

History of Algal Classification

Classification Proposed by F.E. FRITSCH (1935, 1945)

- ❖ Algae is equivalent to a division.
- ❖ Should be divided only into classes.

1. Class **Conjugatae** of Pascher's – to be treated only an order **Conjugales** of Chlorophyceae.
2. **Charophyta** (Pascher) and Charophyceae (Smith) to be treated as an order **Charales**.
3. Does not recognize **Desmokyontae** (Pascher)
4. Criticized inclusion of **Xanthophyceae, Bacillariophyceae and Chrysophyceae** under one single division Chrysophyta (Smith).
No clear similarity between Bacillariophyceae and other two classes:
 - (a) Bacillariophyceae are all **diploid** whereas other two are haploid.
 - (b) **Cell-wall** constituent of diatoms differ from other two.
 - (c) **Mode of reproduction**.
 - (d) **Pigments** as well as **products of assimilation** are different.
5. **Euglenophyta** are placed in two separate classes – **Euglenineae and Chloromonadineae**.

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Chlorophyceae

Xanthophyceae

Chrysophyceae

Bacillariophyceae

Cryptophyceae

Dinophyceae

Chloromonadineae

Euglenophyceae

Phaeophyceae

Rhodophyceae

Myxophyceae

Classification Proposed by F.E. FRITSCH (1935, 1945)

Chlorophyceae

Orders:

- 1. Volvocales**
- 2. Chlorococcales**
- 3. Ulotricales**
- 4. Cladophorales**
- 5. Chaetophorales**
- 6. Oedogoniales**
- 7. Conjugales**
- 8. Siphonales**
- 9. Charales**

Classification Proposed by F.E. FRITSCH (1935, 1945)

Xanthophyceae

Orders:

- 1. Heterochloridales**
- 2. Heterococcales**
- 3. Heterotricales**
- 4. Heterosiphonales**

Classification Proposed by F.E. FRITSCH (1935, 1945)

Chrysophyceae

Orders:

1. Chrysomonadales
2. Chrysosphaerales
3. Chrysotrichales

History of Algal Classification

Classification Proposed by F.E. FRITSCH (1935, 1945)

Bacillariophyceae

Orders:

1. Centrales
2. Pennales

Classification Proposed by F.E. FRITSCH (1935, 1945)

Cryptophyceae

Orders:

- 1. Cryptomonadales**
- 2. Cryptococcales**

Classification Proposed by F.E. FRITSCH (1935, 1945)

Dinophyceae

Orders:

1. Desmomonadales
2. Thecatales
3. Dinophysiales
4. Dinococcales
5. Dinotrichales
6. Dinoflagellata

Classification Proposed by F.E. FRITSCH (1935, 1945)

Chloromonadineae

Orders:

No orders, since it is a very small class of a few highly specialized, unicellular and flagellate algae.

History of Algal Classification

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Euglenophyceae

Orders:

Small class of a very few families.

Classification Proposed by F.E. FRITSCH (1935, 1945)

Phaeophyceae

Orders:

- 1. Ectocarpales**
- 2. Tilopteridales**
- 3. Cutleriales**
- 4. Sporochneales**
- 5. Desmarestiales**
- 6. Laminariales**
- 7. Sphacelariales**
- 8. Dictyotales**

Classification Proposed by F.E. FRITSCH (1935, 1945)

Rhodophyceae

Orders:

- 1. Bangiales**
- 2. Nemalionales**
- 3. Gelidiales**
- 4. Cryptonemiales**
- 5. Gigantiales**
- 6. Rhodymeniales**
- 7. Ceramiales**

Classification Proposed by F.E. FRITSCH (1935, 1945)

Cyanophyceae

Orders:

- 1. Chroococcales**
- 2. Chamaesiphonales**
- 3. Pleurocapsales**
- 4. Nostocales**
- 5. Stigonematales**

Classification of Algae

F.E. Fritch divides algae into 11 classes:

1. Chlorophyceae

425 genera and 6500 species

Grass green in colour with 4 pigments in same proportion as that of higher plants.

Storage food is starch and oil.

Pyrenoids present.

Cell wall cellulolytic.

Motile cells with 2 or 4 flagella.

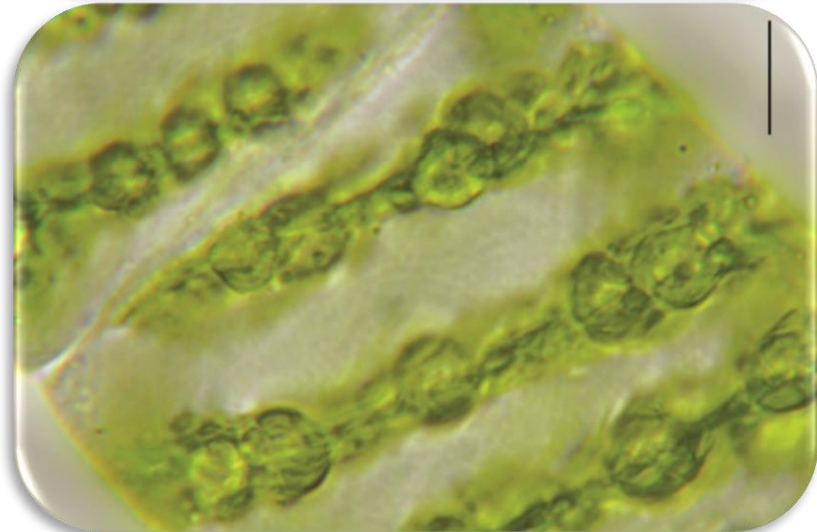
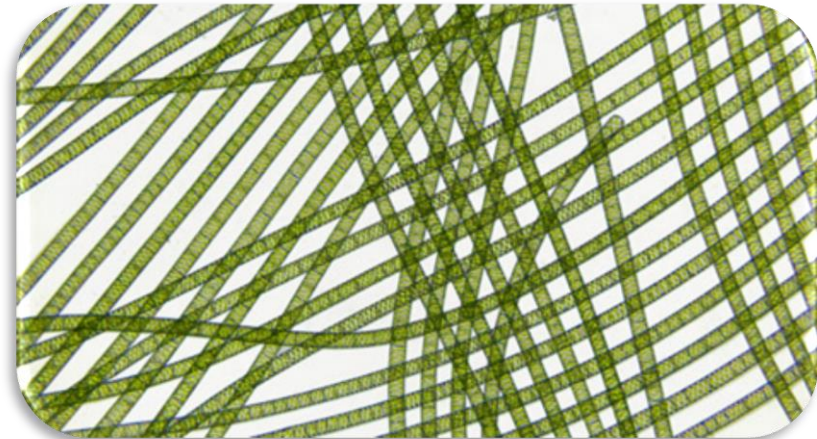
Chromatophores one to few.

Sexual reproduction varies from isogamy to oogamy.

Thallus range unicellular to siphonous and heterotrichous.

Except siphonales, zygote represents the diploid phase.

Mainly distributed in fresh waters with a tendency for terrestrial habitat.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

2. Xanthophyceae

75 genera and 675 species.

Chromatophores yellow green due to excess xanthophyll.

Starch and pyrenoids absent.

Oil is the storage product.

Cell wall rich in pectic substances.

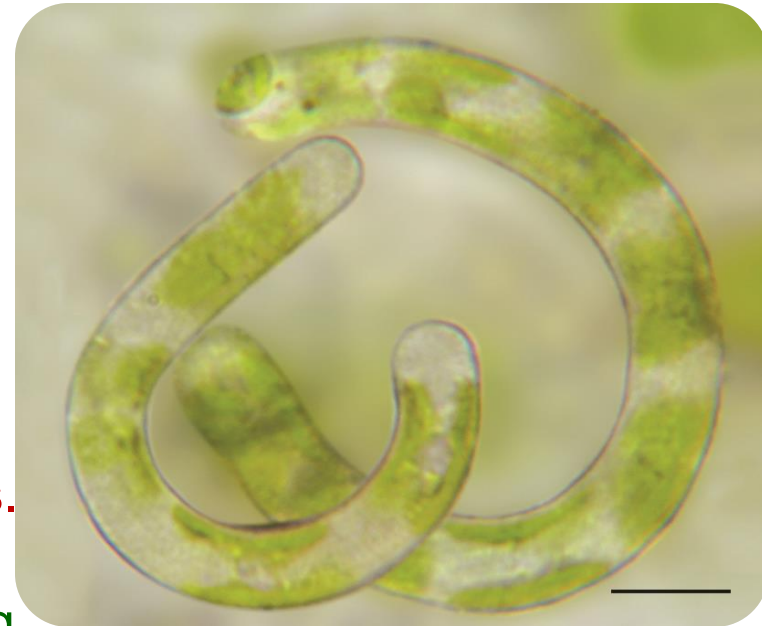
Motile cells are with two unequal flagella.

Cells are with number of discoid chromatophores.

Sexual reproduction rare, if present isogamous.

Thallus represents simple haploid filaments.

Mainly distributed in fresh water and the resting stage with silicified membrane.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

3. Chrysophyceae

300 genera and 6000 species.

Brown orange coloured chromatophores with one or many accessory pigments (phycochrysin).

Starch absent; pyrenoid like bodies are present.

Fat and leucosin the stored food.

Large proportions of members are flagellate and devoid of special cell membrane.

Endogenous spherical silicified cysts may be present.

Motile cells with one or two unequal flagella.

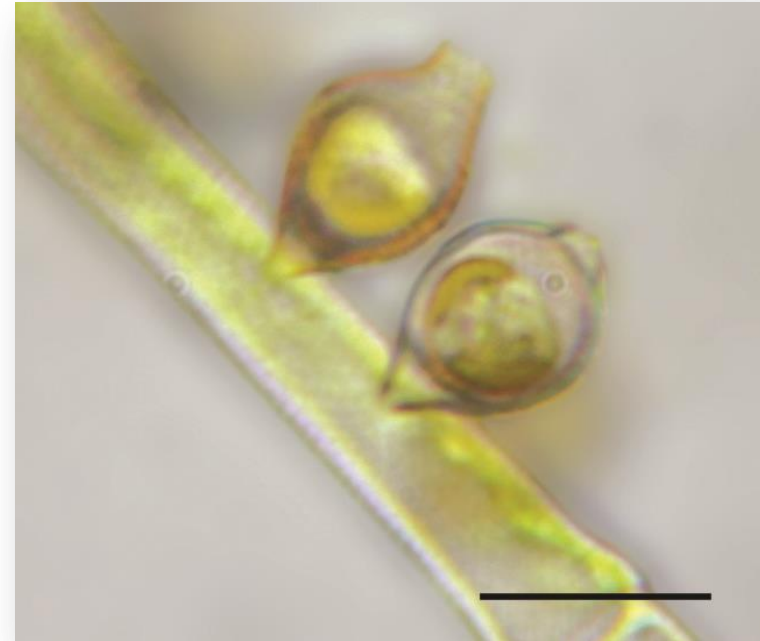
Chromatophores 1-2 parietal.

Filaments may be branched.

Sexual reproduction rare, isogamous.

Mainly distributed in colder fresh waters, few marine.

Mode of nutrition holozoic.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

4. Bacillariophyceae

16000 species under 200 genera.

Chromatophors golden brown due to the presence of diatomin.

Products of photosynthesis volutin and fat.

Unicellular or colonial and diploids.

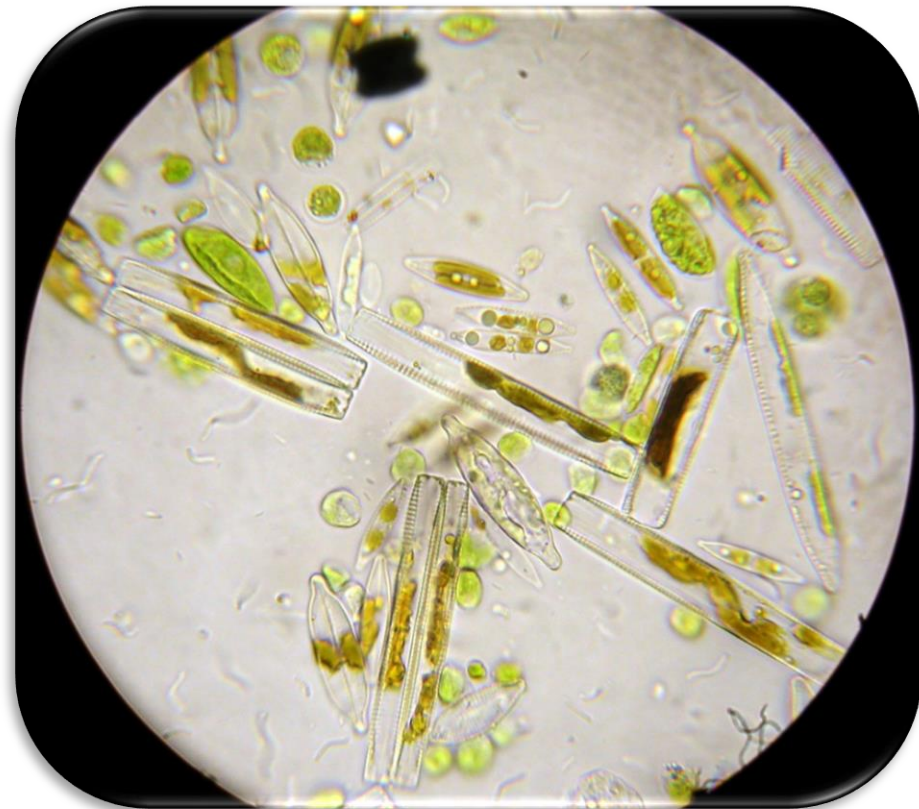
Cell wall made up of pectin and silica.

Divided in to two groups, centrales and pennales.

Centrales with radial symmetry.

Pennales with bilateral symmetry.

Present in all water bodies.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

5. Cryptophyceae

Two large parietal chromatophores.

Pyrenoid like bodies present.

Product of photosynthesis starch and akin.

Motile cells dorsiventral with unequal flagella.

Vacuolar system is complex.

Reproduction isogamous.

Fresh water and marine in distribution.

300 genera and 6000 species.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

6. Dinophyceae

Motile unicells composed of cellulose envelope, with numerous discoid chromatophores - dark, yellow or brown.

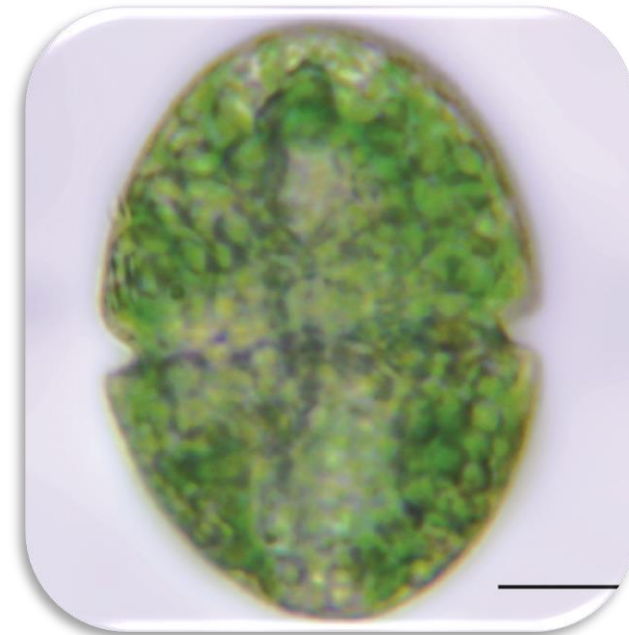
**Products of photosynthesis starch and oil.
Many are colourless saprophytes or with holozoic nutrition.**

Another group is parasitic.

Motile cells with two furrows -transverse with transverse flagellum encircling the body and longitudinal, directed backwards.

Mainly sea planktons.

225 genera and 2000 species.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

7. Chloromonadineae

Motile cells with two equal flagella

Recorded only in fresh waters.

Numerous chromatophores with bright green tint and excess xanthophyll.

Pyrenoids lacking.

Oil is the storage product.

Only 7 genera and few species.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

8. Euglenineae

Mono or biflagellate forms.

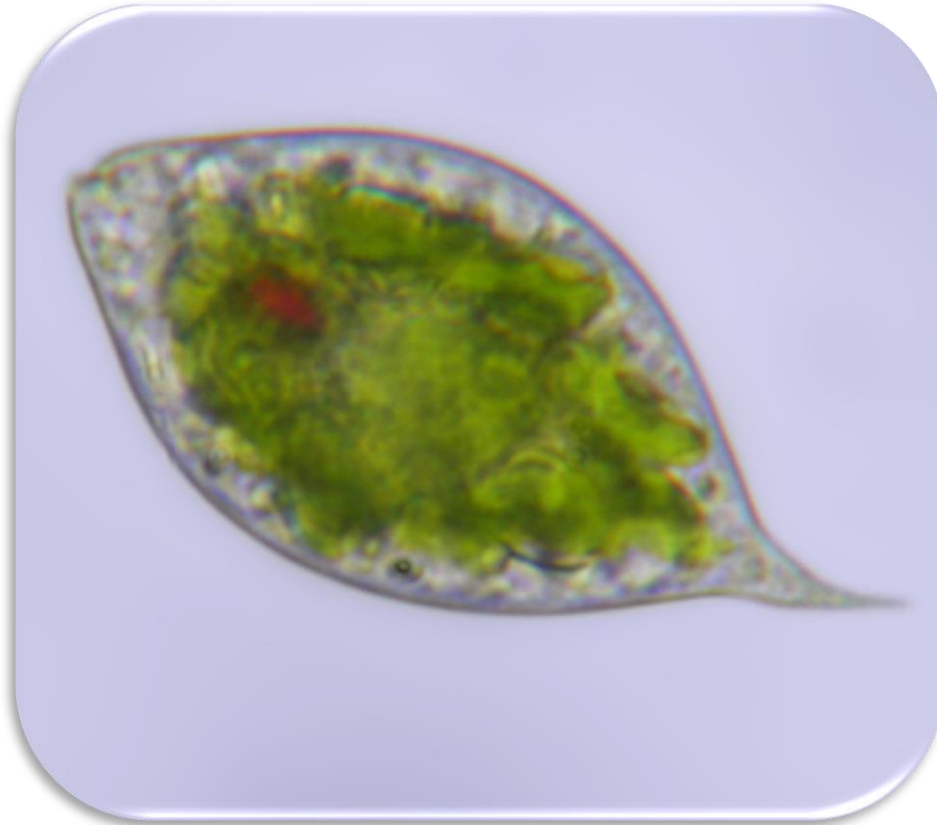
Seen mainly in fresh waters.

Isogamous reproduction.

Chromatophores pure green with several pyrenoids like bodies.

Photosynthetic product paramylons (polysaccharide) in distinctive shapes.

25 genera and 450 species.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

9. Phaeophyceae

250 genera and 1500 species.

Cells contain brown chromatophores containing yellow fucoxanthin and fucosan vesicles (for storing waste products).

Naked pyrenoid like bodies present.

Assimilatory products mannitol, laminarin and fat.

Sometimes thallus may be parenchymatous.

Reproduction ranges from isogamy to oogamy.

Alternation of generation present.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

10. Rhodophyceae

830 genera and 5250 species.

Members are heterotrichous with pit connections.

Chromatophores contain phycocyanin and phycoerythrin.

Pyrenoid like bodies is present.

Storage food is floridean starch.

No motile stage or flagellate members present.

Reproduction is oogamous.

Alternation of generation present.



Classification of Algae

F.E. Fritch divides algae into 11 classes:

11. Myxophyceae

150 genera and 2500 species.

Nucleus is rudimentary.

Chloroplasts absent

Chlorophyll, carotene, phycocyanin
and phycoerythrin present.

Storage products sugars & glycogen.

Vacuoles very common.

No motile cells and sex.

Thallus with true or false branching.

Mainly fresh water and terrestrial.



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

Unicellular Motile



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

Unicellular Non-motile



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

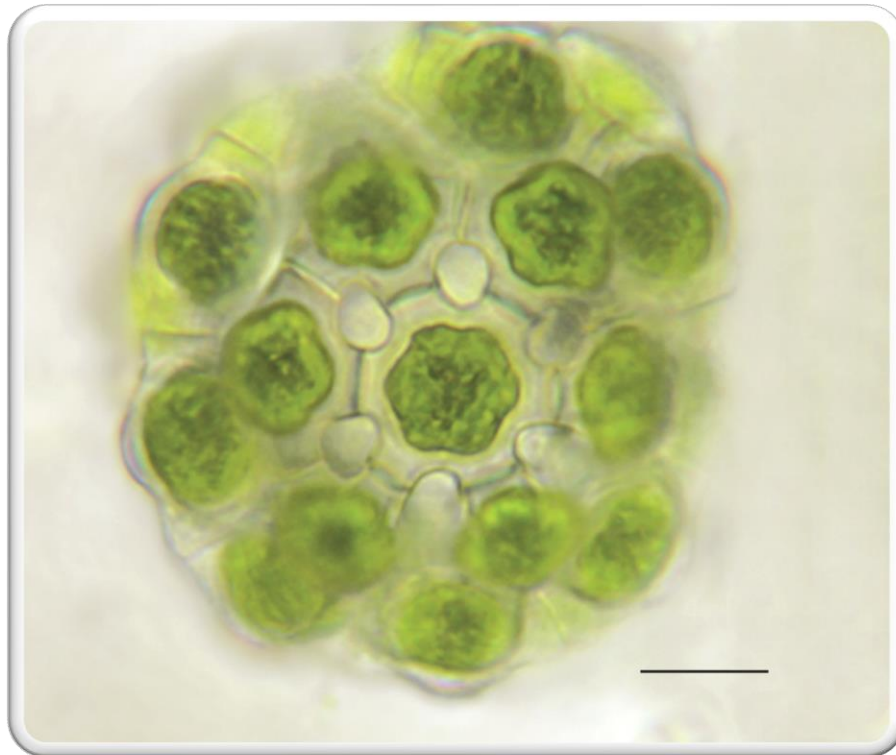
Motile Colony



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

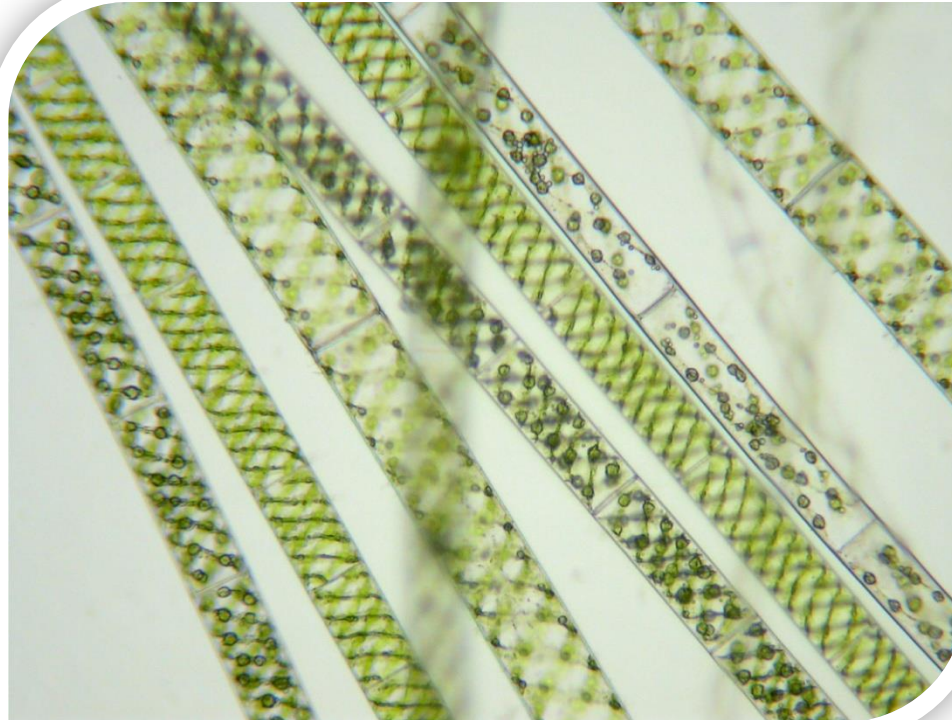
Non-motile Colony



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

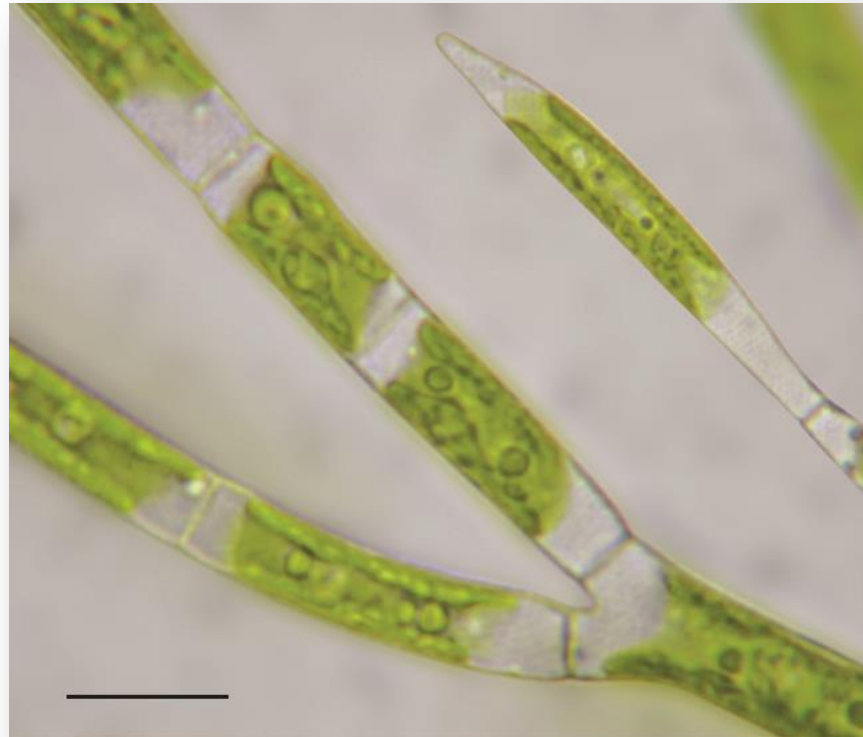
Filamentous Unbranched



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

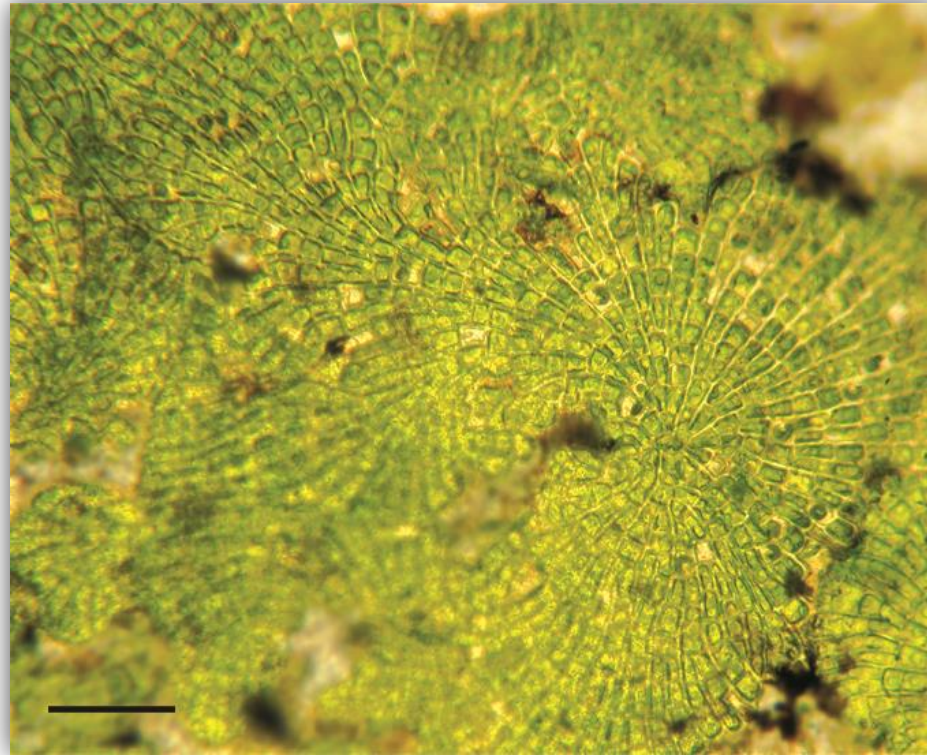
Filamentous Branched



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

Heterotrychous



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

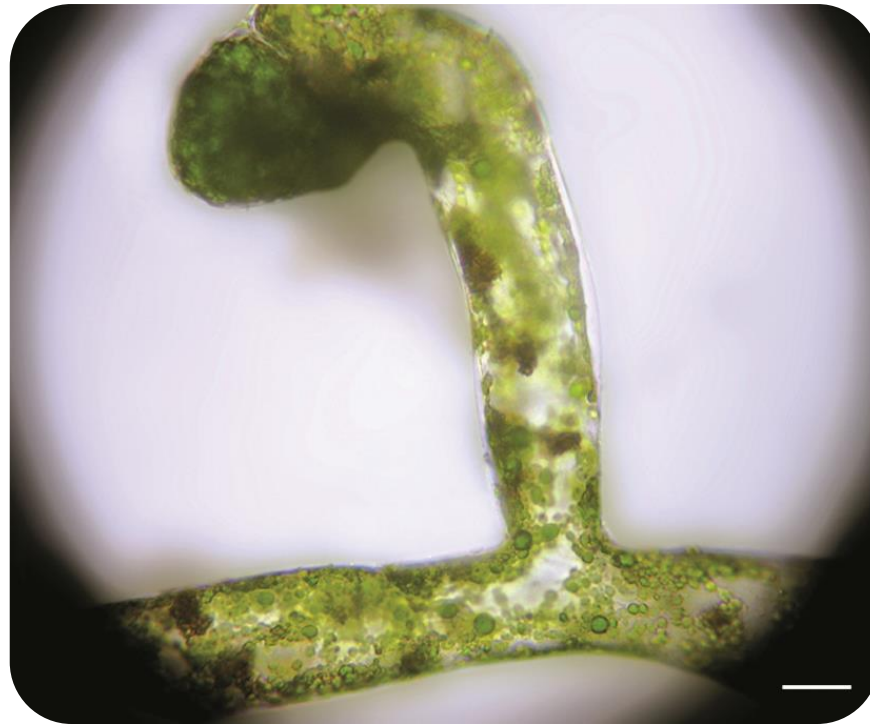
Parenchymatous



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

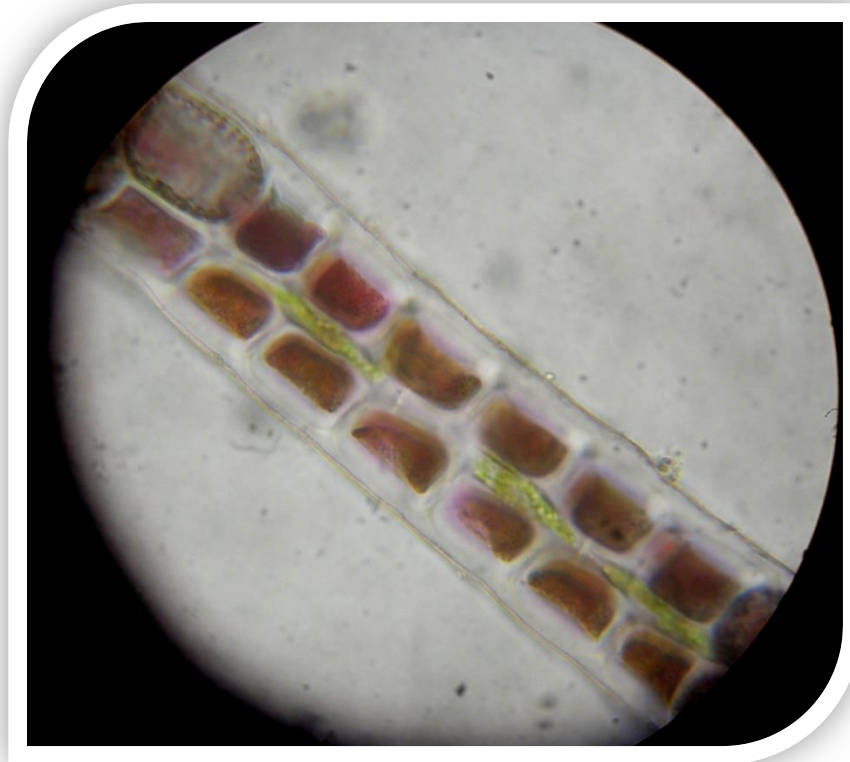
Simple Siphonous



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

Polysiphonous



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

**Stem like, Leaf
like**



Thallus Organization in Algae

Only group of plants with Unicellular forms to giant Kelps

**Attached,
Corticated
thallus**



Habitat of Algae

Benthophytes

Attached forms eg :- *Chara*, *Nitella*, *Cladophora* etc.

Cladophora

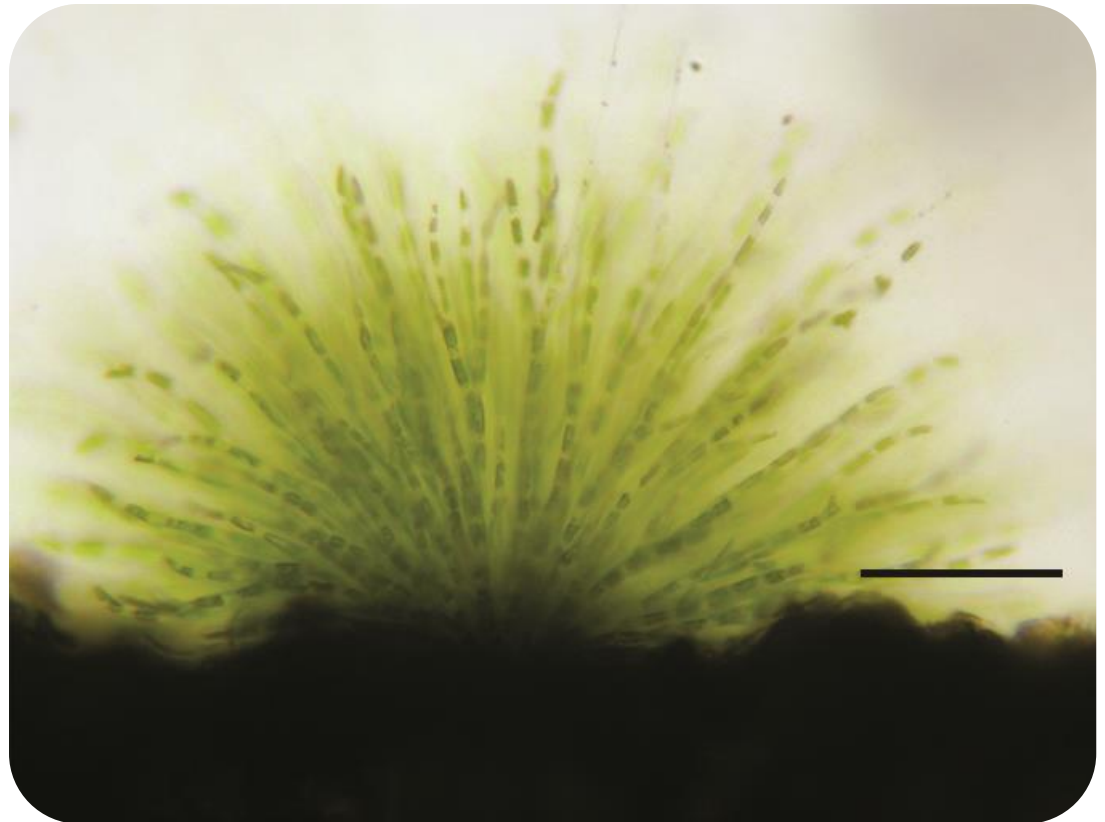


Habitat of Algae

Epactiphytes

Attached to sea shores, lakes and Ponds. eg :- *Oedogonicem*, *Chaetophora* etc.

Chaetophora



Habitat of Algae

Thermophytes

These are organisms living at 70°C and above. 53 genera and 153 species have already identified in this group. Some members of Oscillatoriaceae is reported from 85°C.

Oscillatoria

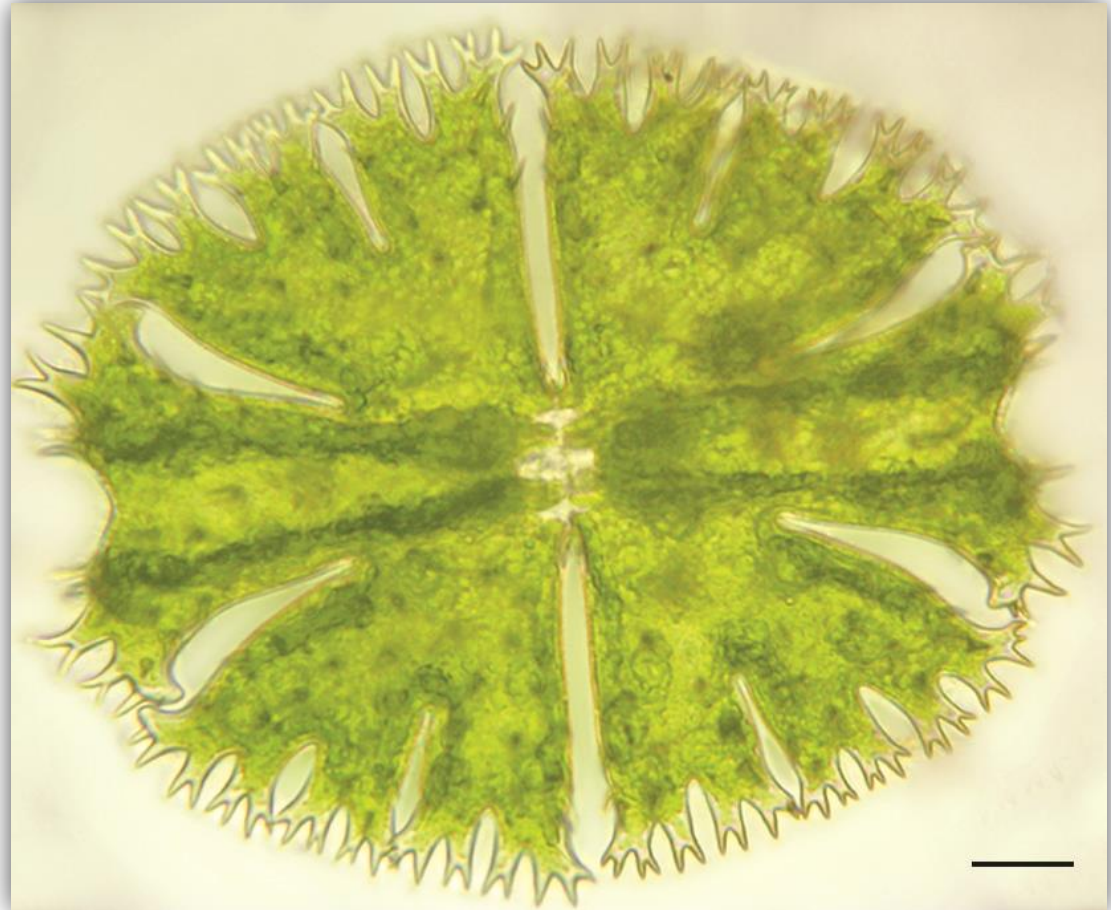


Habitat of Algae

Euplanktophytes

Floating forms through out their life time. eg :- Diatoms, Desmids.

Desmids

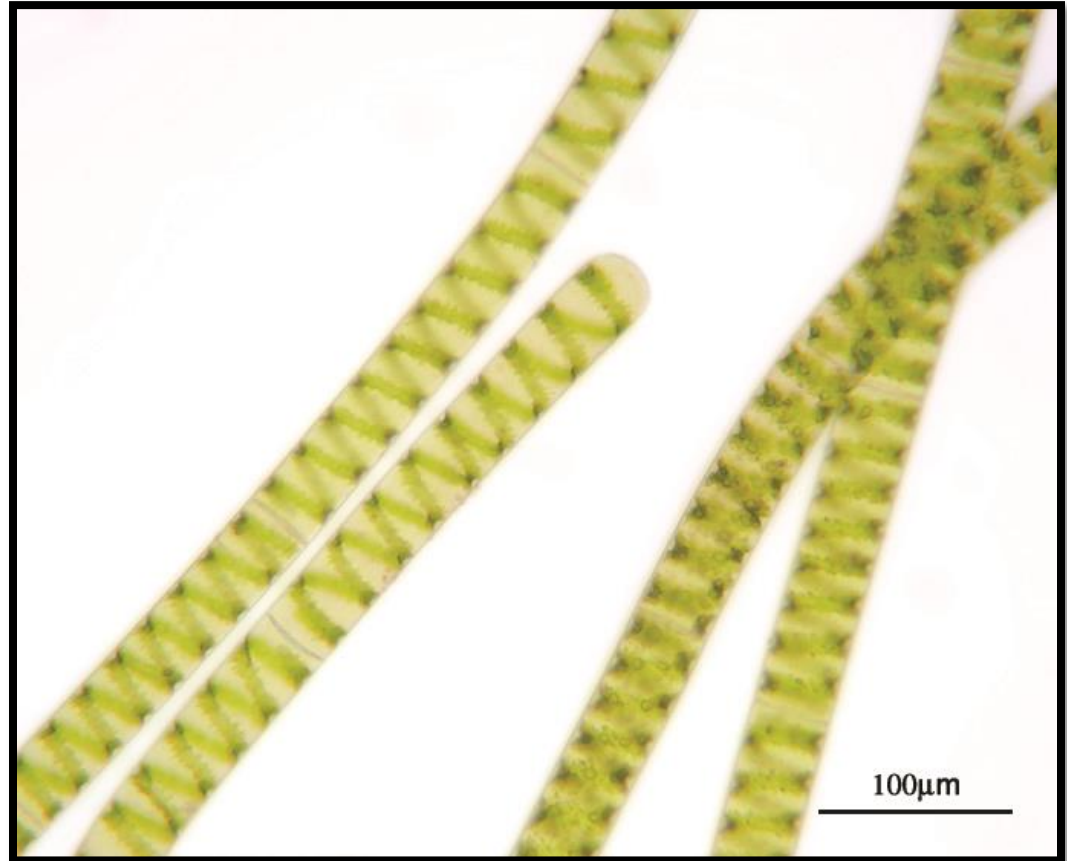


Habitat of Algae

Tychoplanktophytes

In the beginning they are attached later on detached. eg :- *Spirogyra*, *Zygnema*, *Cladophora*

Spirogyra



Habitat of Algae

Halophytes

Forms seen in salt water ex :-*Enteromorpha*

Enteromorpha



Habitat of Algae

Epiphytes

Forms attached to the plants. eg :- *Trentepohlia*

Trentepohlia



Habitat of Algae

Epizooophytes

Attached to the bodies of land animals. Eg : Chaetophorales on the hairs of Sloth.

**Chaetophorales on
hairs of sloth**

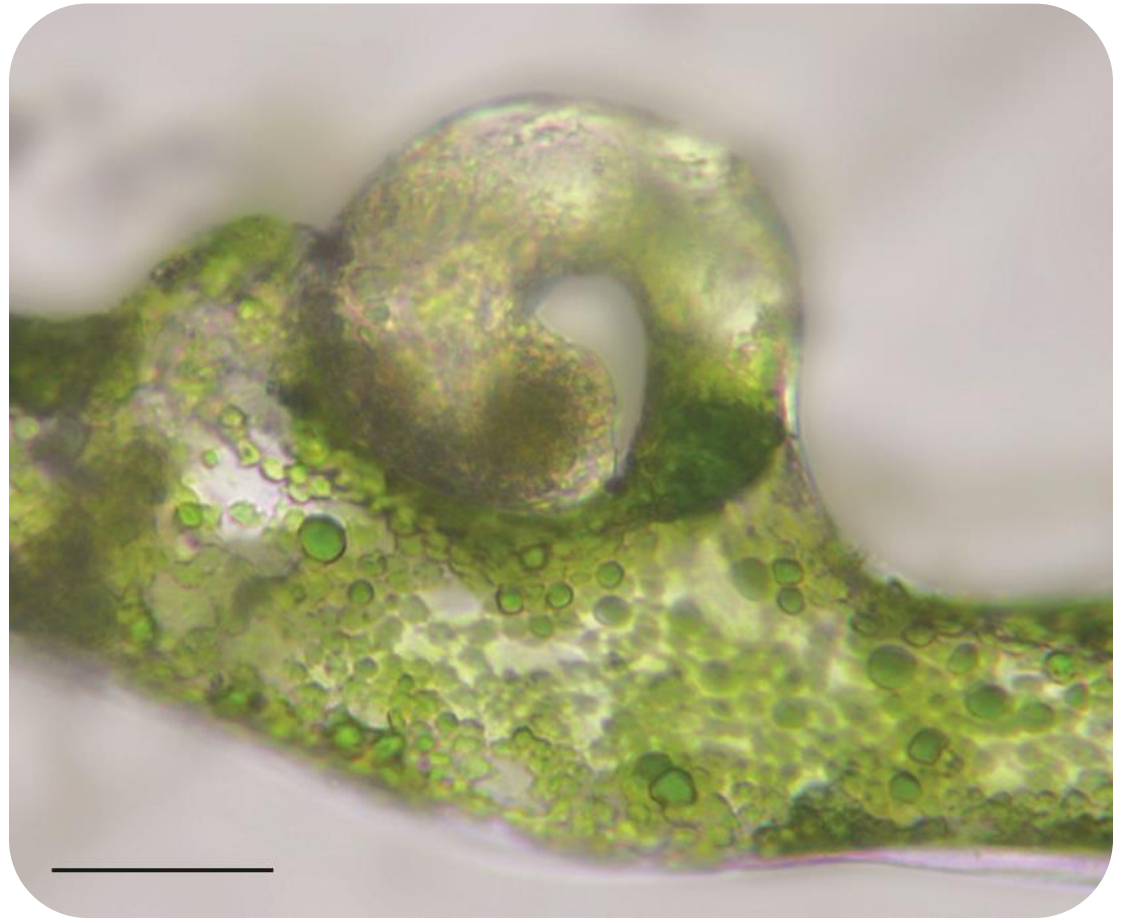


Habitat of Algae

Lithophytes

Seen on rocks & Walls. Eg:- *Vaucheria*, *Nostoc*

Vaucheria



Habitat of Algae

Cryptophytes

Seen on ice and snow. eg:- *Chlamydomonas*, *Ankistrodesmus*, etc

Ankistrodesmus

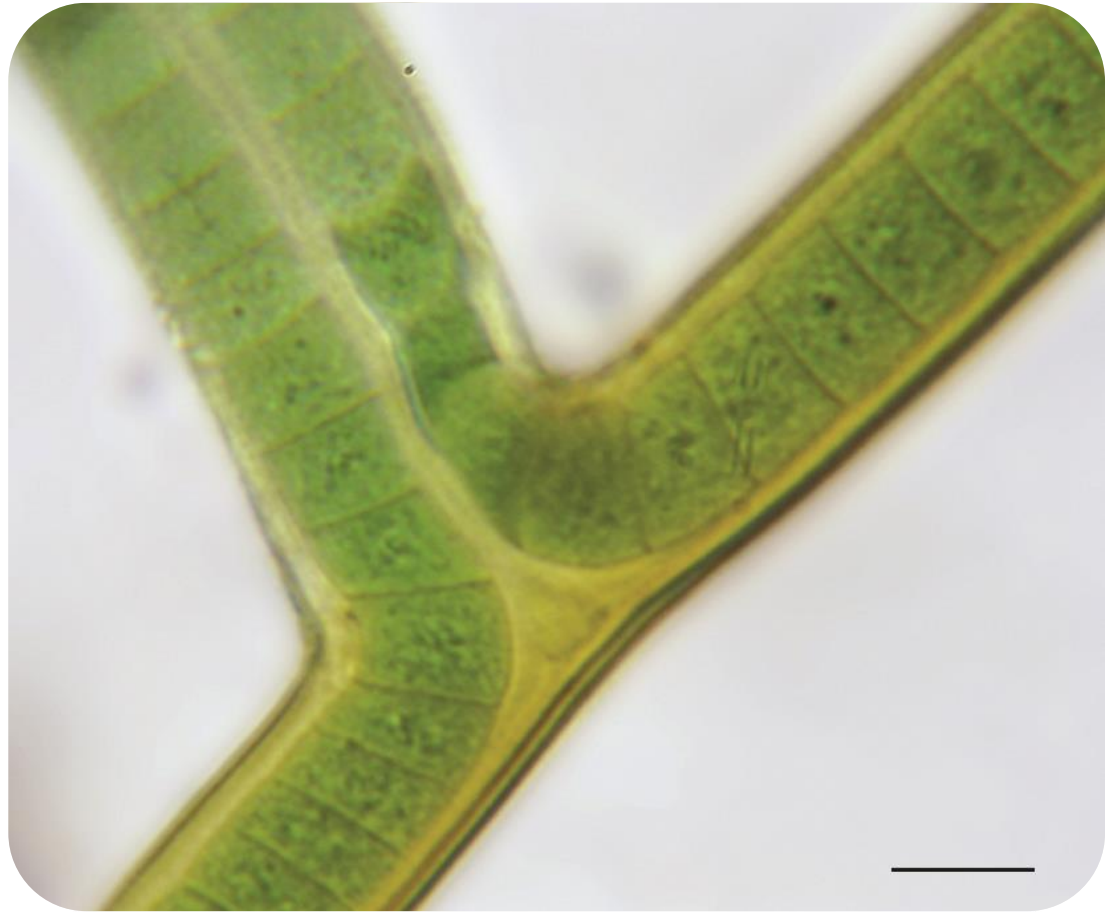


Habitat of Algae

Epiphloephytes

Attached to the bark of the trees. eg:- *Phormidium*, *Scytonema* etc.

Scytonema

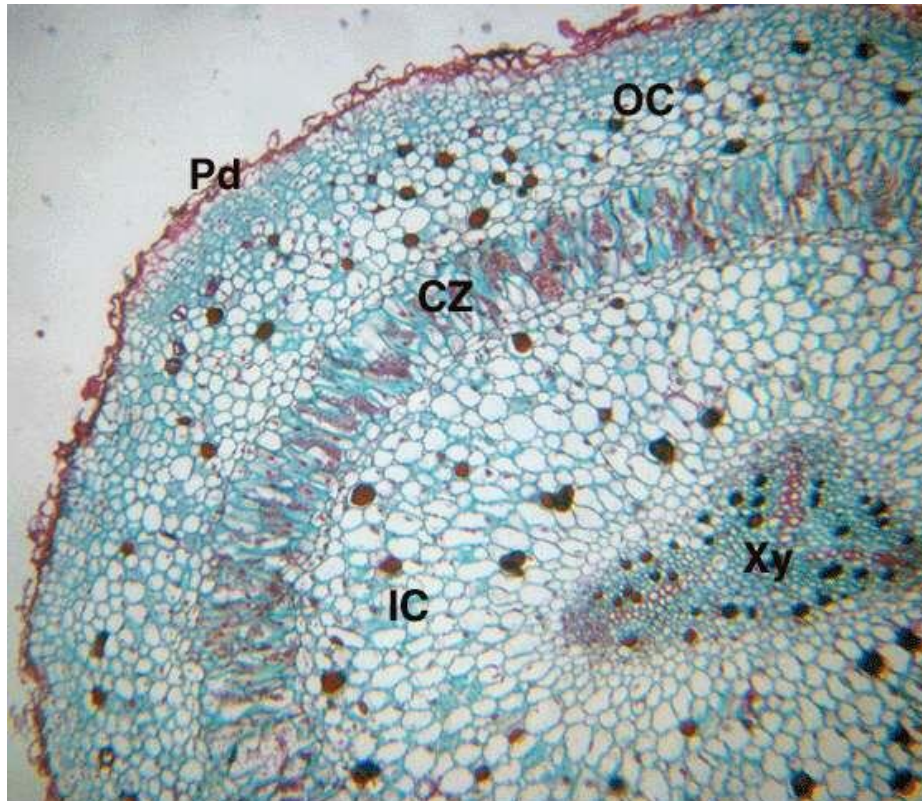


Habitat of Algae

Endophytes

Seen inside living plants. Ex :-*Nostoc*, *Anabaena* etc.
Seen inside the coralloid roots of cycads.

Nostoc



Habitat of Algae

Endozoic

Found inside the animal body. eg:- *Zoochlorella* inside the body of *Hydra*.

Zoochlorella

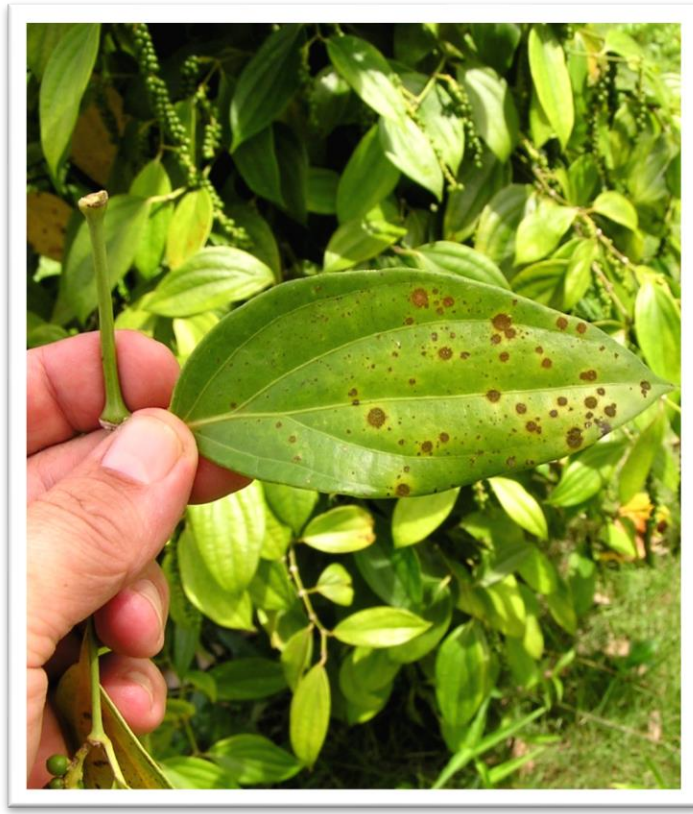
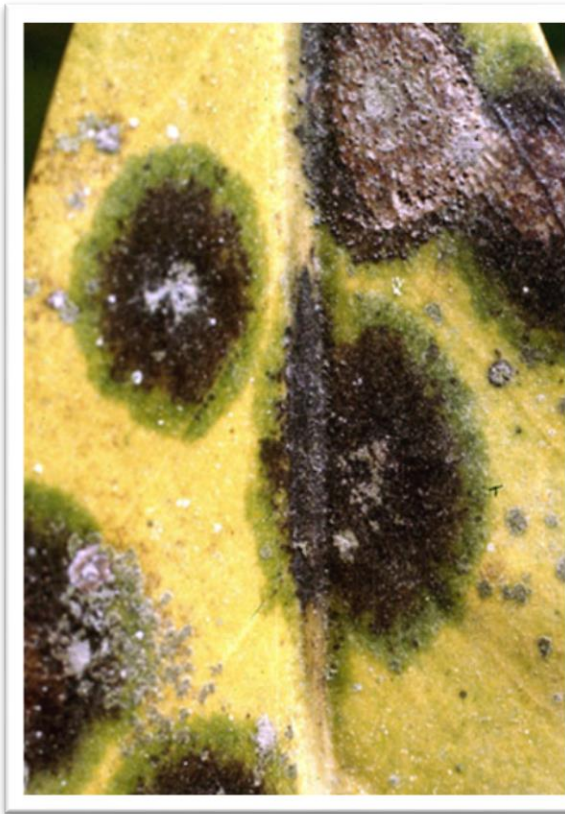


Habitat of Algae

Parasitic

Cephaleuros cause red rust of Tea and Pepper.

Cephaleuros



Habitat of Algae: Endozoic

A short movie on
Zoochlorella inside
Hydra viridis