

LIFE HISTORY OF ECTOCARPUS

Classification of *Ectocarpus* is as follows.

Class – Phaeophyceae

Order – Ectocarpales

Family – Ectocarpaceae

Genus – Ectocarpus

Habitat and distribution

It is the most primitive brown alga consisting a number of species, which are all marine. It is common at the sea shores where it remains attached to the substratum by means of rhizoids. Some species are endophytic. *E. fasciculatus* is epiphytic on fins of fishes.

Habit and cellular structure

The plant body is very well branched, heterotrichous filamentous and consists of prostrate as well as erect branches. The erect branches are monosiphonous i.e. consisting a single row of cells placed end to end. Occasionally, the cells may divide vertically to produce more than one row of cells.

The prostrate portion grows apically so that the growth is apical while in the erect branches, growth is intercalary i.e. some cells near the base of vertical branches become meristematic and cut off cells.

Each vegetative cell is rectangular, uninucleate, with few irregular disc shaped chloroplasts. There are some naked pyrenoids, the presence of which is interesting to note, as they are characteristic of Chlorophyceae. Besides

chlorophyll, fucoxanthin is present. There is usual protoplasm surrounded by cell wall, which is two layered, made up of pectin-cellulose layers.

Reproduction

The reproduction in this genus is of two types.

1. Asexual reproduction
2. Sexual reproduction

1. Asexual reproduction

It takes place by means of biflagellate zoospores, which are produced by neutral or plurilocular sporangium and unilocular sporangium as well.

The neutral sporangium is produced from the terminal cell of a short lateral. The content of neutral sporangium divides repeatedly followed by wall formation. By this process, a multilocular sporangium is formed. No nuclear division is meiotic at any stage. Each chamber or locule of the sporangium is metamorphosed into a biflagellate zoospore. The zoospores are set free by apical pore. The zoospores, after swimming a short time, come to rest and produce a new sporophyte plant. This newly produced sporophyte can produce neutral or plurilocular sporangia and unilocular sporangia, but never gametangia. The gametangia are produced on the plants produced by the zoospores liberated from unilocular sporangia.

The position of unilocular sporangium is the same as that of neutral sporangium. Its nucleus divides again and again to form 32 or 64 nuclei. The first division is the reduction division. Hence, the nuclei are haploid. These nuclei form haploid unilocular sporangia. The cytoplasm of these unilocular sporangia becomes segmented into uninucleate parts. Each part is then metamorphosed into a pyriform zoospore. Each zoospore bears two lateral flagella of unequal size. These zoospores come out from the apical slit found over the sporangium. After swimming for a short period, they germinate and produce haploid plants. These zoospores can also go for gametic union, similar to that of plurilocular gametangia.

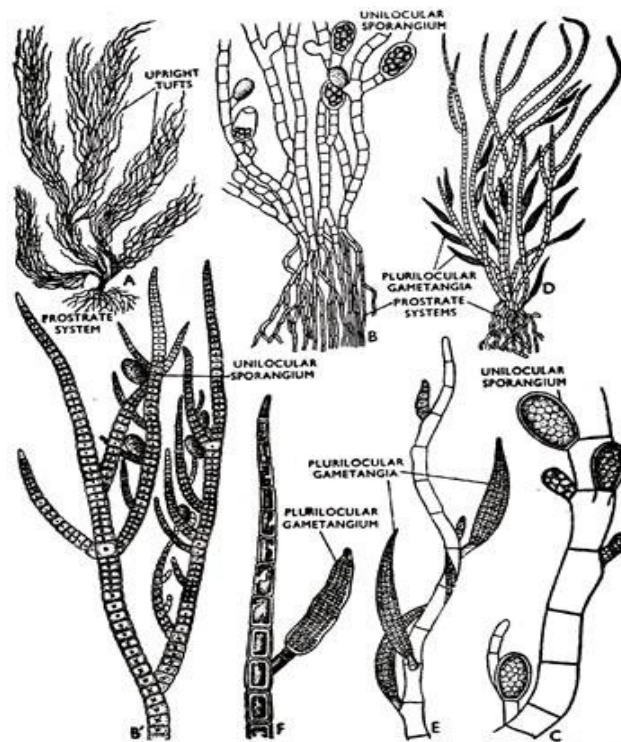


Fig. 102. *Ectocarpus* sp. A. Habit. B-C. Filaments bearing unilocular sporangia. D-E. Filaments bearing plurilocular gametangia. F. Portion of a filament showing plurilocular gametangium.

2. Sexual reproduction

Sexual reproduction in *Ectocarpus* is isogamous or anisogamous. Most of the species are monoecious, although *E. siliculosus* is dioecious. The gametes are produced into plurilocular gametangia found on the haploid plants. The gametangia are similar in appearance to the neutral sporangia. The content of the gametangium divides and redivides followed by wall formation. Each chamber is converted into a gamete, which is biflagellate and bears the same structure as the zoospores, but smaller in size than the zoospores. They are liberated through the apical ruptures.

The fertilization is external. The two gamete, iso or aniso, coming from different plants unite in pair to form a zygote. The zygote directly germinates to give rise to a diploid plant, which bears only neutral or unilocular sporangia.

Alternation of generation

The life history of *Ectocarpus* exhibits isomorphic alternation of generation. The sporophytic plants produce neutral and unilocular sporangia. The zoospores of unilocular sporangia produce haploid plants which are exactly similar to the sporophytic plant. The haploid plants bear only plurilocular gametangia, which produce gametes. The gametes unite to form zygote which on germination, forms the sporophytic plant. Thus, there is an alternation of isomorphic generations.

