

PLANT KINGDOM



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PLANT KINGDOM

What are Plants

Plant kingdom classification has changed a number of times over the years. For instance, blue-green algae were once considered to be part of the plant kingdom, but today, they are classified under Kingdom Eubacteria. Similarly, lichen was once considered a plant; however, they are composite organisms. In other words, lichens are comprised of two individual organisms a fungus and a plant. Historically, organisms that could not be classified under animals were grouped under plants.

Whittaker classified the whole living organism into five kingdoms based on the complexity of cell structure (Prokaryotic and Eukaryotic), the complexity of the body (unicellular and multicellular), and mode of nutrition (autotrophs and heterotrophs).

Classification of the Plant Kingdom

All the classification systems, starting from that of Aristotle to the 20th century, can be divided into three types:

- **Artificial System:** In this system, the classification is based on few morphological characters. Theophrastus, Pliny, and Linnaeus used an artificial system of classification.
- **Natural System:** In this system, the classification is based on all the important related characters. Both external and internal. Bentham and hooker, Adanson, Candolle used a natural system of classification.
- **Phylogenetic System:** Classification based on the evolutionary relationship of plants. The use of phylogeny for classification was done by Eichler, Blessey.

Numerical Taxonomy

Taxonomy based on statistical methods with equal importance using computers.

Cytotaxonomy

Taxonomy that is based on cytology or structure of the cell (chromosome number, shape, behaviour, etc).

Chemotaxonomy

Taxonomy based on chemical constituents of plants (nature of the protein, DNA sequence, taste, smell, etc).

Eichler Classification

The classification of Plant kingdom depending on flowering. Divided into two-

Cryptogamae (non-flowering, seedless plants) and Phanerogamae (flowering, seed-bearing plants).

Based on the Plant Body Cryptogamae is divided into Thallophyta, Bryophyta, and Pteridophyta.

- **Thallophyta:** The plant body is thallus-like (undifferentiated plant body).
- **Bryophyta:** Plant body with a root-like structure, stem-like structure, vascular tissues are absent).
- **Pteridophyta:** The plant body is differentiated into true root, stem, and leaves. Vascular

Thallophytes Again Divided Into:

- Algae (pigmented thallophytes).
- Fungi (non-pigmented thallophytes).
- Lichens: Symbiotic association between algae and fungi.

Phanerogamae is Divided Into Two:

- Gymnosperms (naked seed plants)
- Angiosperma (covered seeded plants)

Angiosperms Are Again Divided Into Two:

- Monocots (bearing single cotyledon, fibrous root system, and parallel venation).
- Dicots (have two cotyledons, taproot system, and reticulate venation).

Algae

1. **Phycology:** Branch of Biology that deals with the study of algae
Phycos = Seaweed
Logos = Study
2. Fritch - Father of phycology.
3. M.O.P. Iyengar is the father of Indian phycology.

Algal members are pigmented thallophyte

Habitat

Hydrophytes: Water is their habitat. In aquatic habitat:

- Freshwater (Spirogyra) and marine (Sargassum).
- Floating- Chlamydomonas, Spirogyra
- Benthophytes - These plants remain attached to the bottom of their habitat. Example Chara (stoneworts)
- Xerophytes: Their habitat is desert.
- Mesophytes- They grow in medium habitats.
- Epiphytes- They grow on plant body (Cladophora)
- Epizoic- growing on the animal body (Trichophyllus)

- Lithophytes- They grow on rocks.
- Halophytes- They grow in salty areas.
- Moist soil-terrestrials (Fritschiella).

Plant Body

- The vegetative plant body of algae is a haploid gametophyte.
- They may be unicellular, flagellated (Chlamydomonas), or non-flagellated (Chlorella).

Multicellular:

- Coenobium- It is a colony with a fixed number of cells and also the division of labor is fixed. E.g.: Volvox.
- Aggregation-indefinite colony. E.g., Tetraspora
- Filamentous-unbranched. E.g.: Ulothrix
- Filamentous branches. E.g.: Cladophora
- Siphonous- multinucleate. E.g.: Vaucheria
- Parenchymatous. E.g.: Ulva the,
- Branched like higher plants. E.g.: Sargassum, Chara

Nutrition:

- Autotrophs - Photosynthetic (most of them)
- Parasitic forms (rare). E.g.: Cephaleuros.

Pigments:

- Chlorophyll- a, b, c, d.
- Carotenoids- carotene and xanthophyll-fucoxanthin are dominating pigments in brown algae.
- Phycobillins- phycocyanin and phycoerythrin.

Reproduction

Vegetative reproduction: Reproduction Using the Vegetative Parts.

Different Types are:

- Fission
- Fragmentation
- Budding
- Tubers
- Gemmae

Asexual Reproduction: Without the Fusion of Gametes.

Mainly by:

- Zoospores within sporangia
- Aplanospores
- Akinete
- Hypnosporos

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