**ALGAE**  **GENERAL CHARACTERS**

**INTRODUCTION** :-

1. It constitute an important part of thallophyta.

2. The plant lacks a differentiation of the body into root, stem and leaf.

3. They contain green pigments or chlorophyll. Although many of them are not green in colour

because of other pigments, which masks the green colour of the chlorophyll.

**HABIT AND HABITAT** :- 1. They are very simple and some are complicated in nature. 2. They are generally aquatic occurring in the sea, as well as in the fresh water and stagnant water of ponds and streams. 3. Some are terrestrial, found on damp and shaded sides of the trees, flower pots, wall of old houses, moist soil and on rocks. 4. They may be free floating or attached to the substratum by the lowermost cell or the holdfast. 5. They may be epiphytic (Oedogonium etc.) and some are endophytes, which lies embedded in the tissues of other plants. 6. Some live with other organisms in symbiosis (an association of two organism resulting mutual benefits). Eg :- Lichen and some algae, in which algae supplies the food while fungi furnish (supply) a certain amount of mechanical protection. 7. Some of the algae are saprophytes and few are parasites.

**SHAPE AND SIZE** :- 1. There is a great variation in the shape and size of thallus among the algae. 2. Some are unicellular and microscopic plants. Whereas some are multicellular and macroscopic. 3. The unicellular forms may be motile or non-motile. 4. In higher forms, some are colonial, while others are filamentous. 5. The filamentous form may be branched or unbranched.

**NUTRITION** :- 1. They are autotrophic. 2. So they are able to build up their own food by a process called photosynthesis.

**REPRODUCTION :**- 1. The method of reproduction varies in various algae. 2. The unicellular algae reproduce mainly by fission or cell division. 3. The both asexual and sexual reproduction are of common occurrence. 4. In multicellular algae, the same cell may behave as vegetative as well as reproductive cell. 5. The reproduction in algae generally takes place by two methods :- I. Asexual Reproduction II. Sexual Reproduction. **I. ASEXUAL REPRODUCTION** :- It takes place by a following methods.:- **1. Zoospore and Aplanospore** :- i. The zoospores are the protoplasmic bodies which have flagella or cilia and the aplanospores are non-flagellate. ii. They are produced in variable numbers from the contents of mother cells called zoosporangium and aplanosporangium respectively. iii. The zoospores may be uninucleate or multinucleate. The multinucleate zoospores are called synzoospores. iv. In favourable condition, the zoospores produce a new plant. v. The aplanospores are produced when there is a lack of sufficient water. **2. Akinetes or Hypnospores :-** i. In drier season, the contents of mother cell round off and become thicker. Such structures are called hypanospores. ii. On approach of favourable conditions they form a new plant. **3. Hormospores and Endospores** :- i. The hormospores are multicellular spores like structure delimit from the tip of trichome in some BGA. ii. They can produce new filaments on favourable conditions. iii. Endospores are gonidia or conidia produced in large number in a single cell. **4. Tetraspores, Carpospores or Monospores** :- i. They are the asexual spores produced in some genera. ii. They produce new plants like zoospores. **5. Palmella stage** :- i. On dry conditions, the mother cell becomes gelatinous having a colony of rounded cells. ii. These cells are embedded in a jelly like substance formed by the cell wall. iii. On favourable conditions, these cells comes out as zoospores or aplanospores to produce a new plant. **6. Cyst** :- i. These are thick walled spores formed at unfavourable conditions having sufficient food. ii. During their formation, the thallus becomes septate and each chamber contents forms a thick walled structure called cyst. **7. Auxospores/Statospore** :- i. These are the asexual spores produced in diatoms.

**II. SEXUAL REPRODUCTION** :- It takes place by the fusion of sexual cells or gametes. The gametes are produced by the cells called gametangia. The sexual reproduction takes place by following methods. **1. Isogamy** :- i. The fusing gametes are identical and motile. ii. Such identical gametes are called isogametes and the sexual process is called Isogamous reproduction or conjugation.

**2. Anisogamy** :- i. The fusing gametes are similar in appearance, motile but differs in size. ii. The smaller one is called microgamete and the larger one is called macrogamete. iii. This sexual process is called anisogamous reproduction. **3. Oogamy** :- i. The fusing gametes are different in size and behavior. ii. One is small and motile called male gamete, while the other one is large and non-motile called female gamete (egg/oospore). iii. This type of sexual process is called oogamous reproduction.

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**ECOLOGY AND DISTRIBUTION OF ALGAE** 1. Different species of algae may grow in different places. 2. The growth of algae depends mainly on the types and concentration of the accessory pigments. 3. Different accessory pigments need different quantity and intensity of light. 4. The change of light wavelength thus effects the distribution of algae. 5. Generally in darker places or in deep oceans, the pigment phycoerythrin & phycocyanobilin can absorb blue light more effectively than chl.a & carotene. 6. The chl.a & chl.b are found in shallow(not deep) water regions, middle littoral(region of shore of lake, sea, ocean) zone. 7. Whereas red algae are found in the lower littoral zone of the deep sea. 8. Substrate, topography, temperature, salinity, humidity, waves, wind and pollutants can also effect the growth and the distribution of the algae. 9. Some algae likes the strong waves, others the calm water, some can tolerate dry condition and some can survive in environmental changes(dry or wet). 10. The algal growth varies depending on the substrate. Such as coral reefs, stone blocks, shells and mud. 11. Most of the algae are annual. 12. Some algae develops in winter and spring. 13. Some can’t survive in strong sunlight or high temperature.

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**ECONOMICS IMPORTANCE OF ALGAE**  The algae constitute an important group of plants. The economic importance are of different types, which may be negative and positive.

**I. NEGATIVE IMPORTANCE** :- 1.Some of the algae which are present in ponds and lacks are deposited along the shore which have no importance but it has a nuisance(problem) value for layman(person working on natural science). 2. Some of the algae accumulates in a large quantity and makes the water discolour. It produces water bloom, which causes several infections to the bathers. 3. The decaying algae in the reservoirs are responsible for the foul odour (bad smell) and makes the water fishy taste. Such water are unfit for drinking purpose and these water may cause damage to the cattles or the cattles may die by drinking such water. 4. Some of the plants (tea etc.) gets badly injured by some algae. These algae grows either on the surface of leaves which interfere the process of photosynthesis. 5. Some of the algae causes death of young fishes through suffocation in the fish hatcheries and ponds by depleting (reduce) the oxygen content of water at night. 6. Sometimes the algal growth becomes very thick and large, so the small fishes are entangled in these algal nets and die or injured themselves. 7. Some species of sea weeds (kelps) attached with the shiphulls and decrease the speed of ship which cause use wastage of fuels. 8. To keep ship safe from the sea weeds the ships are periodically cleaned and painted, which involve heavy expenditure.

**II.POSITIVE IMPORTANCE** :- The various algae are of various positive importance, which are described below :- **1. BGA (Cyanophyceae)** i. The fishes and other aquatic animals feeds on the BGA. ii. These algae are very useful for the soil inhabiting species. iii. After dying these algae add organic matters to the soil, which increases the fertility of soil. iv. This promotes the growth of bacteria and other soil inhabiting organism and the activity of these organism further increases soil fertility. v. In India and other countries, the alkaline soil are being reclaimed or improved by inducing growth of some BGA , which nutralise the alkalinity of the soil by secretion of acids. vi. These acids are produced by the deposition of BGA. **2. GREEN ALGAE (Chlorophyceae)** i. Together with other groups of algae, the green algae are very important because they form the chief source of food and oxygen to all the marine and fresh water animals. ii. Some green algae are eaten directly by humans. Eg :- Ulva etc. iii. The dried plants of algae are also reported to be eaten by some people. Eg :- Spirogyra, Oedogonium etc. iv. In recent studies, some of the green algae (Chlorella) are found as a main source of food for man and also produce an antibiotic chlorellin. v. The soil inhabiting green algae provides food to the soil animals and also increase the organic matters of the soil, which makes the soil fertile. vi. Chara is known to having certain larvicide characters. So these are grown in the village ponds to destroy the malarial larvae. vii. Some green algae secrets calcium salts, which makes the soil fertile. **3. DIATOMS (Bacillariophyceae)** i. The diatoms are very important as the major component of the food of aquatic animals. ii. The largest known animals (Whale) lives on diatoms and other plankton organism also fully depend on it. iii. The diatoms are also of different uses :- (a). Polishing of silverware, metals and automobiles. (b). Toothpowder and toothpastes. (c). Being highly fire proof, it is extensively used as insulators in steam pipes, blast furnance and in refrigeration of plants. (d). They are also used for making the houses fire proof. (e). They are highly absorptive (having absorbing capacity). So used to filter oil & the syrup in the sugar industries. (f). They are sprinkled on the mines wall to prevent from dust explosion. **4. BROWN ALGAE (phaeophyceae)** i. These are used as food by fishes and other aquatic animals. ii. Many brown algae are eaten by peoples living in the seacoasts in some parts of Europe, China and Japan. iii. A product of Laminaria is used as a food in Japan by the name of kombu, while in America the kombu are used as sweets flavour called kombucha. iv. Some of these algae are important source of iodine, mineral salts, bromine (chemical) and potassium. v. They are also used as fertilizers, in soap and in some valuable medicine manufacture. **5. RED ALGAE (Rhodophyceae)** i. Many red algae are eaten by fishes. ii. They are used to feed cattle. iii. Some red algae are sources of jellies, which are used for shoe polishes, shaving creams, cosmetics, shampoos, glue, candles, toothpastes etc. iv. Agar-agar is a product of gelidium, which is used in biological laboratories for media preparations for the culture of bacteria and fungi.

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