

Sexual Reproduction

Sexual reproduction in *Ectocarpus* takes place by isogamy or anisogamy. Majority of the species are isogamous and homothallic. Some species are anisogamous. *Ectocarpus secundus* is heterothallic and anisogamous. The gametes are produced in plurilocular gametangia. These gametangia are many-celled, elongated, and sessile or shortly stalked conical structures. Gametangia are produced on the haploid plants developing from the meiozoospores. The development of gametangia is similar to that of plurilocular sporangia.

These develop from terminal cell of a lateral branch. The gametangial initial gets inflated. It divides mitotically by repeated transverse divisions. It produces a vertical row of flat cells. These cells undergo repeated vertical and transverse divisions. They form many hundred small cubical cells. These cells are arranged in 24-40 transverse rows. The protoplast of each cell metamorphoses into a single, pyriform, biflagellate, haploid gamete. The flagella are laterally attached. The zoospores and the gametes are similar in structure. But the gametes are relatively smaller in size. The gametes are liberated through an apical pore formed in the gametangium .

Forms of sexual reproductions

- a. Isogamy:** Isogamous species are *E. pusilus* and *E. globifer* etc. In these species, the fusion takes place between alike gametes. These gametes belong to the same plant or even to the same gametangium.
- b. Physiological anisogamy :** It occurs in species like *E. siliculosus*. The fusing gametes are identical morphologically. But they show different sexual behaviour. One is less active and is called female gamete. The other is more active and is called male gamete. The female gamete soon comes to rest. It settles on a substratum. It becomes surrounded by active male gametes. The male gametes attach themselves to the female gamete through their anterior flagella. The anchoring flagellum contracts, the body of one of the male gametes comes in contact with that of the female gamete and the fusion takes place. This phenomenon is called clump formation.
- c. Morphological Anisogamy:** It occurs in species like *E. secundus*. In this case, the two fusing gametes are dissimilar in size.

They are produced in different gametangia: The smaller ones are produced in microgametangia. The larger ones are produced in megagametangia.

Fertilization:

After fertilization diploid zygote is formed. There is no zygotic meiosis. The zygote germinates into a diploid sporophyte.

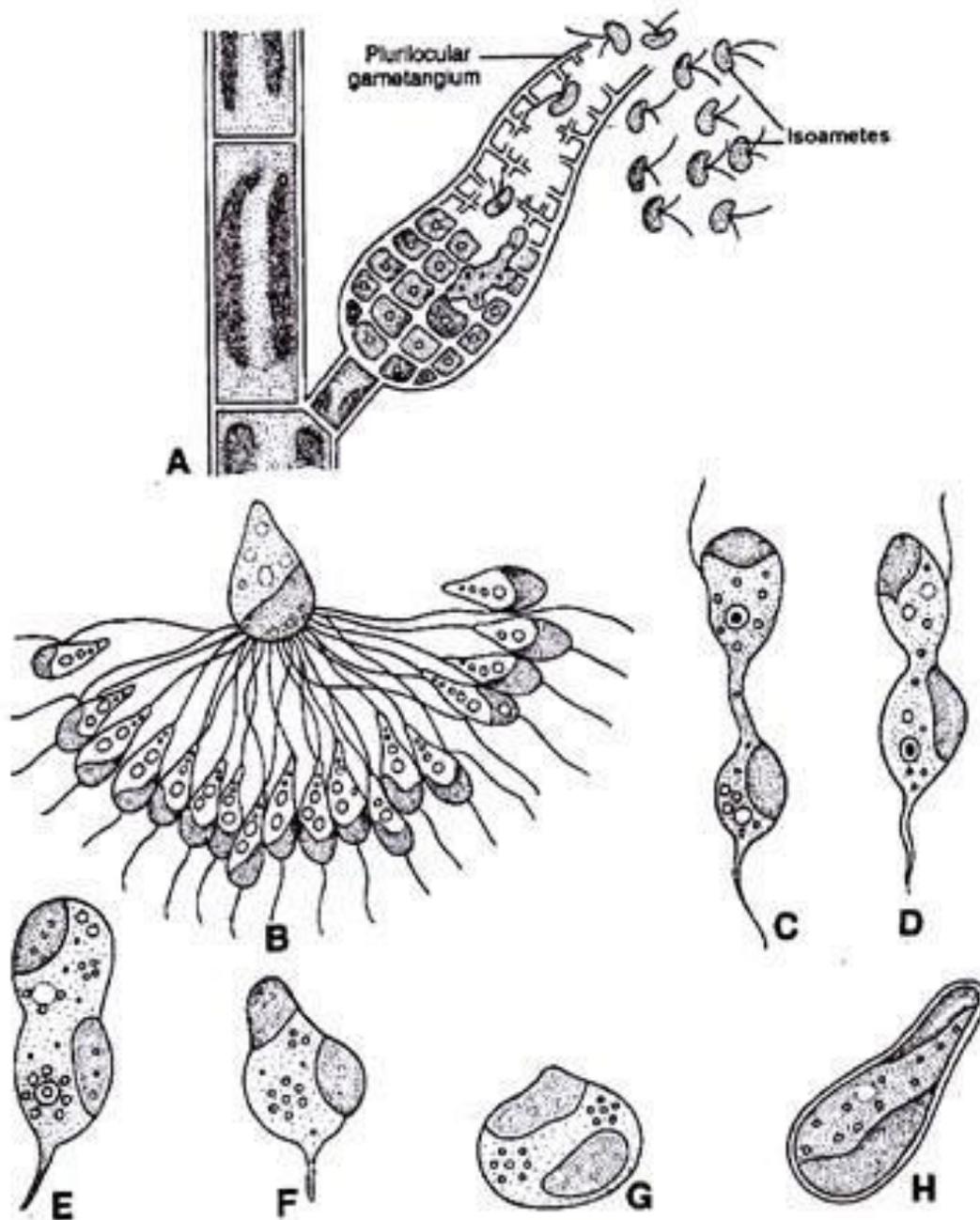


Fig. 4 (A-H). *Ectocarpus*. A. Plurilocular gametangium, B. Clump formation, C-H. Fusion stages and zygote.

Alternation of Generations

Ectocarpus shows isomorphic alternation of generations. There is alternation of morphologically similar gametophytic (haploid) and sporophytic (diploid) generations in its life cycle.

(**Sporophyte:** The sporophyte is diploid. It develops two types of sporangia. Zoospores are produced in these sporangia. Zoospores are produced by mitosis (mitozoospores) in plurilocular sporangia. The zoospores in unilocular sporangia are produced meiotically (meiozoospores). The mitozoospores germinate into a diploid sporophyte. These spores cause reduplication of sporophyte generation. The meiozoospores germinate to give rise a haploid gametophyte plant.

Gametophyte: It develops plurilocular gametangia. These gametophytes are similar to the sporophyte in morphology. Haploid gametes are produced in the gametangia. These gametes fuse to form a diploid zygote. Zygote germinates into a diploid sporophyte plant. In some species the gametophyte generation is also reduplicated by the parthenogenesis. In this case, the gametes from plurilocular sporangia form new gametophyte generation.)

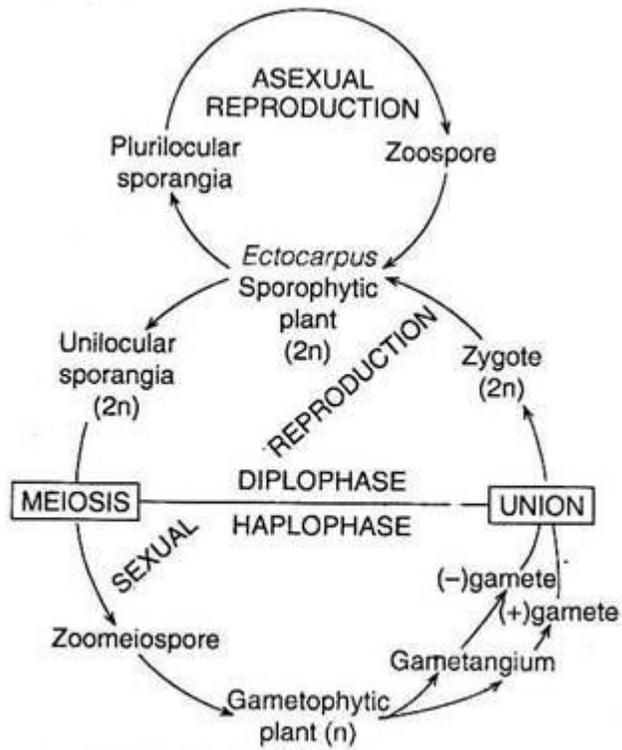


Fig. 3.115 : Graphic life cycle of *Ectocarpus* sp.
