

Green algae (Chlorophyta)

Seaweeds or benthic marine algae are the group of plants that live either in marine or brackish water environment. Like the land plants, seaweeds contain photosynthetic pigments and with the help of sunlight and nutrient present in the seawater, they photosynthesize and produce food.

Seaweeds are found in the coastal region between high tide to low tide and in the sub-tidal region up to a depth where 0.01 % photosynthetic light is available (Fig. 1). Plant pigments, light, exposure, depth, temperature, tides and the shore characteristics combine to create different environment that determine the distribution and variety among seaweeds.

The important criteria used to distinguish different algal groups based on the recent biochemical, physiological and electron microscopic studies are:

- a) Photosynthetic pigments,
- b) Storage food products,
- c) Cell wall component,
- d) Fine structure of the cell and
- e) Flagella.

Accordingly, algae are classified into three main groups i.e. green (Chlorophyta), brown (Phaeophyta) and red (Rhodophyta). Seaweeds are similar in form with the higher vascular plants but the structure and function of the parts significantly differ from the higher plants. Seaweeds do not have true roots, stem or leaves and whole body of the plant is called thallus that consists of the holdfast, stipe and blade (Fig. 2). The holdfast resembles the root of the higher plants but its function is for attachment and not for nutrient absorption. The hold fast may be discoidal, rhizoidal, bulbous or branched depending on the substratum to which it gets attached.

The stipe resembles the stem of the higher plants but its main function is for support of the blade for photosynthesis and for absorption of nutrients from surrounding sea water. The blade may resemble leaves of the higher plants and have variable forms (smooth, perforated, segmented, dented, etc.). The important functions of the blade are photosynthesis and absorption of nutrient. The most significant difference between seaweeds and the higher plants is that their sex organs and sporangia are usually one celled or if multi-cellular, their gametes and spores are not enclosed within a wall formed by a layer of sterile or nonreproductive cells.

Morphology

They are found in the fresh and marine habitats. They range from unicellular to multi-cellular, microscopic to macroscopic forms. Their thalli vary from free filaments to definitely shaped forms. The photosynthetic portion of the thalli may be moderately to highly calcified appearing

in variety of forms as fan shaped segments, featherlike or star-shaped branches with teeth or pinnules, clavate or globose branchlets.

Pigments

They possess photosynthetic pigments such as Chlorophyll a & b, contained in the special cell structure known as chromatophores. The cell wall of this group is composed of an outer layer of pectin and an inner layer of cellulose. The photosynthetic product of this group is starch.

Reproduction

Green algae can produce sexually and asexually by forming flagellate spores and sometimes non-flagellate spores. The vegetative propagation is achieved through fragmentation. Alternation of gametophytic and sporophytic generation occurs in this group.