

GENERAL CLASSIFICATION OF PLANTS

- Kingdom is the highest rank in the biological taxonomy of all organisms.
- Until 20th century, all living things classified under either Kingdom plantae or Animalia.
- Whittaker (1969) classified living things into five Kingdom and these are: Monera, Protista, Fungi, Animalia and Plantae.
- Fungi, and members of the Monera and Protista having cell walls have been excluded from the kingdom Plantae.
- Now, every living thing comes under one of 6 kingdoms: Bacteria, Archaea, Protista, Fungi, Plantae and Animalia.

Archaea

- Single-celled organisms (Unicellular)
- Prokaryotes
- Autotrophs

Example: *Methanogen bacteria*

Eubacteria

- Single-celled organisms
- Prokaryotes
- Some of them can't make their food (***heterotrophs***)
- Others make their own food (autotrophs) by getting energy from:
- Sunlight (***photosynthetic autotrophs***)
- Breakdown inorganic sulphur & nitrogen compounds (***chemosynthetic autotrophs***).

Protista

- They are all eukaryotes
- They could be multicellular & unicellular
- Some of them are microscopic and others are very large.
- Protista contain both heterotrophs & autotrophs.
- They include: slime mould, Amoeba, Euglena, Diatom, Paramecium etc.

KINGDOM PLANTAE

This kingdom consists of a group of organisms which are multicellular, eukaryotic, autotrophic and contain chlorophyll for photosynthesis. The functions and characteristics of plants are identified by their cellular structure, habitats, adaptations, nutrition, inter-relationship, reproduction, life-cycles, importance and classification.

The **plant kingdom** is sub-divided into two divisions; Cryptogams and Phanerogams (Spermatophytes).

- **A Cryptogam** (Cryptogamae) is a plant that reproduces by spores, without flowers or seeds.
- "Cryptogamae" comes from the Greek words *kryptos*, "hidden" + *gamos*, "to marry" means hidden reproduction, referring to the fact that no seed is produced, thus cryptogams represent the non-seed bearing plants.
- As a group, Cryptogamae are the opposite of the Phanerogamae (Greek *phaneros* = "visible").
- Some textbooks refer to the "lower plants" and "spore plants" as the Thallophytes
- The sub-kingdom cryptogams is divided into three divisions; thallophyta (bacteria, fungi, lichen, algae), Bryophyta and pteridophyta.
- Cryptogam is a collective name that includes the fungi, algae, lichen (blue-green algae/algae/ fungi), bryophytes (liverworts, hornworts and mosses) and pteridophytes (ferns and fern allies).

- Note: Not all cryptogams are treated as part of the plant kingdom; the fungi, in particular, are regarded as a separate kingdom now.

Here are some **general characteristics** enumerated:

- They are green except for the fungi
- They have hidden reproductive organs
- They lack flowers and seeds
- They usually occupy the basal portion of almost all natural ecosystems.
- They are found commonly in humid places on soil, decay woods or tree trunks

Fungi

- They are all eukaryotes and
- They are all heterotrophs (either parasitic or mutualistic)
- They have cell wall made of chitin & glycan
- Most of them are multicellular.
- Examples include: mushroom, yeast.

Algae

- Algae are autotrophic organisms and they have chlorophyll.
- They are oxygen - producing photosynthetic organisms that have evolved in and have exploited an aquatic environment.
- In Algae, the plant body shows no differentiation into root, stem or leaf.
- The plant body is called thallus.
- They do not have vascular tissues.
- Examples include: *Chlamydomonas*, *Spirogyra*, *Zygnema* etc

Bryophytes

- Bryophytes are the simplest group of land plants.

- They are relatively poorly adapted to life on land, so they are mainly confined to damp, shady places like damp rocks and logs on forest floors, swamps or marshes beside streams and pools.
- These are terrestrial non-vascular plants.
- They are more advanced than algae in that they develop special organs.
- The male sex organ is called antheridium and the female sex organ is called archegonium.
- Bryophytes show distinct alternation of generation in their life cycles.
- Bryophytes include mosses, liverworts and hornworts.

Pteridophytes

- Pteridophytes are also called ferns or vascular cryptogams are plants with leaves, roots, and stems; but they do not have flowers like most plants.
- Ferns have special stems, called rhizomes, which grow sideways at the surface or underground.
- Many leaves grow from these rhizomes and make fern colonies. Fern leaves are called **fronds**.
- Examples: *Lycopodium*, *Selaginella*, *Equisetum*, *Psilotum*, *Pteris*, *Dryopteris*

Spermatophytes

Spermatophytes (seed plants) or **Phanerogams** (flowering plants) comprises of two divisions namely: Gymnosperms and Angiosperms.

- **General characteristics of Spermatophytes;**
- The plant has roots, stems, leaves and seed-bearing structures.
- They produce seeds.
- They have chlorophyll, hence photosynthetic.
- They have vascular tissue which is highly developed with xylem tissue.

Gymnosperms

- Gymnosperms are closely related to the higher cryptograms on one hand, and to the angiosperms on the other.
- Thus, they form an intermediate group between the two.
- There are about 700 known species of gymnosperms
- Gymnosperms are plants that do not flower and do not bear their seeds in an enclosure such as a fruit. Therefore have their seeds naked.
- They bear cones of two types, male and female.
- After fertilization seeds are not enclosed in a fruit wall.
- They show some xerophytic characteristics such as rolled leaves, needle-shaped leaves, sunken stomata and thick waxy leaves.
- Xylem consists mainly of tracheids while phloem does not have companion cells.

Angiosperms

- This is the most advanced group found almost everywhere.
- They include grasses, herbs, shrubs and trees.
- They are flower bearing and are usually bisexual.
- Seeds are enclosed in an ovary which develops into a fruit.
- Xylem has tracheids and vessels while phloem has companion cells.
- They exhibit double fertilization
- Today spermatophytes are by far the largest vascular plant lineage, with about 270,000 living species.
- Spermatophytes are important because they perform a process for obtaining food called Photosynthesis.

- Photosynthesis which is the basis of life and regulates the concentration of gases in the atmosphere, that affects global climate and produces essential nutrients for the proper functioning of those beings who alone can generate.