CYANOBACTERIA(BLUE GREEN ALGAE)

BSc I Botany Subs.

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- Blue-Green Algae are a type of photosynthetic bacteria consisting either of single cells or colonies which is also known as the Cyanobacteria. Cyanobacteria contain only one type of chlorophyll, Chlorophyll a, a green pigment. In addition, they also contain pigments such as carotenoids, phycobilin.
- These bacteria grow naturally in marine and freshwater systems. They thrive in dams, rivers, reservoirs, lakes and even in hot springs. These bacteria normally look green and sometimes turns blue when scum are dying. Almost all species of these bacteria are buoyant and float on the water surface and forms floating mats.
- The accumulation of these algae is termed as 'blooms'. These blooms discolour the water and produce unpleasant taste and odour. They affect the fish population and reduces water quality. The decomposition of these blooms deplete the oxygen and triggers the killing of fish.
- Examples of cyanobacteria: Nostoc, Oscillatoria, Spirulina, Microcystis, Anabaena.

Favourable Conditions for the Growth of Blue-Green Algae

- When nutrient levels specifically Phosphorus and Nitrogen are sufficiently available in the water.
- When the ratio of the concentration of nitrogen to phosphorus is low.
- When water is still and there is low turbulence.
- When the weather condition of the region is stable
- When there is warm weather (although these live in cooler conditions also)

How Do Blue Green Algae Grow?

- Blue-green algae produce their own food by the process of photosynthesis, which uses light, oxygen and nutrients. The sugars produced by the bacteria helps them in growth and cell division. The rate of cell division is more in warm water, which accounts for the reason why they are often seen in summer when the temperature of the water is more.
- For the optimum growth, blue-green algae require a temperature varying from 10-35 °C, good oxygen supply, high intensity of light and nutrients (mainly Phosphorous).

Uses of Blue-Green Algae

- Blue-green algae contain a small amount of vitamins (including C, E and folate), beta carotene and some minerals. They are a negligible source of nutrients unless you consume huge amounts of algae.
- Blue-green algae are used as a nutrient supplement and also helps in losing weight.
- It helps in boosting the immune system and controlling cholesterol levels.
- Some species of Blue-green algae naturally fertilise the fields and rice paddies and contributes majorly to the food supply. Anabaena converts inert atmospheric nitrogen into a usable form such a nitrate or ammonia. Anabaena coexists with a fern called Azolla which supplies nitrogen to the plant.
- Certain blue-green algae are processed for various food and medicinal products such as vitamins, drug compounds and growth factors. Spirulina is a popular, high protein food source.

Role of Blue-Green Algae in Paddy Fields

- Cyanobacteria are the major microbes which fix nitrogen in paddy fields. The agricultural importance of cyanobacteria in rice cultivation is because of their nitrogen-fixing ability and other positive effects on soil and plants.
- Nitrogen fixation is the process of converting inert atmospheric nitrogen into combined compounds like ammonia, nitrate, nitrite etc.
- The cyanobacterium Anabaena forms a nitrogen-fixing symbiosis with Azolla and fixes atmospheric nitrogen in the presence of significant quantities of oxygen.

Problems Caused by Blue-Green Algae

- Harmful to human health
- Affects the livestock
- Imparts unpleasant odour and taste to water
- Produces toxins which affect the aquatic organisms
- Deplete the oxygen content of water bodies
- Causes the killing of fish
- Incurs high water treatment costs

How to Reduce the Intensity of Blue-Green Algae

- It’s not easy to get rid off blue-green algae once they appear in water bodies. However, to some extent it can be reduced with the help of these following measures:
- By reducing the amount of nitrogen and phosphorus from the water helps in reducing the intensity of blue-green algae in the water. But it may take a long time to effectively remove these compounds from water. The reason for this is that there may be a large amount of these nutrients at the bottom of the water body, and they still serve as the food for the blue-green algae.
- By lowering the oxygen content.
- By reducing the light.
- By lowering the temperature.