# Genus : Oscillatoria

## Systematic position

Class : Cyanophyceae
Order : Nostocales
Family : Oscillatoriaceae

## Occurence :

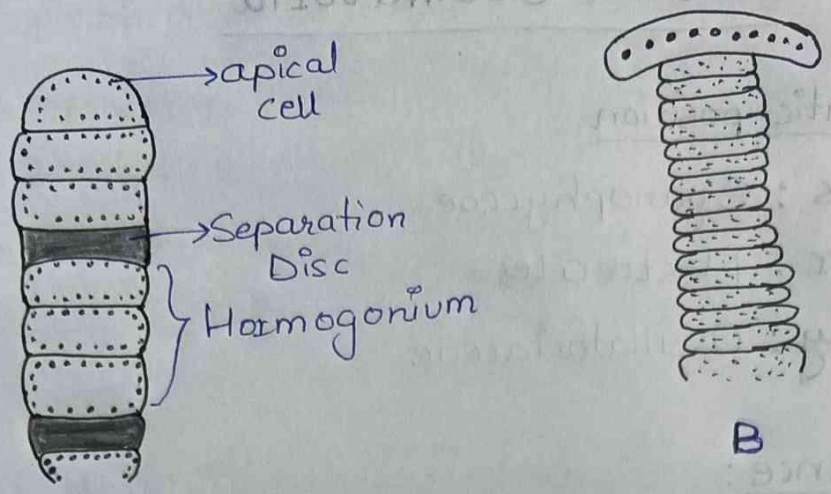
i) Oscillatoria is found in a wide variety of fresh water and sub-aerial habitats.

ii) The algae forms extensive sheets along the muddy bank of rivers and ponds, rocky ~~cliff~~ cliff and on damp soil.

iii) It is also found at the bottom of pond, hot water springs and deep water lakes.

## Thallus Structure

- Oscilatoria is an unbranched filamentous algae.
- The filaments occurs singly or together form a thin or thick sheets.
- Each Trichome is made up of many cells arranged in a uniseriate fashion.
- The trichome is slightly different at anterior end and shows a defenite polarity.
- There are no. constrictions between adjacent cells.
- The apical cell of the filament carries a thickened membrane known as **Calyptra**.
- The trichome are naked or are enveloped in a thin gelatinious sheath.




Filaments showing different types of apices

A: O. annae B: O. Princeps

## Cell structure:

→ All cells of a trichome have similar structure.

→ The cells is ~~so~~ surrounded by thin and firm cell wall which lies external to plasmolemma.

→ The cell exhibit a typical prokaryotic structure.

→ The protoplasm is differentiated into the peripheral pigmented chromoplasm and the central centroplasm.

→ The chromoplasm consist of many thylakoid.

→ Photosynthetic pigments are found on the surface of thylakoid.

→ The amount of C-phycocyanin and C-phycoerythrin is very higher than any other pigment.

## Gaidukov Phenomenon

→ Gaidukov observe that species of oscillatoria develop different shades. When exposed to light of different wave length.

→ Oscillatoria gives green color in red light, Reddish-blue in green light and bluish green

in yellow light.

→ The color changing capacity is known as chromatic adaptation or Gaidukov phenomenon.

→ The advantage of this phenomenon is it enables the alga to maximally absorb the available light for photosynthesis.

→ The major pigment of oscillatoria is c-phycocyanin and c-phycoerythrin and chlorophyll-a.

## Growth

→ Oscilatoria exhibit intercallary growth

→ Cell division occurs by medium constrictions of the cell.

→ Usually the septum is not complete. It leaves a fine inter connection between two adjacent cells called Plasmodesmata.

## Movement

→ Oscillatoria exhibit spontanious movement which is affected by temperature, pH, viscosity and light intensity.

→ The following type of movement shown:
(i) Gliding movement or creeping movement.
(ii) Oscillatory Movement.

### (i) Gliding or Creeping movement

When the trichome exhibits rhythmic movements on any solid surface without help of any visible organ it is called gliding movement.

ii) Oscillatory movement

The trichome of Oscillatoria move to the left and right side of the axial just like the pendulum of clock wall. Because of the presence of such oscillatory movements, the genus is named Oscillatoria.

## Reproduction

→ Oscillatoria reproduce only vegetatively.

→ During vegetative growth of trichome some cells are filled with mucilage and become dead. These cells are called **necredia**. Such dead cells functions as a **separation discs** and provide weak link in the trichome.

→ Soon after separation into hormogonia, the terminal cell of the broken end becomes spherical, conical or tapered depends on species.

→ Each hormogonia have capability to develop into new trichome.

### By fragmentation

→ Some times the trichome divide into small fragment due to insect bite or mechanical injury.

→ Each fragment have capability to develop into new trichome.

# CHLOROPHYCEAE

## General characters of chlorophyceae

- The cell structure is eukaryotic
- The wall is made up of cellulose.
- The protoplast is bounded by thin and semipermeable membrane.
- Like other eukaryotes, it has mitochondria, golgi body, ribosome, E.R, membrane bounded plastids and other cell organelles.
- The main pigments are chlorophyll a & b, carotein and Xanthophyll [$C_{40}H_{56}$]
- The shape of the chloroplast shows much variation.

(i) Chlamydomonas → Cup shaped
(ii) Ulothrix → Girdle shaped
(iii) Oedogonium → Reticulate
(iv) Zygnema → Stellate and Star shaped
(v) Spirogyra → Spiral shape
(vi) Vaucheria & Chara → Discoid.

- The chloroplast contain pyrenoids.
- Most of the flagellate cells have a photosensitive red eye spot on stigma in the anterior portion.
- Reserve food is starch.
- They reproduce by vegetative, asexual and sexual method.

⇒ Vegetative reproduction: Cell division and fragmentation.

⇒ Asexual reproduction: Akinetes, zoospores and Aplanospores.

⇒ Sexual reproduction: It may be Isogamous, Anisogamous and Oogamous.