

Fucus

Classification of Fritsch (1935)

Div. - Phaeophyta
class - Phaeophyceae
order - Fucales
family - Fucales
Genus - Fucus

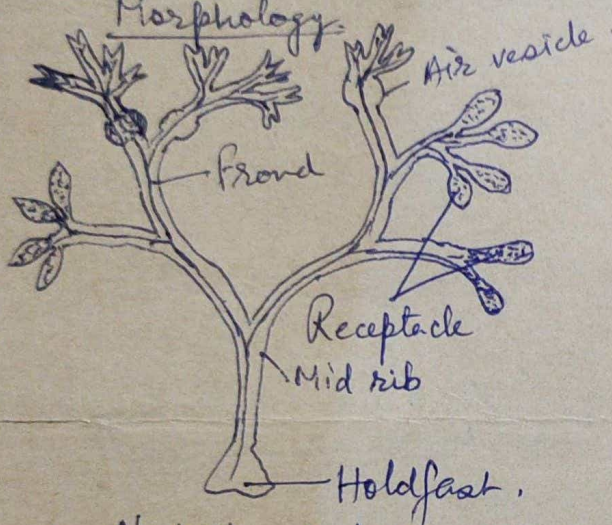
Habitat & distribution

All the species are marine and found in colder seas, brackish water. They are usually attached to rocky substratum.

Habit

The plants are ribbon like thalloid mostly perennial differentiated into holdfast, stipe and blade or frond. The two common species are Fucus vesiculosus and Fucus serratus. Thalli are dichotomously branched, deep grey in colour and shiny in touch.

Morphology



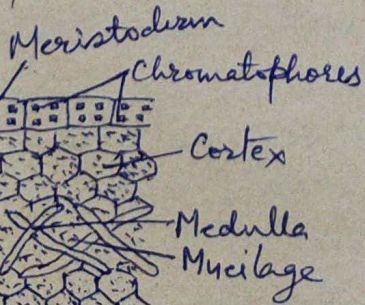
1. Holdfast :- It is generally disc shaped
2. Stipe :- It is the upright stalk of the frond
3. Frond :- (i) It is ribbon like dichotomously branched structure with distinct mid-rib.
(ii) Air bladders ^{filled} with gases are found on the frond
(iii) The apical portion of frond has swollen, leathery receptacle on which sexual structures are found inside most like structures known as conceptacles

Habit sketch

of Fucus

- (iv) Sterile conceptacles known as cryptoblasts may also be found on wing like structure lateral to mid-rib and filled with mucilage.
- (v) Margin of the frond may be serrate (ex - F. serratus) & smooth (ex - F. vesiculosus).
- (v) Apical cell found in apical notch cuts 3 segments on three faces. Each of the new cell forms a branch.

Anatomy



1. Frond is differentiated into Meristoderm, cortex and Medulla.
2. Meristoderm is outermost one layer with rectangular cells. Cells of this layer have many rectangular chromatophores.
3. Cells of cortex are spherical, oval or angular, thin walled with storage material. Cortex is multilayered.

V.S. Frond of Fucus.

4. Central 'Medulla' is also multicellular. Cells are filamentous, but short with perforated cross walls. Medullary cells are lodged in mucilage.

Reproduction

1. Reproduction in Fucus takes place either by vegetative fragmentation or sexual reproduction of oogamous type.

2. Plants are either monoecious or dioecious. Monoecious types are of two types, ones with both sexes in ~~one~~ same conceptacle (*F. furcatus*) or in separate conceptacles (*F. spirales*) but on the same plant.

The dioecious species are *F. vesiculosus*,

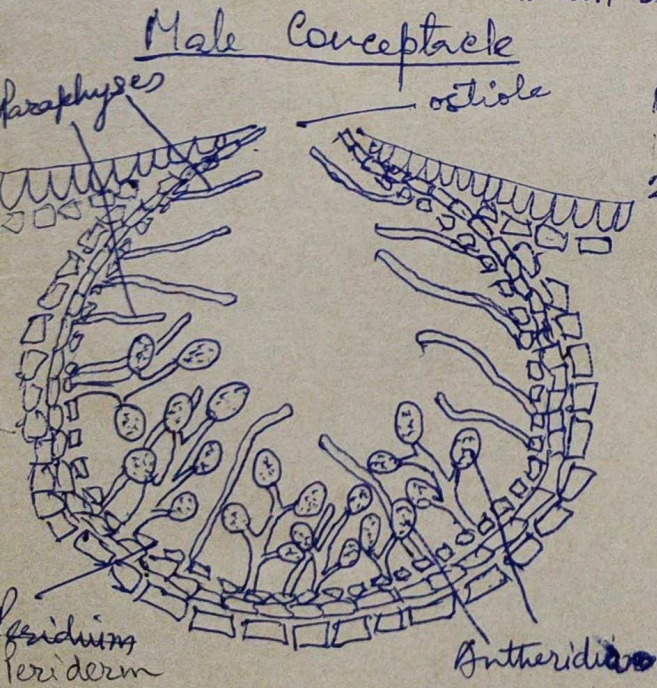
F. serratus

3. Sex organs antheridia and oogonia arise in a spherical cavity with a small aperture, the ostiole. This cavity is known as conceptacle

4. Conceptacles are found on the swollen receptacle

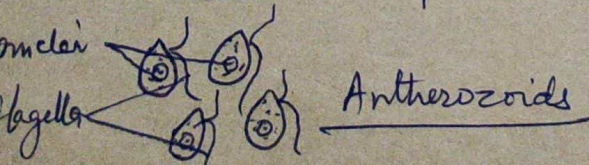
Male Conceptacle

5. The wall of the conceptacle is many layered, the cells of inner layer form sex organs and sterile hairs, known as paraphyses. Wall is also known as periderm.



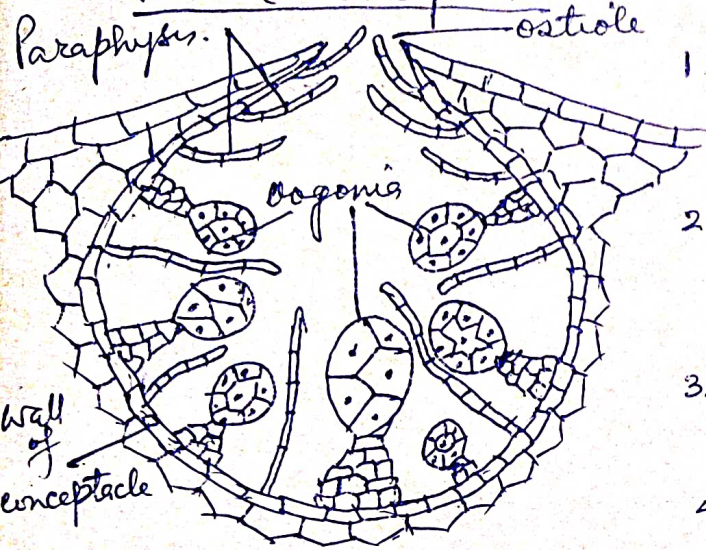
1. Antheridial initials originate from the cells of the inner layer of periderm
2. These initials divide into stalk and antheridial cell
3. The antheridial cell enlarges to form an antheridium
4. The stalk cell divides many times. At each division lower cell and antheridial cell is formed.
5. In this way branched antheridial stalk is formed with many antheridia.
6. Each antheridium has 2 layered wall and provided with one large nucleus, many yellowish green chromatophores and reticulate cytoplasm.
7. Each antheridium forms 64 pear shaped biflagellate, pear shaped antherozoids after first meiotic and subsequent mitotic divisions.

V.S. Leaf showing antheridial conceptacle



8. Each antherozoid is thin walled, uninucleate, pair shaped with pointed anterior end. Two flagella are situated laterally just below the apex. The two flagella are unequal in size, the longer flagellum pointed posteriorly.

Female conceptacle



1. At the base of conceptacle, many cells of inner wall layer function as oogonial initial and form stalk cell and oogonium
2. The diploid nucleus divides ~~mitotically~~ first meiotically and then mitotically to form 8 ova
3. Each oogonium has 3 layered wall - exochite, mesochite and endochite.
4. Mesochite is thick while others are thin.

Oogonial conceptacle in Fucox.

Liberation of antherozoid, egg and fertilization

1. Outer wall of antheridium dissolves and all the antherozoids covered with antherial inner wall layer, liberate ^{through ostiole.} in water
2. Subsequently, inner layer also gelatinized and antherozoids come in water.
3. On maturity, the exochite of oogium breaks and eggs covered with mesochite and endochite are liberated in water ^{through ostiole.} Further wall layers gelatinized and eggs come in water.
4. Eggs are surrounded by many antherozoids but only one of them penetrates the egg and fertilize it, making a diploid zygote.

Zygote and young plant.

1. The zygote soon secretes a wall and attaches itself to the substratum
2. After sufficient rest zygote divides transversely into lower and upper cell. lower cell matures into holdfast and upper ~~into~~ cell divides and reduplicates to form new blade.

Alternation of generation

There is no alternation of generation as the ~~diploid~~ ^{haploid} phase ~~is~~ is only represented by gametes.