

# **CLASSIFICATION OF ALGAE**

By F. E. Fritsch

Algae are simple autotrophic plants showing following **diagnostic characters-**

- Thalloid plant body.
- Autotrophic mode of nutrition with few exceptions.
- No vascular tissue.
- Sex organs, whether unicellular or multicellular, are without a layer of jacket.
- Zygote never develops into an embryo.
- Life cycles of various types.

The primary classification of algae is based on certain morphological and physiological features

. These are...

- Pigment composition
- Chemical nature of reserve food
- Kind, no., point of insertion and relative length of flagella
- Presence or absence of a definite nucleus

Many algologists gave classification of algae but most authentic and comprehensive classification was proposed by F. E. Fritsch (1935) who published his voluminous work in the form of a book entitled “**Structure and Reproduction of Algae**” in two volumes. He classified algae into **11 classes**. These are---

- 1..Chlorophyceae (green algae)
- 2..Xanthophyceae (Yellow-green algae)
- 3..Chrysophyceae

- 4.. Bacillariophyceae (Diatoms)
- 5.. Cryptophyceae
- 6.. Dinophyceae (Dinoflagellates)
- 7.. Chloromonadineae
- 8.. Euglenophyceae
- 9.. Phaeophyceae (Brown algae)
10. Rhodophyceae ( Red algae)
11. Myxophyceae (blue green algae)

# 1..Chlorophyceae –

- Fresh water, marine and terrestrial
- unicellular motile forms, colonial, nonmotile thalli as well as filamentous thallus.
  - Dominant pigment chl a and b along with carotenoids
- Reserve food starch but oil in perennating structures.
  - Motile cells with equal flagella of same length
  - Sexual rep iso to oogamous.
  - Meiosis usually zygotic
  - Life cycle usually haplontic.

## 2..Xanthophyceae-

- Freshwater or terrestrial
- Dominant pigments chl a and e and  $\beta$ -carotene and a special xanthophyll
- Reserve food oil and leucosin
- Motile cells with unequal flag. of diff types
- Sex rep predominantly iso rarely oogamous
- L.C. haplontic with zygotic meiosis

### 3..Chrysophyceae-

- Mostly freshwater sometimes marine .
- Chl a and c and an excess of phycochrysin (yellow orange) pigments

Reserve food oil and leucosin

- Sex rep rare, when present isogamous
- Motile cells have 1 or2 flagella of equal or rarely unequal length.

## 4..Bacillariophyceae –

- Freshwater as well as marine
- Cell wall silicaceous with two halves
- Chl a and c,  $\beta$ - carotene ,and xanthophylls ( lutein and fucoxathin) -
- Reserve food oil, chrysolaminarin and a prot. reserve food- volutin
- Motile stages with 1 or 2 tinsel flagella

- Meiosis gametogenic
- Sex rep isogamous with the formation of special spores- **auxospores**.
- Life cycle monogenic and diplontic

## 5..Cryptophyceae –

- Found in cold and subsurface of freshwater as well as marine habitat

- Pigment chl a,c,  $\beta$  - carotene, xanthophyll, phycocyanin and phycoerythrin but these are different from those of cyanophyceae
- Reserve food starch ,pyrenoid present
- Mostly motile with unequal flagella
- Sexual reproduction isogamous..

## 6..Dinophyceae-

-Freshwater as well as marine and unicellular, motile biflagellate forms.

-Pigments chlorophyll a and c,  $\beta$ -carotene, phycoerythrin, red peridinin

-Reserve food starch and fat.

-Sexual rep rare, when present isogamous.

## 7..Chloromonadineae-

- Simple freshwater forms
- Bright green due to an excess of chlorophylls and xanthophylls. -
- Reserve food fat
- Rep by longitudinal div

## 8.. Euglenineae-

- Found in freshwater as well saline habitat
- Unicellular motile forms with one or two flagella
- Cell wall absent , pellicle present.
- Pigments chl a and b
- Rep by fission.

## 9..Phaeophyceae –

- Mostly marine.

Simplest thallus organization is heterotrichous filamantous thallus. Higher forms are large bulky parenchymatous thalli which may attain a length of several meters.

- Chromatophores have chl a and c,  $\beta$ -carotene, fucoxanthin.

- Reserve food laminarin and mannitol

-

- Motile rep structures with two laterally inserted flag. of unequal length and type

- Sexual rep. -- isogamy to oogamy .
- L.C. **digenic** with isomorphic or heteromorphic alternation of generations.

or **monogenic(diplontic)** eg members of order fucales

## . 10..Rhodophyceae –

- Majority are marine with a few exceptions.
- Pigments are chl a, d,  $\beta$ - carotene, r-Phycocyanin and r-phycoerythrin.
- Reserve food is floridean starch.
- Presence of pit connections common.  
Motile stages completely absent in the life cycle and the male gamete is known as spermatium.

- Sexual rep oogamous, female sex organ – **carpogonium** and male sex organ **spermatangium**. The zygote never released from carpogonium.
- Formation of a fruiting body – the **carposporophyte**, as a result of post-fertilisation changes.
  - Meiosis sporogenic and zygotic
- L.C. trigenic.

## -11..Myxophyceae –

- Freshwater, terrestrial , epiphytic, endophytic and symbiotic.
- Main pigments chl a,  $\beta$ -carotene, xanthophylls, c-phycoerythrin and c-phycoerythrin, allophycoerythrin.
- Reserve food glycogen, cyanophycean starch, metachromatin granules .
- Conventional sexual rep absent.