The sexual cycle involves the following three steps:
- ✓ Fusion of protoplasms between two motile or non-motile gametes called plasmogamy.
- ✓ Fusion of two nuclei called karyogamy.
- ✓ Meiosis in the zygote resulting in haploid spores.

- ✓ When a fungus reproduces sexually, two haploid hyphae of compatible mating types come together and fuse. In some fungi, the fusion of two haploid cells immediately results in diploid cells (2n). However, in other fungi (ascomycetes and basidiomycetes), an intervening dikaryotic stage (n + n i.e. two nuclei per cell) occurs; such a condition is called a dikaryon and the phase is called dikaryophase of fungus. Later, the parental nuclei fuse and the cells become diploid. The fungi form fruiting bodies in which reduction division occurs, leading to the formation of haploid spores.
- ✓ The classification of fungi based on the characteristics of the life cycle involved like nature of somatic phase, kinds of asexual spores, kinds of sporangia, nature of the life cycle and presence or absence of perfect or sexual stage.



Question 1: The term ‘Protista' was introduced by a German Biologist and Philosopher
Options:
(a) John Ray
(b) Robert Grant
(c) Ernst Haeckel
(d) Leuckart
Answer: (c)
Difficulty: Easy
Analysis: Knowledge

Question 2: Which is common amongst Euglena, Amoeba, Entamoeba and Trypanosoma ?
Options:
(a) Binary fission
(b) Contractile vacuole
(c) Holozoic nutrition
(d) Multiple fission
Answer: (a)
Difficulty: Easy
Analysis: Understanding

Question 3: The group often referred to as the ‘garbage' of classification, contains
Options:
(a) Slime moulds ,
(b) Simple algae
(c) Simple animals
(d) All organisms not placed in other groups
Answer: (d)
Difficulty: Easy
Analysis: Knowledge

Question 4: Whittaker’s system of classification implies that unicellular eukaryotes are primarily precursors of the
Options:
(a) Plants
(b) Fungi
(c) Animals
(d) Plant, fungi and animals
Answer: (d)

Difficulty: Easy
Analysis: Knowledge

Question 5: Auxospores or rejuvenescent cells are characteristic of which of the following ?
Options:
(a) Dinoflagellates
(b) Diatoms
(c) Zooflagellates
(d) Sporozoans
Answer: (b)
Difficulty:Medium
Analysis: Application

Question 6: Golden brown protists are
Options:
(a) Dinophyceae
(b) Bacillariophyceae
(c) Euglenophyceae
(d) Both (1) and (2)
Answer: (d)
Difficulty:Medium
Analysis: Knowledge

Question 7: Longitudinal binary fission is found in
Options:
(a) Amoeba
(b) Paramecium
(c) Euglena
(d) None
Answer: (c)
Difficulty: Medium
Analysis:Understanding

Question 8: The cell wall is absent in
Options:
(a) Dinoflagellates
(b) Diatoms
(c) Euglenoids

(d) None of these
Answer: (c)
Difficulty: Easy
Analysis: Knowledge

Question 9: Trichocysts are found in
Options:
(a) A number of dinoflagellates and Paramecium
(b) All dinoflagellates
(c) Paramecium
(d) Protozoans
Answer: (a)
Difficulty: Medium
Analysis:Understanding

Question 10: Which of the following does not belong to the kingdom Protista ?
Options:
(a) Chrysophytes
(b) Euglenoids
(c) Ascomycetes
(d) Dinoflagellates
Answer: (c)
Difficulty: Medium
Analysis:Understanding

Question 11: Match the following and select the correct combination from the options given below.

Column I (Kingdom)	Column II (Class)
A Plantae	1. Archaebacteria
B Fungi	2. Euglenoids
C Protista	3. Phycomycetes
D Monera	4. Algae

Options:
(a) A -4, B-3, C-2, D-1
(b) A-1, B-2, C- 3, D-4
(c) A-3, B-4, C-2, D-1
(d) A-2, B-3, C-4, D-1

Answer: (a)
Difficulty: Medium
Analysis:Understanding

Question 12: Where will you look for the sporozoites of the malarial parasite ?
Options:
(a) Saliva of infected female Anopheles mosquito
(b) Red blood corpuscles of human suffering from malaria
(c) Spleen of infected humans
(d) Salivary glands of freshy moulted female Anopheles mosquito
Answer: (a)
Difficulty: Medium
Analysis:Knowledge

Question 13: Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom
Options:
(a) Protista
(b) Fungi
(c) Animalia
(d) Monera
Answer: (a)
Difficulty: Easy
Analysis:Understanding

Question 14: Select the wrong statement
Options:
(a) The walls of diatoms are easily destructible
(b) Diatomaceous earth' is formed by the cell walls of diatoms
(c) Diatoms are chief producers in the oceans
(d) Diatoms are microscopic and float passively in water
Answer: (a)
Difficulty: Medium
Analysis:Understanding

Question 15: Which one of the following is endogenously produced ?
Options:
(a) Ascospores
(b) Basidiospores

(c) Conidiospores
(d) All of the above
Answer: (a)
Difficulty: Medium
Analysis:Knowledge

Question 16: Match List -I (Fungal class) with List - II (Organism) and select the correct answer using the codes given below the lists

List - I (Fungal class)	List - II (Organism)
A Ascomycetes	1. Agaricus
B Basidiomycetes	2. Trichoderma
C Deuteromycetes	3. Rhizopus
D Zygomycetes	4. Saccharomyces

Codes :	A	B	C	D
(1)	4	2	1	3
(2)	2	1	3	4
(3)	4	1	2	3
(4)	2	3	1	4

Answer: (c)
Difficulty: Medium
Analysis:Understanding

Question 17: Find the correct match
Options:
(a) Phytophthora infestans - white rust of crucifers
(b) Albugo candida - white rust of crucifers
(c) Puccinia graminis - Loose smut of wheat
(d) All of the above
Answer: (b)
Difficulty: Medium
Analysis:Application

Question 18: Sexual reproductive structure in lichens are produced by
Options:
(a) Algae
(b) Fungi
(c) Both algae and fungi
(d) Lichens remain vegatative and do not reproduce
Answer: (b)
Difficulty: Medium
Analysis:Understanding

Question 19: Wonder drug is extracted from
Options:
(a) Aspergillus
(b) Claviceps
(c) Penicillium
(d) Albugo
Answer: (c)
Difficulty: Medium
Analysis:Knowledge

Question 20: Coenocytic mycelium is a characteristic feature of
Options:
(a) Phycomycetes
(b) Ascomycetes
(c) Basidiomycetes
(d) Deuteromycetes
Answer: (a)
Difficulty: Medium
Analysis:Knowledge

Question 21: Which of the organisms is used as food ?
Options:
(a) Bracket fungi
(b) Agaricus
(c) Claviceps
(d) Moulds
Answer: (b)
Difficulty: Medium **Analysis:Knowledge**

Question 22: Lichens are composite organisms consisting of an alga and _____
Options:
(a) Mosses
(b) Fungus
(c) Protozoa
(d) Bacterium
Answer: (b)
Difficulty: Medium
Analysis:Knowledge

Question 23: Which one of the following fungi contains hallucinogens ?
Options:
(a) Ustilago sp
(b) Morchella Esculenta
(c) Amanita muscaria
(d) Neurospora sp
Answer: (c)
Difficulty: Medium
Analysis:Knowledge

Question 24: One of the major component of cell wall of most fungi is
Options:
(a) Peptidoglycan
(b) Cellulose
(c) Hemicellulose
(d) Chitin
Answer: (d)
Difficulty: Medium **Analysis:Knowledge**

Question 25: The imperfect fungi which are decomposers of litter and help in mineral cycling belong to
Options:
(a) Deuteromycetes
(b) Basidiomycetes
(c) Phycomycetes
(d) Ascomycetes
Answer: (a)
Difficulty: Medium **Analysis:Knowledge**