Class : Botany
Class : XI

Kannada

Biological Classification

Recall what did you study in previous class

Biological Classification

Table 1: Characteristics of Five Kingdoms proposed by Whittaker (1969)

Characters	Five Kingdoms				
	Monera	**Protista**	**Fungi**	**Plantae**	**Animalia**
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Cell wall	No cellulosic (Polysaccharide + amino acid)	Present in some	Present with chitin	Present (cellulose)	Absent
Nuclear membrane	Absent	Present	Present	Present	Present
Body organisation	Cellular	Cellular	Multicellular/ loose tissue	Tissue/organ	Tissue/organ/ organ system
Mode of nutrition	Autotrophic (Chemosynthetic and photosynthetic) and Heterotrophic (sapro-phytic/ parasitic)	Autotrophic (Photosynthetic) and Hetero-trophic	Heterotrophic (Saprophytic/ Parasitic)	Autotrophic (Photosyn-thetic)	Heterotrophic (Holozoic/ Saprophytic etc.)

Kingdom Monera

- Bacteria can be classified into two categories that is archaebacteria and eubacteria.
- **Archaebacteria:** It includes halophiles, thermoacidophiles and methanogens.
- Autotrophic bacteria are of two types that is photosynthetic autotrophs and chemosynthetic autotrophs.

Photosynthetic autotrophs

- They have chlorophyll a & includes cyanobacteria.
- They can fix nitrogen through heterocyst.
- E.g., Nostoc, Anabaena, etc

Chemosynthetic autotrophs

- They oxidise various inorganic substance.
- They play important role in nutrient cycling.

Heterotrophic bacteria

- Majority of them are important decomposers.

Kingdom Protista (Single-celled Eukaryotes)

Crysophytes

- Includes diatoms and golden algae (desmids).
- Diatoms forms 'diatomaceous earth' and are chief producers' in the oceans.

Dinoflagellates

- Mostly marine and photosynthetic.
- Toxins released by Gonyaulax make the sea appear red (red tides).

Euglenoids

- Majorly fresh water organisms.
- Presence of pellicle makes their body flexible.
- E.g., Euglena

Slime Moulds

- Saprophytic protists.
- They form plasmodium and fruiting bodies under favourable and unfavourable conditions respectively

Protozoans

- Heterotrophs and live as predators or parasites.
- 4 major groups are as follows:
- Amoeboid protozoans
- Live in fresh water, sea water or moist soil.
- e.g., Amoeba
- Flagellated protozoans
- Either free living or parasitic
- e.g., Trypanosoma
- Ciliated protozoans
- Aquatic and actively moving organisms.
- e.g., Paramoecium
- Sporozoans
- They have infectious spore like state in their life cycle
- e.g., Plasmodium (Malarial parasite)

Kingdom Fungi (Heterotrophic Organisms)

- Reproduction is of three types i.e.,
- Vegetative means: Fragmentation, fission and budding.
- Asexual reproduction (spores): Conidia/sporangiopores/ zoospores.
- Sexual reproduction: Oospores, scospores and basidiospores.
- Sexual cycle follow plasmogamy, karyogamy and meiosis in zygotes.
- On the basis of morphology of mycelium, mode of spore formation and fruiting bodies, fungi are classified into four different classes (Table 2)

Table 2: Classification of Fungi

Classes	Typical Examples	Sexual Reproduction	Asexual Reproduction	Hyphae
Phycomycetes	Rhizopus, Mucor, Albugo	Zygospores	Zoopores (motile) Aplanospores (non-motile)	Aseptate and Coenocytic
Ascomycetes (Sac fungi)	Penicllium (multicellular), yeast (unicellular), Aspergillus, Claviceps, Neurospora, morels and truffles	Ascospores produced endogenously in sac like asci	Conidia produced on conidiophore	Branched and septate
Basidiomycetes (Club fungi)	Mushrooms (Agaricus) smut (Ustilago), Rust (Puccinia) bracket fungi or puff balls.	Basidiospores produce exogenously on the basidium	Generally asexual spores are not found but reproduce vegetatively by fragmentation	Branched and septate
Deuteromycetes (Imperfect fungi)	Alternaria, Colletotrichum, Trichoderma	Sexual phase has not been observed	Conidia	Septate and branched

Kingdom Plantae

- Includes all eukaryotic chlorophyll-containing organisms commonly called plants

Kingdom Animalia

- This kingdom is characterised by heterotrophic eukaryotic organisms that are multicellular and their cells lack cell walls.

Virus

- The viruses are non-cellular organisms that are characterised by having an inert crystalline structure outside the living cell
- Viruses contain protein and genetic material, that could be either RNA or DNA.

Viroids

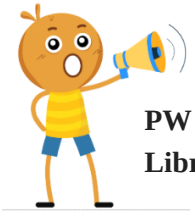
In 1971, T.O. Diener discovered a new infectious agent that was viroid's and they contain only RNA.

Prions

- It is a types of infectious protein aggregates that can cause different types of disease. E.g., bovine spongiform encephalopathy (BSE) commonly called mad cow disease in cattle and its analogous variant Cr–Jacob disease (CJD) in humans.

Lichens

- A symbiotic form of algae and fungi, in which algae provide food and fungi provide shelter as well as nutrition to algae
- Lichens are very good pollution indicators—they do not grow in polluted areas.



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