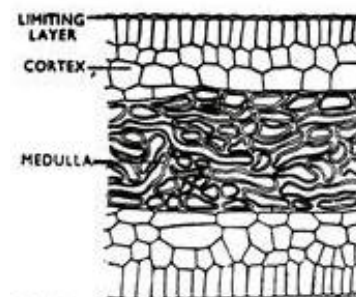
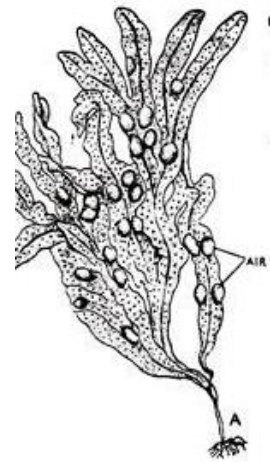


Fucus sp.✚ **Systematic Position****Class:** Phaeophyceae**Order:** Fucales**Family:** Fucaceae**Genus:** *Fucus*

- This is a common marine alga containing a number of species that are widely distributed in the sea coasts of temperate and Arctic regions.
- Most species are found attached to rocks between low and high tide marks and are commonly known as rock-weeds.
- The plant body of *Fucus* consists of a leathery, parenchymatous, dichotomously branched ribbon-like frond, stem-like stipe and a basal disc-like holdfast or hapteron by which it is attached to the substratum. The plants may be attached to completely or partly submerged rocks.
- The thallus gets its buoyancy in water by air vesicles or bladder-like structures. The swollen tips of the thalli, the receptacles, which lack midrib, are covered with small scattered pimple-like projections with small openings which lead into cavities, known as conceptacles.
- The thallus is diploid, may be monoecious or dioecious and is characterized by anatomical complexity.
- Anatomically thallus is divided into three parts
 - a) **Outer or peripheral or limiting layer:** composed of small cells containing abundant plastids and performing the function of assimilation.
 - b) **Cortex:** elongated mucilaginous parenchymatous cells, several layers, storage system
 - c) **Medulla:** central tissue is composed of hypha-like elongated cells, conduction of food material.



- Rudimentary sieve-plates are present in *Fucus*.
- Growth in length of the thallus takes place by means of an apical cell which lies in the depression at the tip of each branch.

REPRODUCTION

- The only method of asexual reproduction in *Fucus* is by fragmentation.
- The method of sexual reproduction is heterogamous. The gametes are borne in oogonia and antheridia, which are produced in the conceptacles.
- Monoecious – male and female conceptacles are borne on same thalli
Dioecious – distinct male and female conceptacles borne on two different thalli
- Within each conceptacle are many multicellular hairs, the paraphyses, which are mixed with antheridia and oogonia.
- The oval oogonium is produced from a single cell and is borne on a short stalk. By cell division eight egg cells are produced being enclosed in a cell wall of two or three layers.

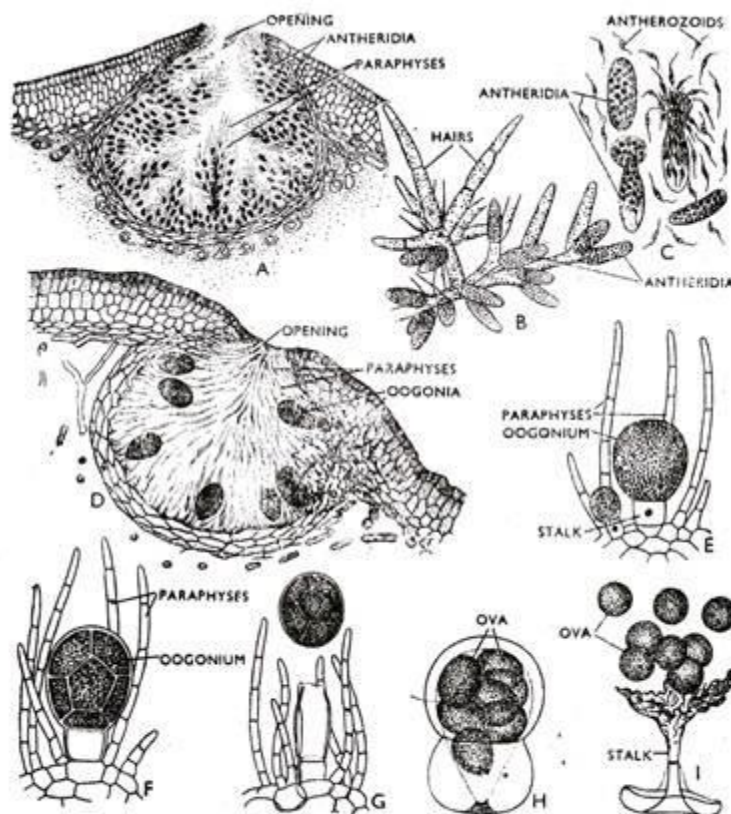


Fig. 110. *Fucus* sp. A. Section of a male conceptacle. B. Antheridia and hairs. C. Liberation of antherozoids from antheridia. D. Section of a female conceptacle. E-F. Stages in oogonium development. G. Liberation of packet of ova. H-I. Stages in liberation of ova.

- All eight eggs or ova when mature are liberated out in water. The antheridia are smaller and more numerous than the oogonia, and are borne in groups on short, much

branched hairs. Like oogonium antheridial wall is also composed of two to three layers. Numerous pear-shaped antherozoids with two laterally inserted unequal flagella are produced in the antheridium.

- Eggs floating free in water are soon surrounded by innumerable antherozoids which set the non-motile eggs in rotation and may continue until an antherozoid penetrates the egg and fertilizes it resulting in an oospore.
- The oospore forms a thin wall and at once divides to produce new *Fucus* plant without undergoing a resting period, the lower cell growing into the holdfast and the upper the thallus.

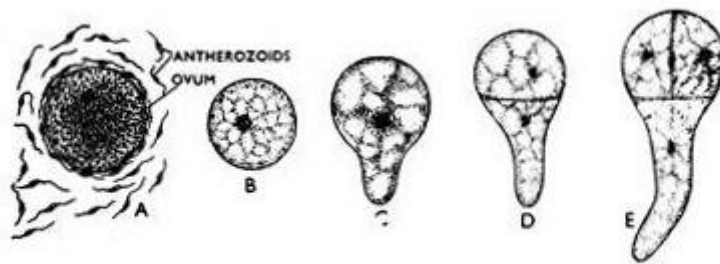


Fig. 111. *Fucus* sp. A. Ovum surrounded by antherozoids during fertilization. B. Oospore. C-E. Stages in oospore germination.

- Meiosis in the life cycle of *Fucus* takes place during gametogenesis, as such the diploid phase is very predominating as against haploid phase which is reduced merely to the gametes.
- *Fucus* exhibits a unique feature in its life cycle pattern. It possesses a remarkably elaborate diploid phase which bears the male and female sex organs. Reduction division occurs during the development of gametes (antherozoids and eggs) only. Hence the antherozoids and the eggs represent the haploid gametophytic phase in the life cycle of *Fucus*.
- The gametophytic phase instead of being distinctly organized has thus been appreciably reduced to the gametes alone.
- The diploid phase, on the other hand, does not produce any sporangia or spores. Instead, it produces gametangia and gametes, is rather very uncommon in Algae. In *Fucus*, therefore, there is only an alternation of chromosome numbers from diploid to haploid and back, to diploid state. Whereas, the regular alternation of corresponding spore-producing and gamete-producing plants is lacking.
- There is thus no morphological alternation of generations in the life cycle of *Fucus*.

- Besides above, it has also been suggested that the so called antheridia and oogonia are micro- and macrosporangia. In the microsporangium four haploid cells are formed by meiosis which is potential microspores. Each potential microspore by mitosis produces gametophytes from which antherozoids are produced.
- Again the macrosporangia by meiosis produce four haploids; each one is a potential macrospore. Each macrospore by mitosis produces female gametophyte from which ovum is produced. According to this view there is heteromorphic alternation of generations in *Fucus*. If this interpretation is correct the order Fucales should be placed in the class Hetero- generate.
- **Special features of Genus *Fucus*:**
 1. The diploid plant body differentiated into holdfast, stipe and dichotomously branched ribbon-like frond.
 2. Presence of floating device by bladders.
 3. Complex internal structure of the plant body.
 4. Absence of asexual reproduction by means of spores or similar other structures.
 5. Sexual reproduction heterogamous.
 6. Sex organs in the same or different conceptacles.
 7. Reduction division during the development of gametes in the antheridium and oogonium.
 8. The development of eight eggs in each oogonium.
 9. Fertilization of ova outside the plant body in the open water.
 10. Absence of morphological alternation of generations.
 11. Presence of chromosomal alternation of generations.

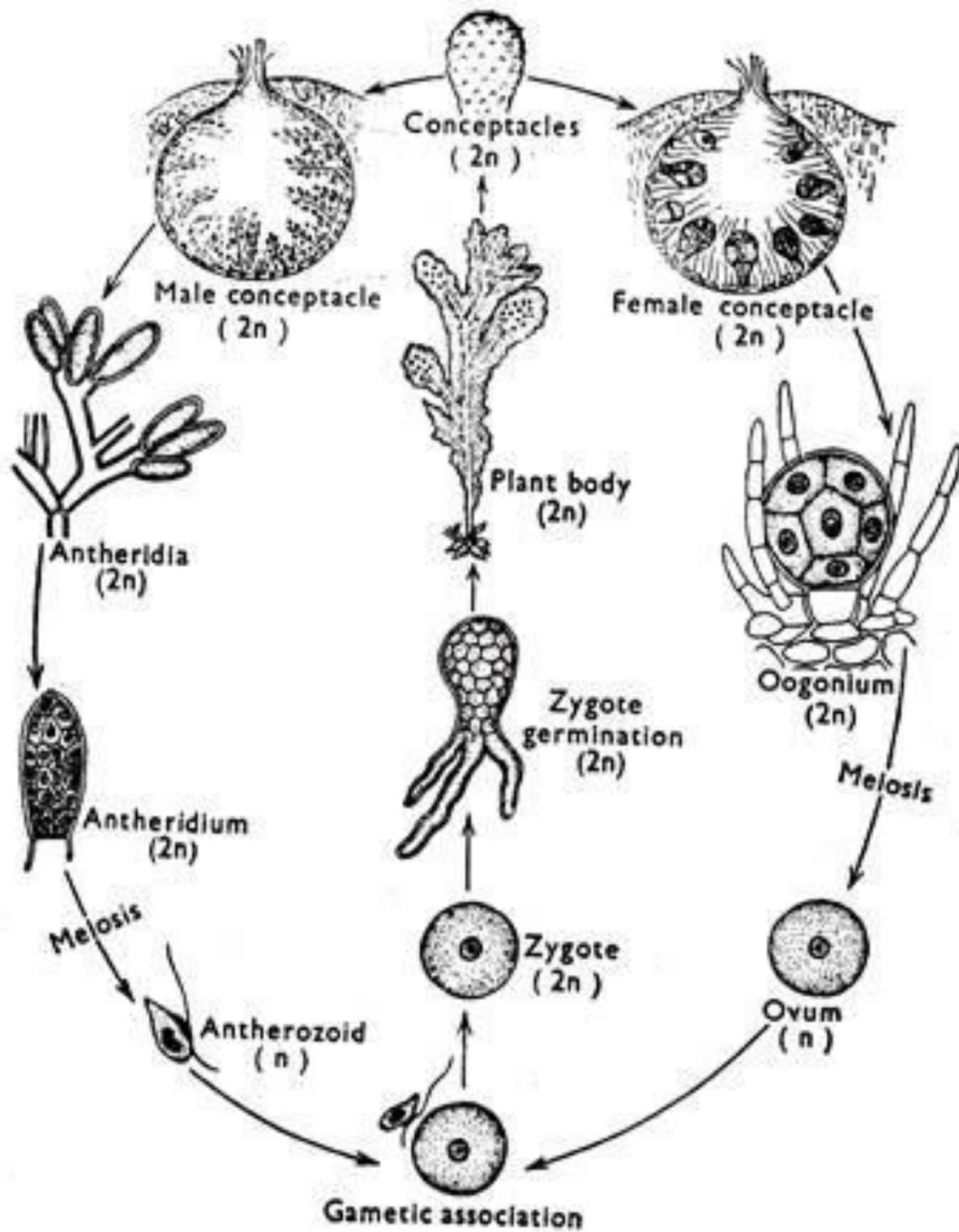


Fig. 112. Life cycle of *Fucus* sp.