Ecology of Algae

For 3rd year students

Faculty of Science

Definition of algae

- Group of simple, plant-like organisms.
- Photosynthetic
- Thallophytes
- Algae lack the roots, leaves, and other structures typical of true plants.
- Form the foundation of most aquatic food webs.
- Vary greatly in size and grow in different habitat.
- Tolerate a wide range of temperature.

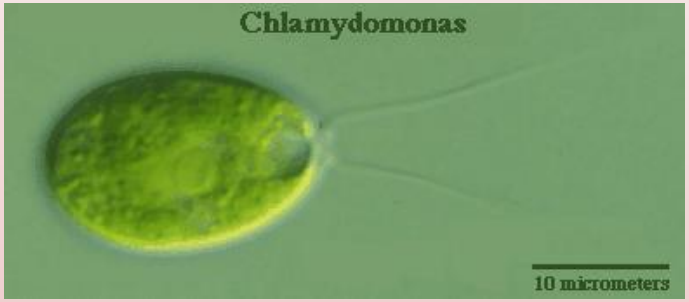
Habit and Habitat

- **Habit:** free swimming, free floating or attached.
- **Habitat:**

1. **Aquatic algae**
2. **Terrestrial algae**
3. **Aerophytes**
4. **Cryophytes**
5. **Thermophytes**
6. **Algae of unusual habitats**

1. Aquatic algae

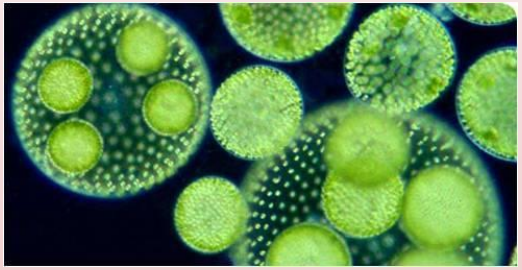
- Freshwater algae
- Marine algae



- Microscopic algae.
- Macroscopic algae (sea weeds).

1. Aquatic algae

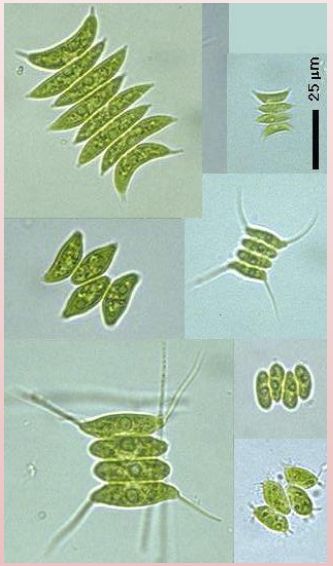
- **Stagnant water**:*Chlamydomonas, Volvox, Hydrodictyon.*



- **Slow running water**: *Cladophora, Oedogonium, Ulothrix* and *Vaucheria.*

- **Free floating & free swimming (phytoplankton)**
- **Attached (benthic algae)**

1. Aquatic algae



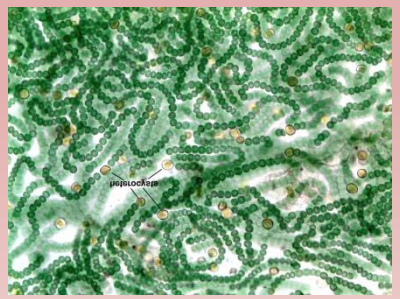
❖ Planktons:

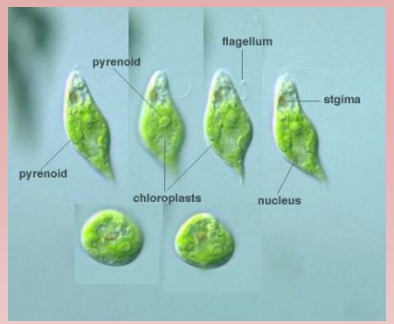
- **Euplanktons: free floating from beginning and are never attached: *Microcystis, Chlamydomonas, Scenedesmus* and *Cosmarium*.**
- **Tychoplanktons: in the biginning may be attached but later they get detached and become free floating: *Zygnema, Oedogonium, Cladophora, Cylindrospermum* and *Rivularia*.**

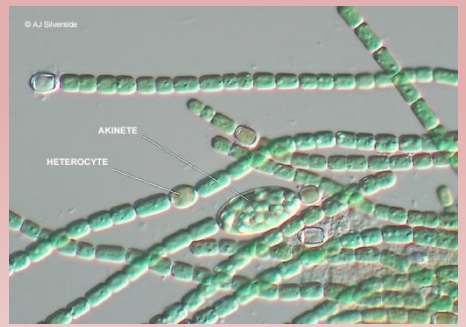
2. Terrestrial algae

Algae found on or beneath the moist soil surface.

- **Sapophytes: occuring on the surface of soil**
  e.g. *Vaucheria, Botrydium, Fritschiella* and *Oedocladium*.
- **Cryptophytes: having subterranean habit**
  e.g. *Nostoc, Anabeana* and *Euglena*.







Factors affecting the soil algae

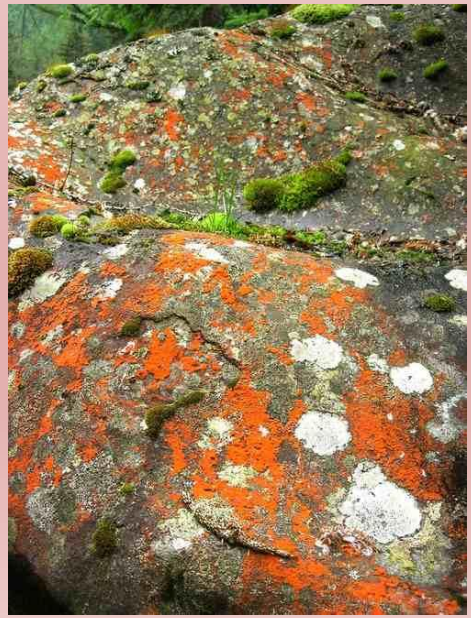
❖ **Factors associated with the growth and diversity of soil algae:**

1. **Moisture:** required to complete the life cycle
2. **Temperature:** blue-green algae (60-90 ^{0}C)
   Diatoms can survive very low temperatures
3. **Light:** algae can withstand bright sunlight but their growth is maximum in less bright light.
4. **pH:** Green algae (wide range of pH),
   Blue-green algae (neutral or alkaline pH),
   Blue-green and diatoms do not prefer acidic soils.
5. **Salinity:**
6. **Soil texture:**
7. **Chemical composition:**

   which decide the type and growth of algal flora.

3. Aerophytes

- ➢ Adapted for aerial mode of life.
- ❖ Found on the trunks, moist walls, flower pots and rocks.
- ❑ Get their water and carbon dioxide requirements from atmosphere.
- ✓ *e.g. Phormidium, Scytonema & Hapalosiphon* grow on bark of trees.



4. Cryophytes

- **Found on the mountain peaks covered with snow.**
- **Impart attractive colours to the mountains.**
- ***Haematococcus nivalis*** **gives red colour to Arctic and Alp regions.**
- ***Chlamydomonas yellowstonensis*** **with some species of** ***Ankistrodesmus*** **is responsible for the green colour of the snow of the mountain of Eurobean countries in Arctic region.**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4. Cryophytes

1) Algae found on snow and not on ice e.g. *Raphidone* & *Chlamydomonas*.
2) Algae can grow only on ice and result in "ice bloom" e.g. *Ancyclone* & *Mesotaenium*.
3) Algae can grow on snow and ice both e.g. *Cylmdrocys*.
4) Algae are not true cryophytes and have their temporary growth on ice or snow e.g. *Phormidium* & *Gleocapsa*.

5. Thermophytes

- **Algal genera occurring in hot springs at quit high temperature.**
- **Certain algae tolerate the temperature up to 85°C.**

e.g. few genera belonging to family Chroococcaceae and Oscillatoriaceae, *Oscillatoria brevis*, *Synechococcus elongatus* and *Haplosiphon lignosum* can survive up to a temperature of 70°C.

6. Algae of unusual habitats

a) Halophytic algae

Algae found in saline water containing high percentage of salts.

- **e.g. *Dunaliella*, *Stephanoptera* and *Chlamydomonas chrenbergii*.**

b) Lithophytic algae

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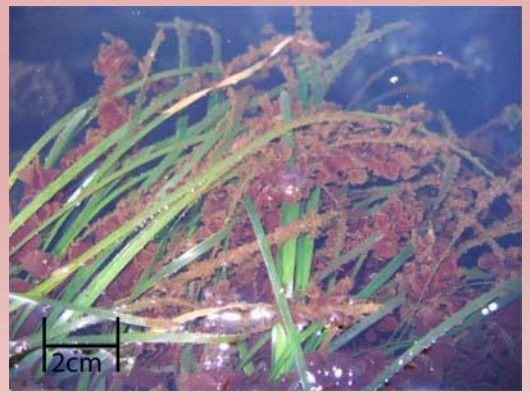
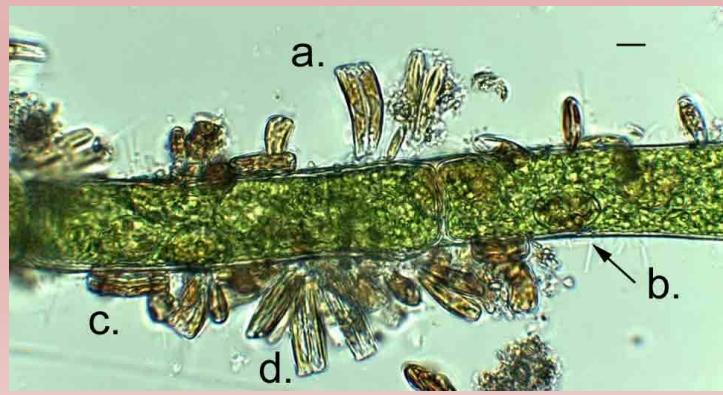
- Members of Cyanophyceae grow on moist rocks, wet and other rocky surfaces.
- Blue green algae *Rivularia* and *Gleocapsa* occur on exposed rocks, whereas *Nostoc* is found growing in damp shady habitats.
- Several marine belonging to Rhodophyceae and Phaeophyceae grow on submerged rocks and rocky surface e.g. *Ectocarpus*, *Polysiphonia*.

c) Epiphytic algae

Algal forms grow on other aquatic plants.

- ✓ **Green algae *Chaetonema* found growing on *Batrachospermum*.**
- ✓ ***Rivularia* are observed to grow on Angiospermic plant.**





d) Epizoic algae

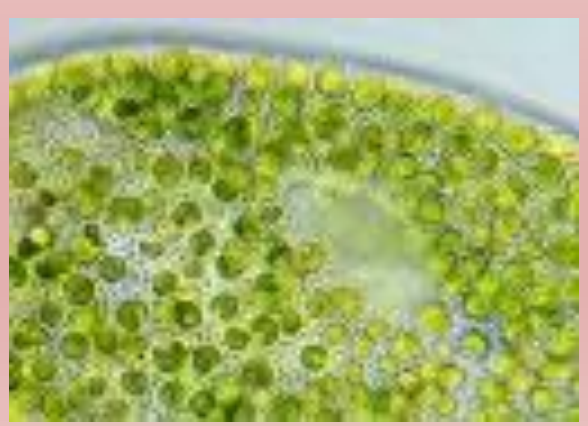
Many algae grow on the shells of molluscs, turtles and fins of fish.

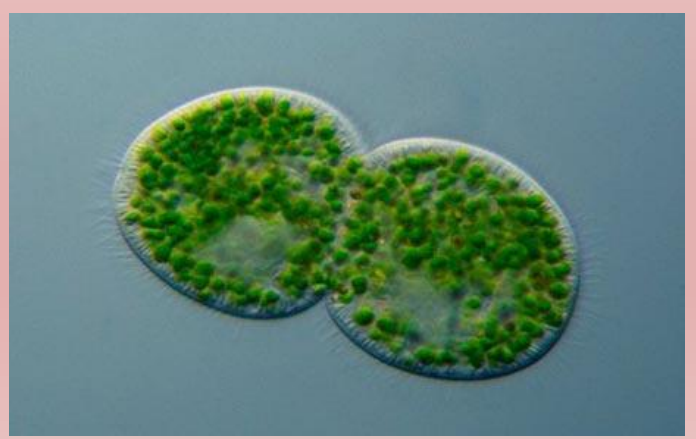
- ***Cladophora*** **is found on snails and shells of bivalves.**

e) Endozoic algae

algae are found inside the aquatic animals

- **e.g. *Zoochlorella* is found inside *Hydra viridis* While *Zooxanthe* known to occur inside the fresh water sponges.**





f) Parasitic algae

- ***Cephaleuros virescens*** **which causes "red rust of tea" causes heavy damage to tea foliage.**
- ***Polysiphonia festigata*** **a member of Rhodophyceae is reported as <u>semiparasite</u> on *Ascophyllum nodosum*.**

g) Symbiotic algae

Several members of **Cyanophyceae** grow in association with other plants.

- **Lichen** exhibit good example of it.
- e.g. ***Nostoc*** **(Anthoceros),** ***Anabaena cycadeae*** **(Cycas),** ***Anabaena azollae*** **(Azolla).**

- ***Chlorella*** with nitrogen fixing bacterium ***Azotobacter chrooccocum,*** and with certain species of ***Ceratophyllum*** and **mosses.**

nitrogen

micro-environment