Class : Botany
Class : XI

Kannada

Plant Kingdom

Recall what did you study in previous class

Classification Systems

Artificial Classification System:

- Given by Carolus Linnaeus.
- Based mainly on vegetative characters or on the androecium structure.
- Separated the closely related species since they were based on a few characteristics.
- Gave equal weightage to vegetative and sexual characteristics.

Natural Classification System:

- Given by George Bentham and Joseph Dalton Hooker.
- Based on natural affinities among the organisms.
- Consider both external and internal features

Phylogenetic Classification System:

- Based on evolutionary relationships between the various organisms
- Assumes that organisms belonging to the same taxa have a common ancestor.

Numerical Taxonomy

- Carried out using computers and based on all observable characteristics.
- Each character is given equal importance and at the same time hundreds of characters can be considered

Cytotaxonomy

- Based on cytological information like chromosome number, structure, behaviour.

Heterotrophic bacteria

- Majority of them are important decomposers.

Chemotaxonomy

- Uses the chemical constituents of the plant to resolve confusions.

Classification of Algae			
Features	**Chlorophyceae**	**Phaeophyceae**	**Rhodophyceae**
Common name	Green algae	Brown algae	Red algae
Pigment	Chl a, b	Chl a, c and fucoxanthin	Chl a, d and r-

			phycoerythrin
Reserve food	Starch	Laminarin, Mannitol	Floridean starch
Flagella	2-8, equal, apical	2, unequal, lateral	Absent
Examples	Chlamydomonas, Volvox etc.	Ectocarpus, Sargassum etc.	Polysiphonia, Gracilaria etc.

Bryophytes

- Commonly called as amphibians of plant kingdom.
- Includes Liverworts and mosses.
- Vascular tissues are absent.
- Lack true stem, leaves and roots.
- Main plant body is gametophyte. Sporophyte is dependent on gametophyte for nutrition.
- Plant body attached to substratum by unicellular or multicellular rhizoids.
- Water is essential for fertilization.
- Sex organs are multicellular. Male-antheridium and female-archegonium.
- Fertilization produces zygote which develops into multicellular sporophyte

Liverworts

- Grow usually in moist and shady habitats.
- Plant body is thalloid which is dorsiventral and closely appressed to the substrate.
- Leafy members have tiny leaf-like appendages in two rows on the stem-like structures.
- Asexual reproduction through fragmentation.
- Gemmae are green, multicellular asexual buds.
- Sporophyte is formed as a result of sexual reproduction.
- Sporophyte is differentiated into foot, seta and capsule.
- After meiosis, spores are produced within the capsule which germinate to form free-living gametophytes. E.g., Marchantia

Mosses

- Protonema is the first stage of gametophyte that develops directly from spore.
- Leafy stage is second stage develops from secondary protonema as lateral bud.
- Vegetative reproduction through fragmentation and budding in secondary protonema.
- Sexual reproduction present.
- Have an elaborate mechanism of spore dispersal. E.g., Funaria, Polytrichum and Sphagnum.

Pteridophytes

- Includes horsetails and ferns.
- First vascular plants without seeds.
- Main plant body is sporophyte and distinguishes into root, stem and leaves.
- Reproduction is of vegetative, asexual and sexual type.
- Male gametes are flagellated.
- Sporangia produce spores by meiosis in spore mother cells.
- Spores germinate to give rise to inconspicuous, small but multicellular, free-living, mostly photosynthetic thalloid gametophytes called prothallus.

- Requires water for fertilisation.
- Development of the zygotes into young embryos take place within the female gametophytes which represents is a precursor to the seed habit. E.g., Psilotum, Lycopodium, Selaginella etc.

Gymnosperms

- Vascular plants with naked seeds.
- Redwood tree Sequoia is one of the tallest tree species.
- In Pinus roots have fungal association in the form of mycorrhiza.
- Coralloid roots are found in Cycas which are associated with N_2-fixing cyanobacteria.
- Male and female cones may be borne on same tree as in Pinus or in different tree as in Cycas.
- Male and the female gametophytes do not have an independent free-living existence.
- Zygote is formed after fertilisation of pollen grain and ovule.
- Zygote develops into an embryo and the ovules into seeds. These seeds are naked.

Angiosperms

- In angiosperms, the seeds are enclosed in fruits, the pollen grains and ovules are developed in specialized structures called flowers.
- Stamen (male sex organ) consists of a filament and an anther and carpel (female sex organ) consists of a stigma, style and ovary containing ovules.
- Double fertilization occurs in angiosperm. One produces zygote and other forms primary endosperm nucleus (3n).
- Fertilized ovules ripen into seeds and ovaries into fruit.
- Angiosperms are divided into two classes.

Dicots

- There usually have two cotyledons.
- Flowers are generally pentamerous or tetramerous (floral parts in sets of 5 and 4 or their multiples).
- Leaves possess reticulate venation.

Monocots

- The seeds contain one cotyledon.
- Flowers are usually trimerous (floral parts in sets of three or
- its multiples).
- Leaves possess parallel venation.

Plant Life Cycles & Alternation of Generations

Haplontic Life Cycle

- Sporophyte generation is represented only by the one-celled zygote.
- No free-living sporophytes.
- Meiosis in the zygote results in the formation of haploid spores.
- Haploid spores divide mitotically and form the gametophyte.
- Dominant, photosynthetic phase in such plants is the free-living gametophyte.
- Many algae such as Volvox, Spirogyra and some species of Chlamydomonas represent this pattern

Haplo-diplontic Life Cycle

- Bryophytes and pteridophytes exhibit this pattern

Bryophytes

- Dominant, independent, photosynthetic, thalloid or erect phase is represented by a haploid gametophyte.
- Sporophyte is short-lived, multicelluler and totally or partially dependent on the gametophyte for its anchorage and nutrition.

Bryophytes

- Diploid sporophyte is represented by a dominant, independent, photosynthetic, vascular plant body. ™
- Gametophyte is multicellular, saprophytic/autotrophic, independent but short-lived.



PW Web/App - https://smart.link/7wwosivoicgd4
Library- https://smart.link/sdfez8ejd80if