

Chapter No. 3. Plant Kingdom

Q.1. Explain Division of algae & their main characteristics.

- Algae are chlorophyll-bearing, simple, thalloid, autotrophic & largely aquatic organisms.
- They occur in a variety of other habitats, moist stones, soils & wood.
- The form & size of algae is highly variable.
- Algae reproduce by vegetative asexual & sexual methods.
- Vegetative reproduction is by fragmentation. Each fragment develops into a thallus.
- Asexual reproduction by production of different types of spores. Most common being zoospores.
- Sexual reproduction takes place through fusion of two gametes.
- The algae are divided into three main classes. Chlorophyceae, Phaeophyceae, & Rhodophyceae.

a] Chlorophyceae :- (Green Algae)

- The members of chlorophyceae are commonly called green algae.
- The plant body may be unicellular, colonial or filamentous.
- They are usually grass green due to the dominance of pigments chlorophyll a & b.
- The pigments are localised in definite chloroplasts.
- The chloroplast may be discoid, plate-like, reticulate, cup-shaped, spiral or ribbon-shaped in different species.
- Pyrenoids are present, which are the storage bodies.
- The inner layer of cell wall is made up of cellulose & the outer layer is made of pectose.

- The members reproduce
1. Vegetatively by fragmentation.
 2. Asexually by flagellated zoospores.
 3. Sexually by isogamy, anisogamy & oogamy.
- Common chlorophyceae members are:
Chlamydomonas, Chlorella, Volvox, etc.

b] Phaeophyceae :- Brown algae :-

- The members of phaeophyceae or brown algae are found primarily in marine habitat.
- They show great variation in size & form.
- Simple branched & filamentous as in Ectocarpus or flat ribbon-shaped in Sargassum, Limnoria, fucus etc.
- The giant brown algae kelps are largest sea plants are free floating as in Sargassum.
- The plant body has three parts:
 1. Fixing structures called a holdfast.
 2. The stalk like structure called a stipe.
 3. The leaf like structure is called a frond.
- Food is stored in as laminarin & mannitol, which are complex carbohydrates.
- Cell wall is made up of cellulose & it remains covered by a gelatinous coating called algin on the outer part.
- vegetative reproduction occurs by the process of fragmentation.

Q. No. 2. Describe the main features of Pteridophytes?

- Pteridophytes are used for medicinal purpose and as Soil binder.
- They are the first terrestrial plants to possess vascular tissue xylem - phloem.
- They have leaf like appendages that extends that Sporangia of the plants. These appendages are called Sporophylls.
- In some cases sporophylls may form distinct compact structures called Strobili or cones.
- The Sporangia produce spores by meiosis in Spore mother cells.
- The spores germinate to give rise to inconspicuous small but multicellular, free living, mostly photosynthetic thalloid gametes called prothallus.
- These gametophytes require cool, damp, shady places to grow.
- The gametophyte bear male & Female sex organs called antheridia & archegonia.
- Fusion of male gamete with the egg present in the archegonium result in the formation of zygote.
- In majority of the pteridophytes all the spores are similar kinds such plants are called homosporous.
- Genera like Selaginella; & Salvinia which produce two kinds of spores, macro. & micro spores are known as heterosporous.
- The megaspores & microspores germinate & give rise to female & male gametophytes respectively.
- The Pteridophytes are further classified into four classes.
- Psilopsida, Lycopsidea, Sphenopsida, Pteropsida.

Q.3 Describe the important characteristics of gymnosperm

- They have branched stem & unbranched.
- Their roots are generally tapping roots & in some genera have mycorrhiza, a form of fungal association.
- The leaves in gymnosperms are well-adapted to withstand extremes of temperature, humidity & wind.
- The gymnosperms are heterosporous they produce haploid microspores & megaspores.
- The strobili bearing microsporophylls & microsporangia are called microsporangiate or male strobili.
- The microspores develop into a male gametophytic generation which is highly reduced & is confined to only a limited no. of cells. The reduced gametophyte is called pollen grain.
- The cones bearing megasporophylls with ovules or megasporangia are called macrosporangiate or female strobili.
- The male or ~~female~~ female cones or strobili may be borne on the same tree.
- The megaspore mother cell is differentiated from one of the cell of the nucleus.
- The nucellus is protected by envelopes & the composite structure is called an ovule.
- The ovules are borne on megasporophylls which may be clustered to form the female cones.
- The multicellular female gametophyte is also retained within megasporangium.

- Asexual reproduction occurs by biflagellated zoospores which are pear in shape with two flagella attached laterally.
- Sexual reproduction occurs by the process of fusion of gametes it include.
 1. Isogamy
 2. Anisogamy
 3. oogamy.

§ Rhodophyceae (Red Algae) :-

- They are mostly marine & rarely freshwater
- The members of Rhodophyceae are commonly called red algae because of the predominance of the red pigment, r-phycocerythrin in their body.
- The red Thalli of most of the red algae are multicellular. Some of them are complex body organisation.
- The food is stored as floridean starch which is very similar to amylopectin & glycogen in structure.
- The red algae usually reproduce vegetatively by fragmentation
- They reproduce asexually by non motile spores.
- Sexually by non-motile gametes.
- eg. Gracilaria & Gelidium.

Differentiate betⁿ Gymnosperms & Pteridophyte. male gametophytes :-

Gymnosperms	pteridophyte
A distinct male gametophyte is always present.	A distinct male gametophyte is male absent.
Antheridium is not present	Antheridium is present.
Male gametes may or may not be flagellated.	Male gametes are flagellated
Male gametes reach the female gamete through Pollen tube.	Female gamete by flowing in water.

Female gametophytes :-

Gymnosperms	Pteridophyte
A distinct gametophyte is always present.	A distinct gametophyte may or may not be present.
Female gametophyte does not leave the parent plant.	It is independent of the parent plant.
Enclosed inside an ovule	Not enclosed inside the ovule.

Q.5. Explain the life cycle of an angiosperm!

→ The angiosperms are an exceptionally large group of plants occurring in wide range of habitats.

- They are divided into two classes dicotyledons & monocotyledons.

- The dicotyledons are characterised by seeds having two cotyledons, reticulate venations in leaves & tetramerous or pentamerous flowers i.e. having four or five members in each floral whorls.

- Reproductive organs are developed in flowers.

- The male sex organ present in a flower are called stamens or androecium.

- Each stamen consist of a slender filament with an anther at the tip.

- It has filament. Anthers on meiosis produce pollen grain. pollen grains have two male gametes.

→ The female reproductive part in the flower is called the pistil or gynoecium. It has stigma, style & ovary.

- Inside the ovary ovules are present. in which the female gametophyte develops by meiosis.

7 cells & 8 nuclei are present in the embryo sac. They are,

- one egg cell
- two synergids
- three antipodal
- one central cell having two polar nuclei.

- The pollen grain is carried by various agent like wind, water, birds, insects etc. & reaches the stigma.

• pollen grain produce a pollen tube that contains two male gametes & enters into embryo sac.

- one of the male gametes fuses with the egg cell to form a Zygote.
- The other male gametes fuses with the diploid Secondary nucleus to produce the triploid primary endosperm nucleus (PEN)
- Because of occurrence of two fusion i.e. Syngamy + triple fusion, this event is termed as a double fertilization.
- The endosperm is triploid.
- The zygote develops into an embryo & PEN develops into endosperm, which provide nourishment to the embryo.
- ovules get to develop into seeds whereas ovaries into fruits.

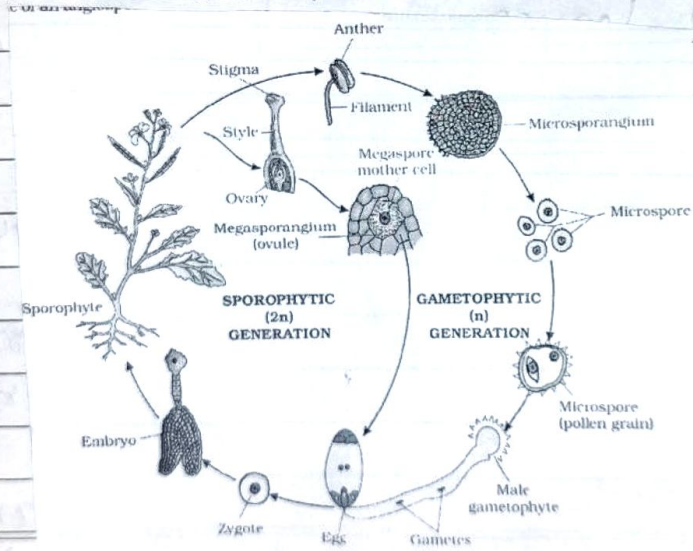


Figure 3.6 Life cycle of an angiosperm

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Differentiate betⁿ monocot & Dicots ?

Monocot

- 1] Plants having one cotyledons in seeds are monocots.
- 2] monocot leaves have parallel venation.
- 3] Stomata are present on both the upper & lower epidermis of leaves.
- 4] monocot tends to have fibrous root system.
- 5] vascular bundles are scattered in stem.
- 6] The Secondary growth doesn't occur in monocot

Dicot

- 1] plants which have two cotyledons in seeds are dicots.
- 2] Dicot leaves have reticulate venation.
- 3] Less Stomata are present more on the lower surface of leaves.
- 4] Dicots have tap root system.
- 5] vascular bundle are present in ring in stem.
- 6] secondary growth occurs in dicots.