

FYBSC Paper I Semester I

Plant Life And Utilization I

Chapter –II- Algae

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- Algae
- Introduction
- General Characters
- Classification Of Algae
- **Introduction:**
- The term algae (latin - seaweeds) was first introduced by Linnaeus in 1753.
- Algae comprise of a large heterogeneous assemblage of plants which are diverse in habitat, size, organization, physiology, biochemistry, and reproduction.
- It is an important group of thallophyta (gr. Thallos - a sprout; phyton - a plant), the primitive and simplest division of the plant kingdom.

- The orderly systemic study of algae is called phycology (gr. Phycos- seaweeds; logos study or discourse).
- The algae are chlorophyll-containing primitive plants, both prokaryotic and eukaryotic, with a wide range of thalli ranging from unicellular to multicellular organisations.
- They are typically autotrophic organisms having thalloid plant bodies like bryophytes

- The definitions of algae as given by some phycologists are
- **Fritsch F.E.** (1935) defined algae as the holophytic organisms (as well as their numerous colourless derivatives) that fail to reach the higher level of differentiation, characteristic of the archegoniate plants.
- **Smith G. M.** (1955) defined algae as simple plants with an autotrophic mode of nutrition.
- **Chapman V. J.** (1962) defined algae (seaweeds of the seashore and green scum in stagnant fresh water, ponds and pools) as among the simplest in the plant kingdom.
- **Singh R.N.** (1974) defined that the algae are simple plants which display a spectrum of photosynthetic pigments and evolve oxygen during the process

- **General characters:**
- Algae have chlorophyll-bearing, autotrophic, thalloid plant Body.
- Algae are of two types prokaryotic (bluegreen algae) and eukaryotic.
- Prokaryotic algae do not show sexual reproduction, they reproduce only by vegetative and asexual means.
- Vegetative reproduction occurs by means of fragmentation fission, formation of hormogonia, intercalary heterocyst, by separating discs, etc.
- Asexual reproduction also occurs by means of spore formation e.g. Zoospores, aplanospores, autospores etc.
- Eukaryotic algae reproduce by asexual, sexual and vegetative methods.
- Thallus shows little differentiation in tissues.

- Almost all algae are aquatic.
- The plant body may range from being unicellular to large robust multicellular structure.
- The multicellular complex thalli lack vascular tissue.
- The sex organs are generally unicellular but, when multicellular, all cells are fertile and, in most cases, the entire structure does not have any protection jacket.
- There is no embryo formation after gametic union.
- The zygote undergoes further development either by mitosis or meiosis, but not through embryo formation.
- Both the generations when represented in life cycle are independent.

Classification Of algae According To Bold And Wynne 1978

H. C. Bold and M. J. Wayne (1978) classified the algae into nine divisions. They followed the papenfuss (1946) idea of using the word phyco before phyta in the classification.

The outline of the classification system is given below:

Division: Cyanochloronta (Blue green algae 3 orders)

- Dominant pigments are chlorophyll a, b, c phycocyanin and c phycoerythrin.
- The reserved food material is cyanophycean starch.
- Sexual reproduction is absent.
- Asexual reproduction by hormogonia, fragmentation and akinets.
- e.g. Nostoc, Anabaena, Gloeocapsa, Gloeotrichia.

Division: chlorophyta (green algae 15 orders)

- Dominant pigments are chlorophyll a and b, carotene and xanthophylls.
- The reserved food material is starch.
- Motile reproductive cells are bi or quadriflagellate, flagella are equal, whiplash type.

Division: charophyta (stoneworts)

- Commonly known as stoneworts or brittleworts
- The thallus is characterized by distinct nodes and internodes, with whorls of laterals borne at the nodes e.G. Chara

(4) Division: Euglenophycophyta (Euglenoids 3 Orders)

- Dominant Pigments Are Chlorophyll And ? Carotene.
- The Reserved Food Material Is Paramylum And Fats.
- Motile Reproductive Cells Are Uni, Bi Or Triflagellate, Flagella Anterior. E.G. Euglena, Colacium.

(5) Division: Phaeophycophyta (brown algae 13 orders)

- Dominant pigment is fucoxanthin.
- The reserved food material is laminarin and mannitol.
- Cell wall is cellulosic with fusinic and alginic acid.
- Motile reproductive cells are pyriform with two laterally inserted flagella one of which is tinsel.
- Sexual reproduction is isogamous, anisogamous or oogamous.
- e.g. Dictyota, Ectocarpus.

(6) **Division: Chrysophycophyta** (Golden and yellow green algae including diatoms 4 classes and 14 order)

Dominant pigments are carotene and xanthophylls.

The reserved food material is leucosin and oil. The cell wall is usually composed of two halves.

Sexual reproduction isogamous, anisogamous

E.G. Pinnularia, cyclotella.

(7) **division: pyrrhophycophyta** (dinoflagellates 6 classes)

Dominant pigments are chlorophyll a, xanthophylls.

The reserved food material is starch/ oil.

The cell wall is cellulosic.

Sexual Reproduction Is Rarely Absent.

E.G. Exuviaella. Class: Chrysophyceae

Class: Prymnesiophyceae Class: Xanthophyceae

Class: Eustigmatophyceae

Class: Chloromonadophyceae

Class Bacillariophyceae

- (8) **Division: Rhodophycophyta** (red algae 2 subclasses and 9 orders)
- Dominant pigment is r-phycoerythrin.
- The reserved food material is floridean starch.
- Sexual reproduction is oogamous.
- Motile reproductive cells are not found.
- Subclass- bangiophycidae e.G. Erythrocladia
- Subclass- florideophycidae e.G. Kappaphycus

(9) **Division: Cryptophycophyta** (cryptomonads) - chlorophyll a and c and carotene

- Food reserve is starch
- Cell wall absent
- Two anterior flagella of unequal length
- E.G. Cryptomonas, chromonas, chilomonas.



Thank You...