

Economic importance:

- Provide food for herbaceous mammals / birds.
- Sphagnum species (mosses) provide peat, used as a fuel.
- Due to its water holding capacity it is used as packing material for trans-shipment of living materials.
- Mosses and Lichens form Pioneer community on bare rocks.
- Form dense mats on soil, so reduce the impact of rain and soil erosion.

Classes: - There are two classes → Liverworts, Mosses.

a) Liverworts :

- Moist, shady habitats, damp soil, bark of trees and deep in the woods.
- Plant body is Thalloid, have a tiny leaf structures.
- Asexual reproduction is by fragmentation / form gemmae (green, multicellular, asexual bodies) they detach from parent body and form as a new individual.
- Sexual reproduction → form male & female sex organs sporophyte is differentiated into a foot, setae and capsule.
- Spore germinate to form gametophyte.

Example :- Marchantia

b) Mosses :

- Gametophyte shows two stages → Protonema (spores) and Leafy stage (Secondary protonema)
- Attached to the soil by Rhizoids
- Vegetative reproduction is by fragmentation / budding
- Sexual reproduction is by antheridia and archegonia
- Zygote develops into sporophyte and form capsule and it contains spores (haploid)

Example :- Sphagnum, Funaria

III. PTERIDOPHYTES (first land plants):

They are used for medical purpose, ornamental and as soil binders and first terrestrial plants.

- They grow in cool, damp, shady places
- Possess vascular tissues (xylem and phloem)
- Main plant body is Sporophytes
- The body is differentiated into true roots, stem and leaves.

- Leaves may be small (microphylls – selaginella) or large (macrophylls – ferns) and bear sporangia and form sporophylls (leaf carrying spores).
- Sporangia produce spores by meiosis.
- Spore germinates to form gametophyte, called Prothallus.
- They need water for fertilization.
- Gametophyte bear male & female sex organs called Antheridia and Archegonia respectively.
- Gamete fusion results in zygote formation. Zygote develops into sporophytes (dominant phase).
- If all the spores are similar kind, it is called *Homospores*.
- Selaginella produce two kinds of spores, Macro and micro spores, hence known as *Heterosporous*.
- Macro and micro spores develop into female and male gametophytes respectively.
- Female gametophyte retained on sporophyte. It leads to the development of seed habit.

Classes: - There are four classes in Pteridophtae;

- a) Psilopsida – Ex. *Psilotum*
- b) Lycopsidea – Ex. *Selaginella*
- c) Sphenopsida – Ex. *Equisetum*
- d) Pteropsida – Ex. *Pteris*

IV. GYMNOSPERMS (Naked seeds)

- They are seed bearing plants.
- The ovules are not enclosed in an ovary, so no fruits.
- Tallest gymnosperm is Sequoia (red wood tree)
- Plant body is differentiated into roots, stems and leaves
- Roots are tap root – associated with other organisms like Pinus roots with Mycorrhizae and Cycas roots with Cyanobacteria like Nostoc and Anabaena (nitrogen fixing microbes)
- Stem can be branched / unbranched
- Leaves are simple / needle like – leaves show Xerophytic adaptation
- Gymnosperms are heterosporous, produce microspores and megaspores
- They form male cones & female cones
- Both cones can occur on some plant / different.
- Fertilization results in Zygote and embryo develops.
- Ovules form seeds.
- Gymnosperms show diplontic life cycle.
- They show Alternation of generation.

Examples ; - Pinus, Cycas, Cedrus

V. ANGIOSPERMS (flowering plants)

- They are flowering plants
 - Seeds are covered by fruits – live in wide range of habitats.
 - Size varies from tiny microscopic *Wolffia* to tall trees *Eucalyptus*.
 - Provide food, fodder, fuel and medicine.
 - There are two classes → Dicotyledons and Monocotyledons.
 - Male sex organ is Stamen and female is Pistil.
 - Ovules have embryo sac; it undergoes meiosis and form egg apparatus with one egg and 2 synergids, 3 antipodal cells and 2 polar nuclei.
 - Polar nuclei fuses to form secondary polar nucleus.
 - Pollen dispersal is by pollination – pollen tube grows in to stigma and style of pistil, one male gamete fuses with egg and form zygote and other male gamete fuses with secondary polar nucleus ($2n$) to form Primary Endosperm Nucleus (PEN - $3n$).
 - Due to two fusions, it is called Double fertilization.
- a) Zygote → Embryo
 - b) PEN → Endosperm (and nourishes embryo)
 - c) Synergids and antipodal cells → degenerate
 - d) Ovules → seeds
 - e) Ovary → Fruits

Preview from Notesale.co.uk
Page 13 of 21