

Lab(4): Non-Vascular Plant (Cryptogams)

Thallophyta

Super kingdom: Eukaryota

Kingdom: Protista

Division: phaeophyta

1-Class: isogenerate

Order :Ectocarpales

Genus: *Ectocarpus*

2-Class: heterogenerate

Order : Laminariales

Genus: *Laminaria*

3-Class: cyclospora

Order: Fucales

Genus: *Fucus*

General characteristics of phaeophyta (Brown algae):

- 1- Brown algae exist in a wide range of sizes and forms, they are the major seaweeds live in marine environments (Unlike the chlorophyta and cyanophyta which are mainly freshwater). Their forms as **tissue like** or **parenchymatous**.
- 2- Contain chlorophyll type **A** and **C**.
- 3- Most brown algae contain the pigment **fucoxanthin** (xanthophylls pigments) which is responsible for the distinctive greenish-brown color that gives them their name
- 4- Store their food as compounds named **Mannitol** and **laminarin**
- 5- Motile reproductive cells biflagellate .
- 6- During their life cycles, brown algae alternate between two multicellular forms (**alternation of generation**): the **gametophyte** and the **sporophyte**. The gametophyte

develops sexually active reproductive cells, which, when they merge, create the sporophyte. In turn, spores produced by the sporophyte give rise to the gametophyte.

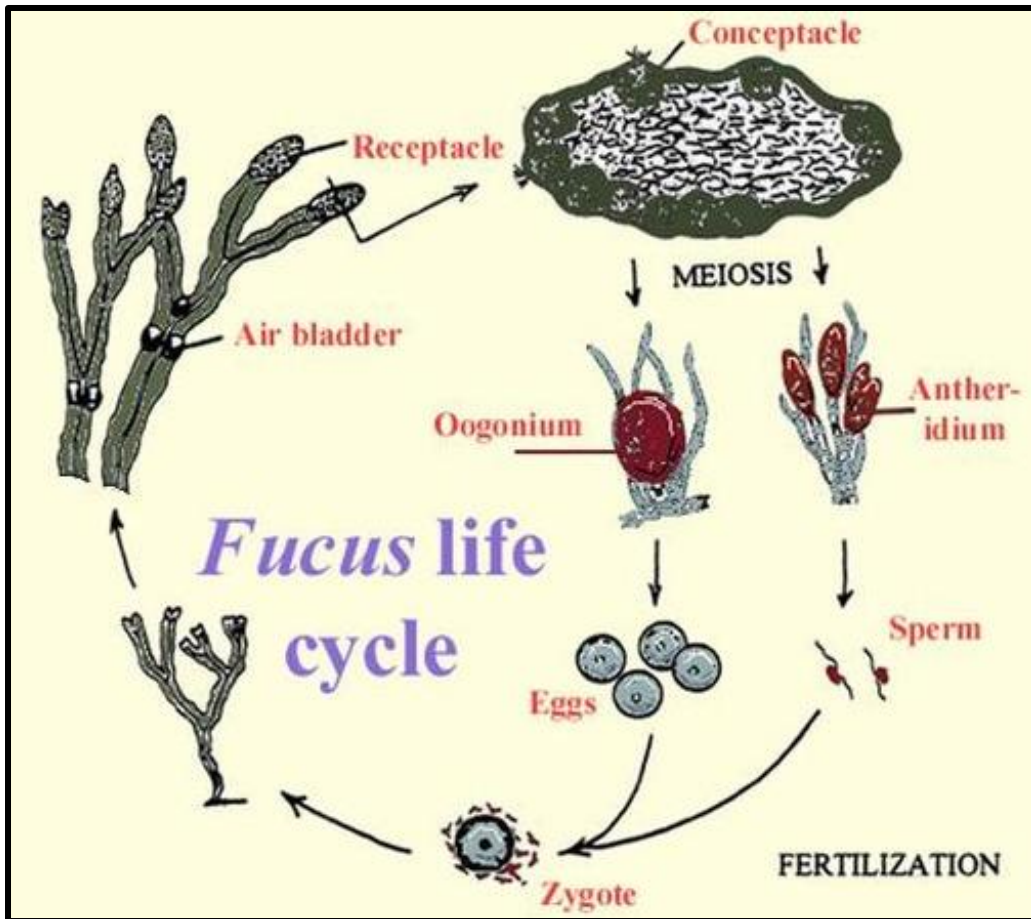


Figure (1): Life cycle of brown algae

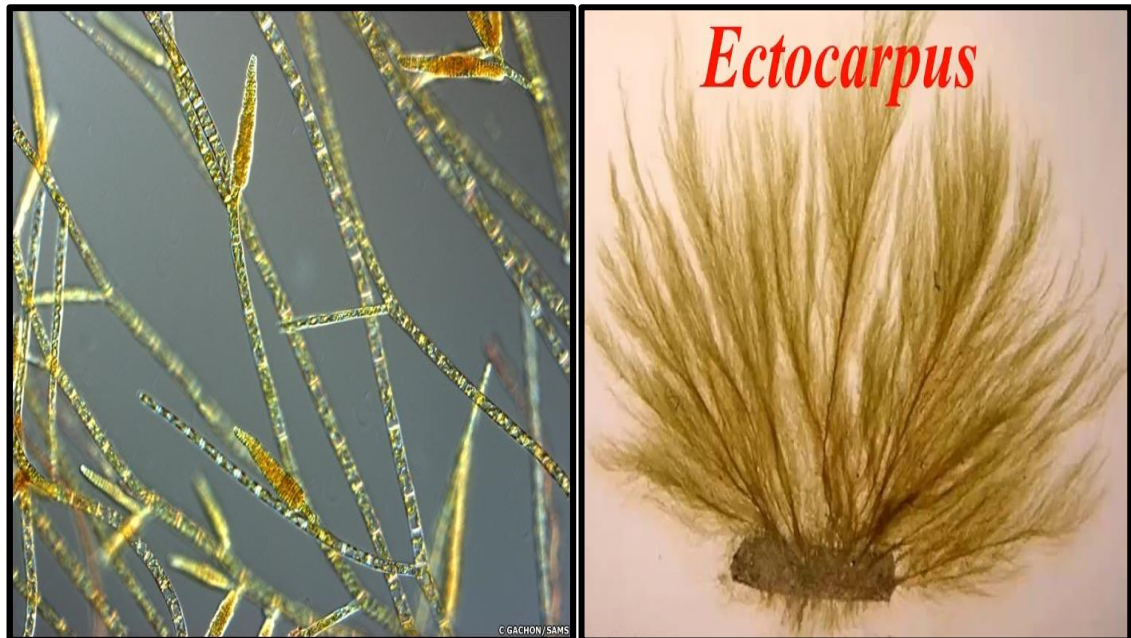
- In **isogenerate**, the two alternating generations **similar** in vegetative structure and size
- In **heterogenerate**, the two alternating generations **different** in vegetative structure and size(sporophyte is macroscopic while gametophyte is microscopic)
- In **cyclospora**, gametophyte **reduced** into only male and female gametes (antheridia and oogonia) within sporophyte itself.

Essential terms

- **Oogonium** are female gamete mother cells, They produce eggs by oogenesis
- **Antheridium** is the saclike male reproductive organ .The antheridium produces and stores numerous sperm cells.
- **Conceptacle** flask-shaped cavity containing the reproductive organs.
- **Sporangia** is the capsule structure, in which the reproductive spores are produced and stored.

Genus: *Ectocarpus*

Branched filamentous thalli with bushy structure.



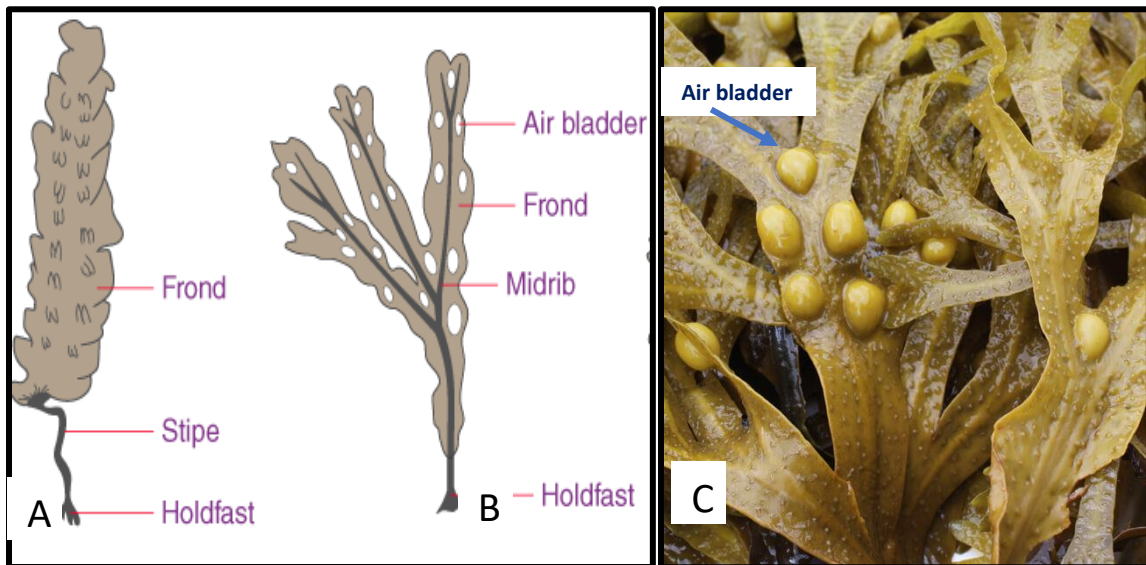
Figure(2): *Ectocarpus*

Genus: *Laminaria*

- a- The common name of these algae is the **kelps**.
- b- It has three distinct multicellular organs: a **holdfast**, that attaches the organism to a substrate, a **broad flat blade** that carries out the bulk of photosynthesis, and a **stipe (stalk)** that connects the blade to the holdfast .

Genus: *Fucus*

- a- The common name is **rock weed**.
- b- The thallus of these algae is **leathery dichotomously branched**, supported by a short narrow stalk that is attached to a disk-shaped holdfasts. The blade is mucilage- covered resist desiccation and temperature changes. And contains **air bladders** (to keep the thallus floating in vertical position when submerged).



Figure(3):A: *Laminaria* ,B: *Fucus*,C: *Fucus* air bladder

Practical section

See under microscope:

- C.S in *Laminaria* blade shows sporangia.
- Whole view of *Ectocarpus*.
- Sections in *Ectocarpus* show Oogonium ,antheridium and conceptacle.