

Brown Algae

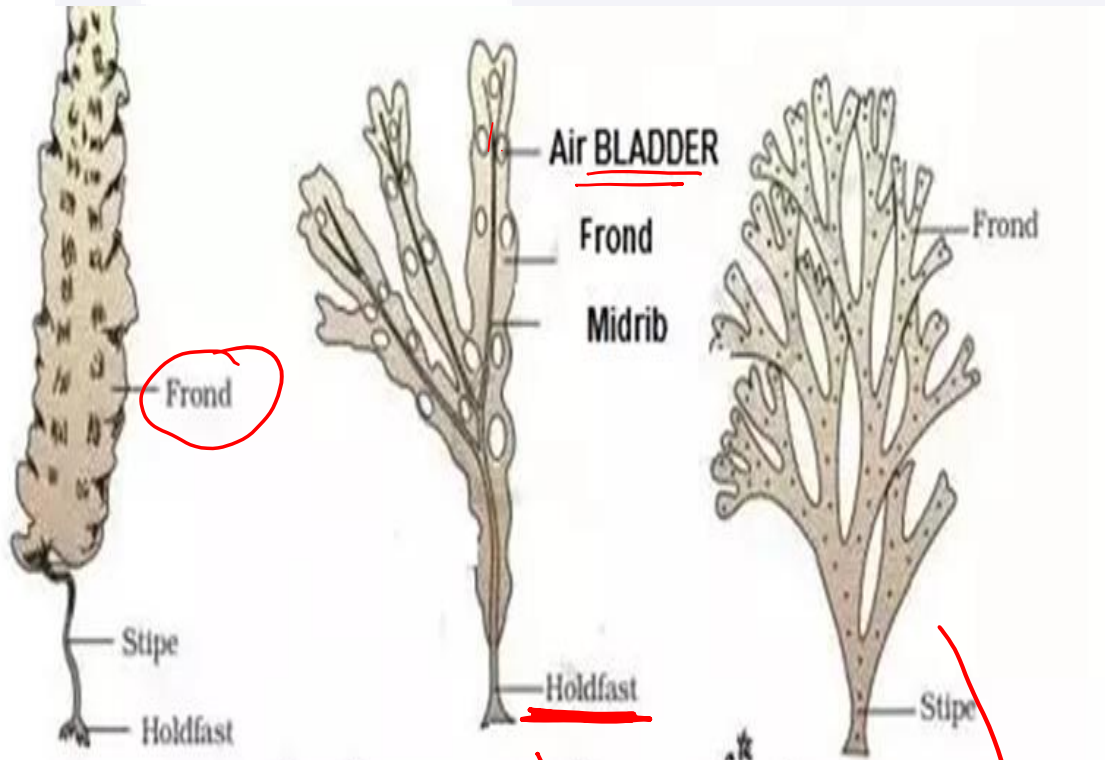


Fig: Phaeophyceae (Brown Algae)

Laminaria

Fucus

Dictyota

Examples of Brown algae

Phaeophyta II

Stored food

- Laminarin and mannitol - both are derivatives of carbohydrates

Phycocolloids

- On cell wall of brown algae some colloid substances like fucinic acid, alginic acid and fucoidin are present which are known as Phycocolloids

- It protects brown-algae against desiccation & shocks and used in ice-cream as thickening agent.
 due to waxes consistency

- Life cycle of Ectocarpus and kelps are diplohaplontic, life cycle of Fucus is diplontic ** ON VERT* *alginic acid*
- Zoospores and gametes are pear shaped and have two unequal laterally attached flagella *whiplash* *dinsel*

Special name

Sargassum

→ It is known as Gulf weed because Sargassum is a free floating alga

Laminaria (Kelps)

→ It is called as Devil's Aprin.

→ Iodine and Bromine - Obtained from Laminaria

Sargassum
found. sea

Life Cycle of Fucus

LIFE CYCLE OF *FUCUS SERRATUS* (BROWN ALGAE)

The diagram illustrates the life cycle of *Fucus serratus*, a brown alga, showing the alternation of generations between the diploid sporophyte and the haploid gametophyte.

Key Stages and Structures:

- Sporophyte:** The diploid (2n) stage, shown at the bottom as a branched, leafy structure.
- Receptaculum:** A specialized structure on the sporophyte where gametes are released.
- Conceptaculum:** A structure on the sporophyte where the zygote develops after fertilization.
- Oogonia:** The site of oogenesis, where egg cells are produced.
- Antheridia:** The site of spermatogenesis, where sperm cells are produced.
- Male Gametes:** Sperm cells released from the antheridia.
- Egg cells:** Released from the oogonia.
- Fertilization:** The process where a male gamete fertilizes an egg cell, forming a zygote.
- Meiosis:** The process by which the sporophyte produces haploid gametes.

Handwritten Annotations:

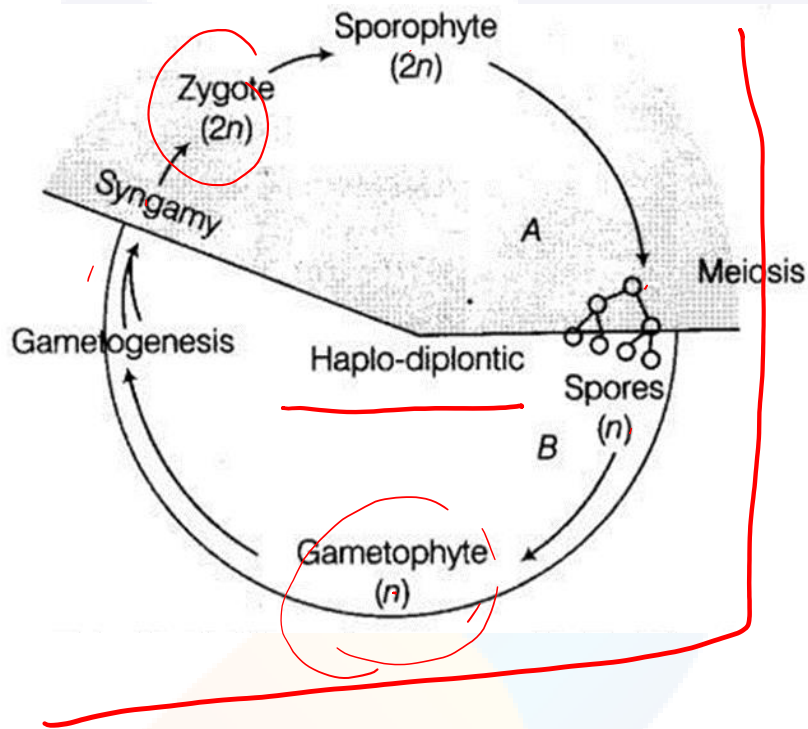
- Meiosis:** Written in green text, indicating the process of gamete production.
- Male Gametes:** Written in blue text with an arrow pointing to the released sperm cells.
- p/le** and **Spor**: Handwritten red notes with arrows pointing to the conceptacle and sporophyte, respectively.

The diagram illustrates the life cycle of a moss, showing the alternation of generations. Key stages and processes labeled include:

- Male Gametes**: Released from the male plant.
- Antheridia**: Male reproductive organs.
- Oogonia**: Female reproductive organs.
- Meiosis**: The process by which the diploid sporophyte produces haploid spores.
- Conceptaculum**: The point of attachment for the sporophyte to the gametophyte.
- Pleurocarp**: A type of moss where the sporophyte is attached to the gametophyte at the side.
- Sporangium**: The structure where spores are produced.
- Zygote**: The diploid cell formed by the fusion of gametes.
- Mitosis**: The process of cell division that produces the gametophyte.
- Spores (2n)**: The haploid reproductive cells.
- Plant n**: The haploid gametophyte.

The diagram shows the transition from the diploid sporophyte to the haploid gametophyte and back to the diploid sporophyte.

Life cycle of brown algae



Fucus

Plant (2n) $\xrightarrow{\text{meiosis}}$ Zoospore (2n)

→ No haploid stage
→ Diplontic cycle

Brown Algae \rightarrow Fucus

Haplodiplontic
Diplontic

Rhodophyta I

Red Algae

- Red algae are ancient algae.
- There is no motile stage found in life cycle of red algae and BGA i.e. cilia & flagella are ~~absent~~ ^{*}.
- Red algae mainly found in marine water with greater concentration found in the warmer areas. But exceptionally Batrachospermum is found in fresh water (river) and Porphyridium is found on land.
↳ exception
- Cell wall of red algae is complex and made up of cellulose & pectin and also complicated like blue green algae.
- Their cell wall has many different type of substances such as xylan, galactose, polyuronic acid, polysulphate esters

Pigments

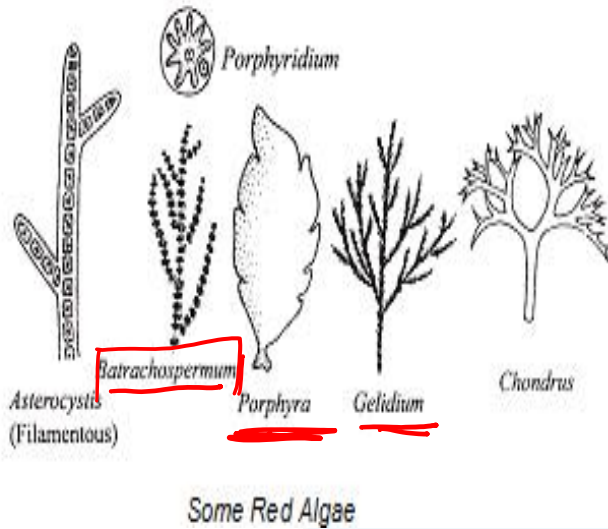
Chlorophyll - Chl 'a' and Chl 'd'

Carotenes - b carotene

Phycobilins - R - phycoerythrin (red coloured) and R - phycocyanin (blue coloured)

Deep water - Red (ab blue green)
Shallow water - Green (more chl a)

Red Algae Examples



e.g's of red algae

→ Gelidium, Gracilaria → Agar

→ Porphyra - edible

→ Chondrus
(Irish Moss)
↳ food

Rhodophyta II

Stored food

- Floridean starch - floridean starch is structurally similar to glycogen and amylopectin
- Phycocolloids: Agar - Agar, carrageenan and funori Phycocolloids are found in the cell wall of red algae

→ Hydrocolloid

Reproduction

Vegetative reproduction



By fragmentation ✓

Asexual reproduction



Non motile spores [By monospore, carpospores, tetraspore]

asexual spores

Sexual reproduction

- Sexual reproduction is oogamous and accompanied by complex post fertilization developments.
- The female sex organs are called carpogonia — *
- The male sex organs of red algae are known as spermatangia → male gametangium
- Non motile spore like gametes are formed in spermatangia which are known as spermatia

Rhodophyta III

Special points and economic importance

Harveyella



- It is a colorless parasitic alga.
- It remains as parasite on other alga.

Porphyra



It is an edible algae ✓

Gelidium and Gracilaria

- Agar - Agar colloid is obtained from these. → Solidification of medium
- It is used to prepare culture medium to grow microbes and in preparation of ice creams and Jellies.

Chondrus crispus

* * QNKET

- It is also called Irish moss.
- Carrageenin colloid is obtained from this alga.
- It is used as gelatin agent in food industries (i.e. to make the food item viscous)

Habitat of some Important Algae

Terrestrial	→	The algae found in moist soil & wall. e.g. Terrentofolia
Epiphytes	→	Algae which are present on plants. e.g. Protococcus
Entophytes	→	Present inside plants. e.g. <u>Coleochaete nitelum</u> (in <u>Nitella plant</u>)
Epizoic	→	Present on animals. e.g. <u>Cladophora</u> (present on <u>Mollusca shell</u>)
Endozoic	→	Present inside body of animals. e.g. <u>Zoochlorella</u> and <u>Zooxenthellae</u> (inside the <u>Hydra</u>)
Parasites	→	Algae that live as parasite and causes diseases. e.g. <u>Cephaleuros</u> (algae remains in the leaves of tea plant)
Thermophilic	→	Found in hot water. e.g. Chlorella
Cryophytes	→	Present in Polar Regions & Low Temperature. E.g. Chlamydomonas (some species)
Epiphloephytes	→	Algae arise on bark of trees

2 NKE
T
Trunk pet hyphae
present in Kelo

* * Q
C. nivalis NKE

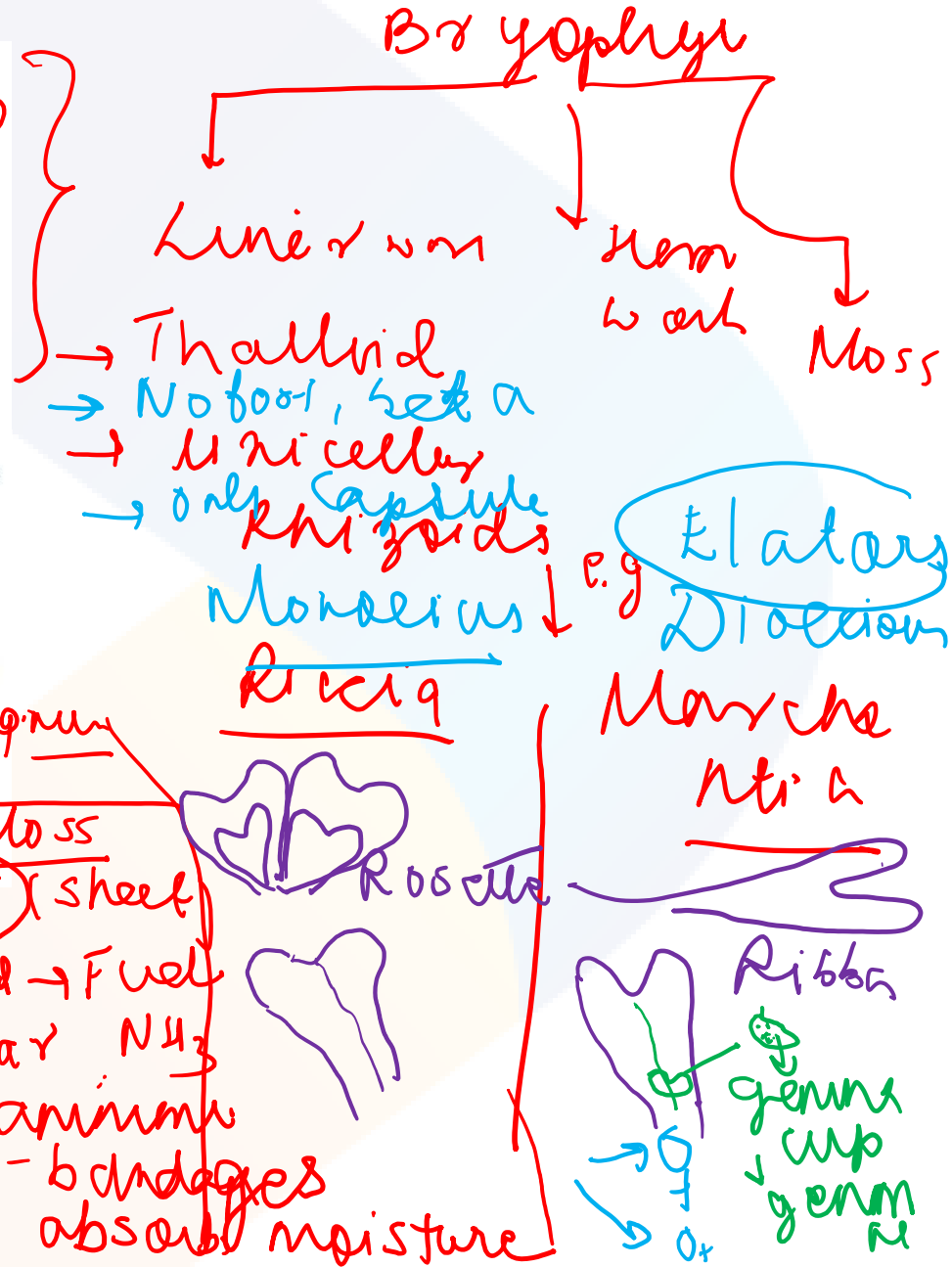
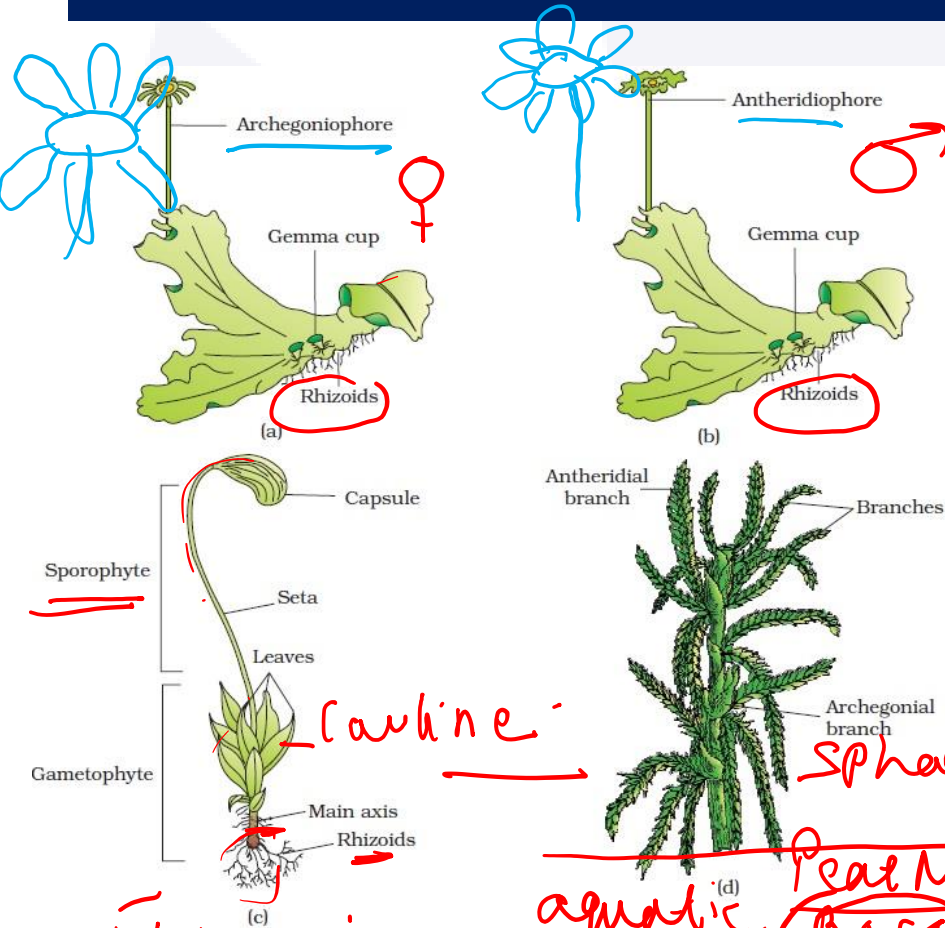
Bryophyta

Characteristics of Bryophyta


- Bryophytes are the first land plant. *→ algae*
- They originated from aquatic plant and they come on land through water.
- Bryophytes are known as amphibians of the plant kingdom. (*need H₂O for fertilization*)
- Due to the absence of vascular tissue bryophytes cannot grow very tall.
- The process of water conduction in bryophytes takes place with the help of parenchyma.
- Roots are absent in bryophytes. *NO Vascular tissue ✗ ✗*
- Bryophytes are sciophytes, i.e. bryophytes prefer to grow in moist (wet) and shady places.

→ moist shady place
→ male gametes swim in water
→ Non tracheophytes
 (*Cryptogams*)

BRYOPHYTES



Life cycle of bryophytes

- Main plant body of bryophyte is haploid. It produces gametes, hence called gametophyte.
- Sex organs are formed on gametophyte. 
- Male sex organs and gametes are called as antheridium and antherozoids respectively. Female sex organs and gametes are called as archegonium and egg respectively.
- In Bryophyta, fertilization is performed by zooidogamy i.e. male gamete swims into water to reaches the female gametes and fertilizes it. *req water for fertilizⁿ*
- Oogamous types of fertilisation is found in bryophytes.

↳ female gamete stationary
↳ Male is mobile

Gametophyte (n)

- Dominant
- Independent

Sporophyte

- Dependent ($2n$) on gametophyte
- Spores are produced in sporophyte

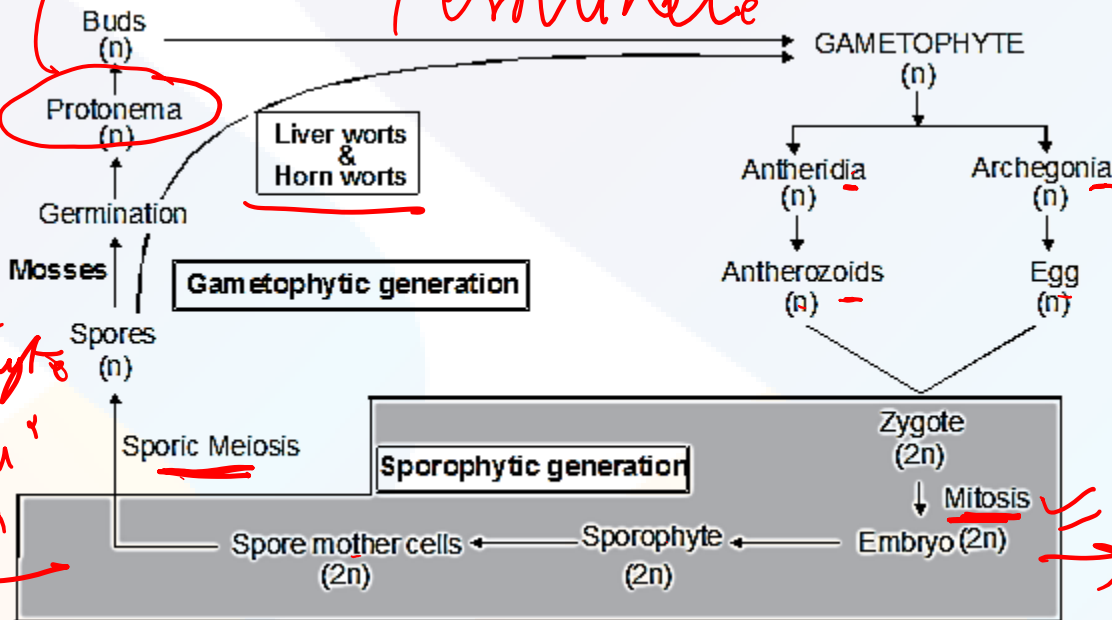
Life cycle of Bryophyte

KONKERT

Germinate

Young juvenile gametophyte

Redu' DIV'

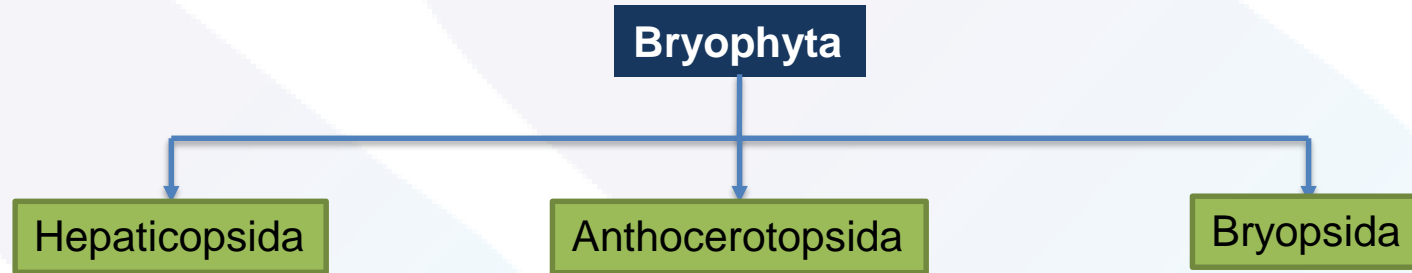


Embryo phyla

Alternation of generation

Bryophyta – Classification

Bryophyta is divided into three classes



- Bryophytes are of liver or flat shape so are known as liverworts.
- Plant body is thallus (Rhizoids and scales) like and dorsiventral.
- There are tiny leaf like appendages in two rows on the stem like structures.
- The sporophyte of Liverworts is made up of foot, seta and capsule.
- E.g. Riccia, Marchantia, Cryptothallus, Riella, Pellia, Porella

only capsule

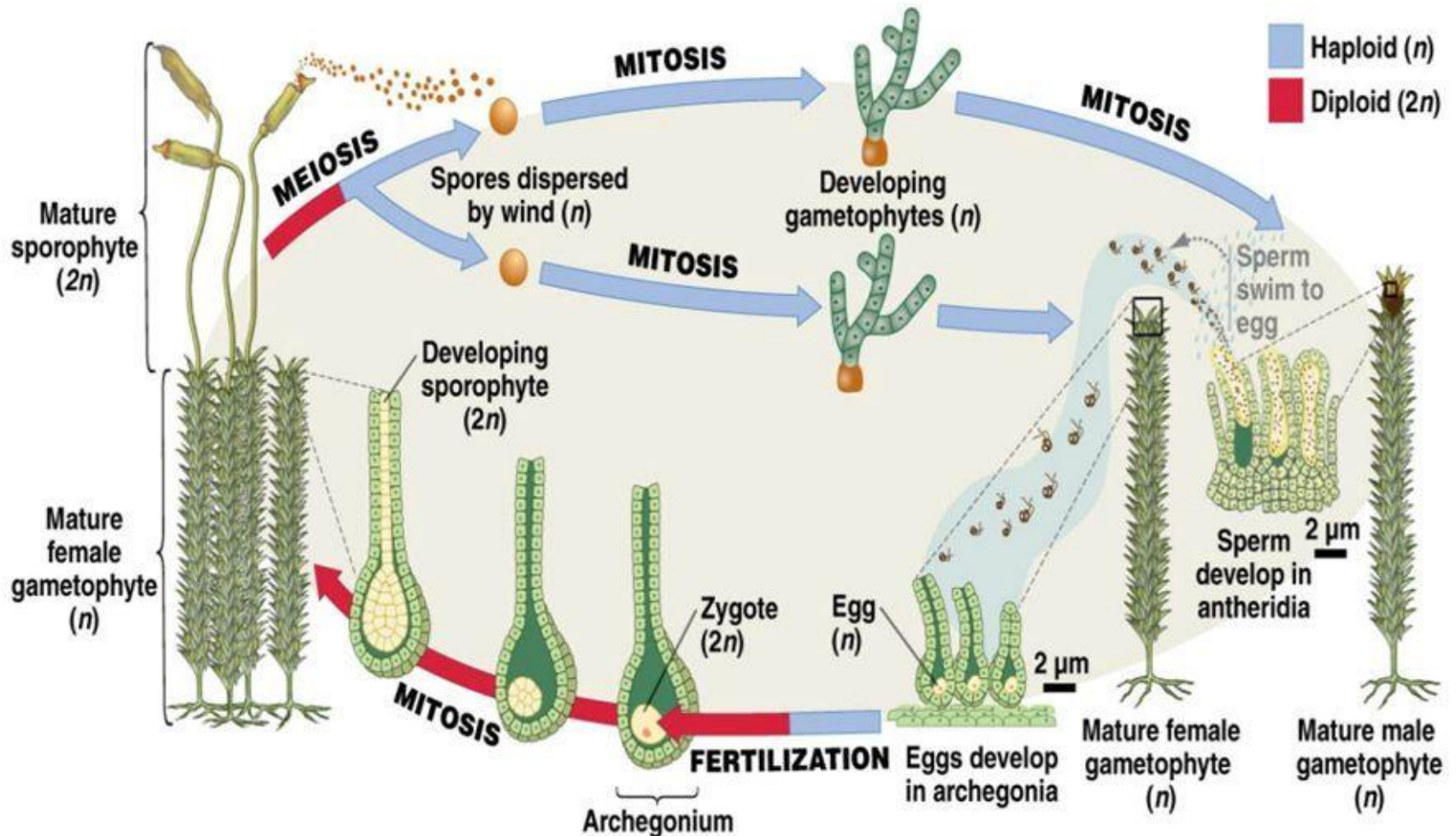
- The plant body of Hornworts is also thallus like (rhizoids only).
- The sporophyte is divided into foot and capsule and it is photosynthetic therefore it can manufacture its own food.
- e.g. Notothylus, Anthoceros

- The plant body of mosses is stem like, leaf like and rhizoids.
- The sporophyte is highly developed, divided into foot, seta, and capsule & is photosynthetic.
- In sexual reproduction, sex organs produce at apex of leafy shoots.
- E.g. Funaria, Dawsonia

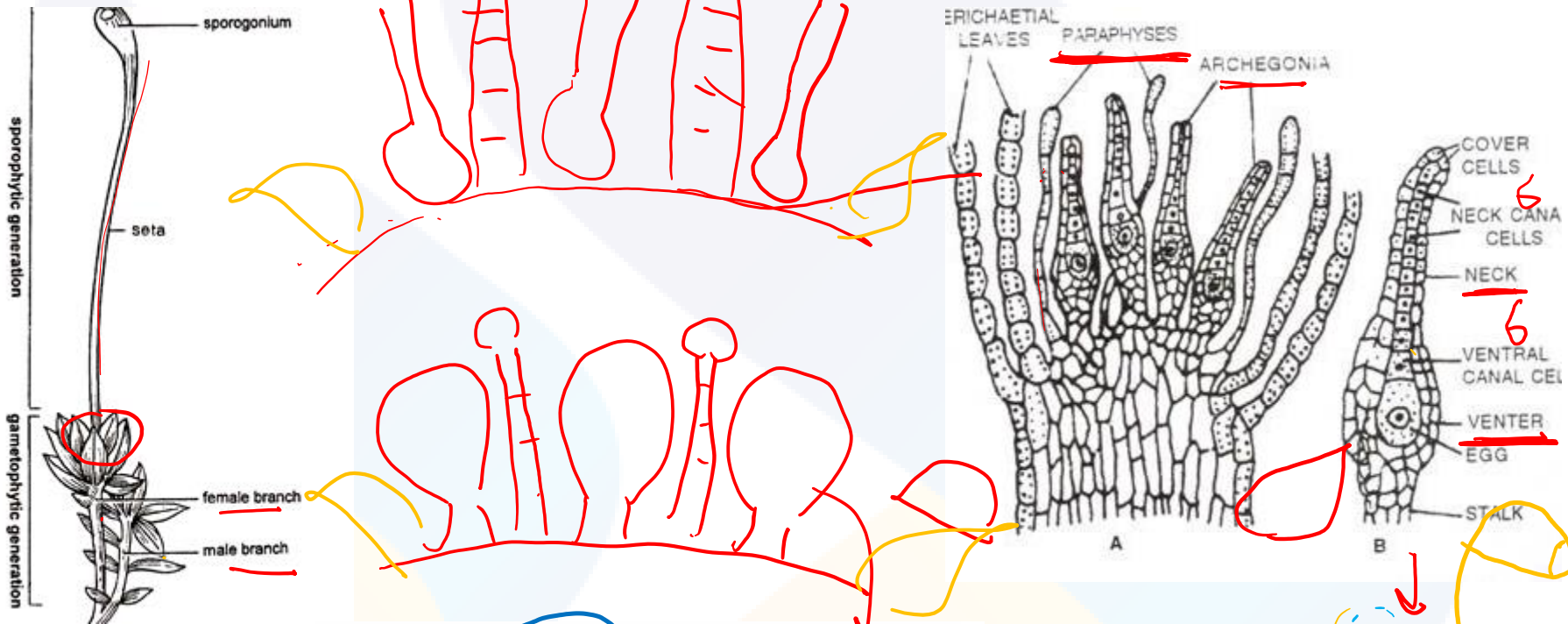
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50cm

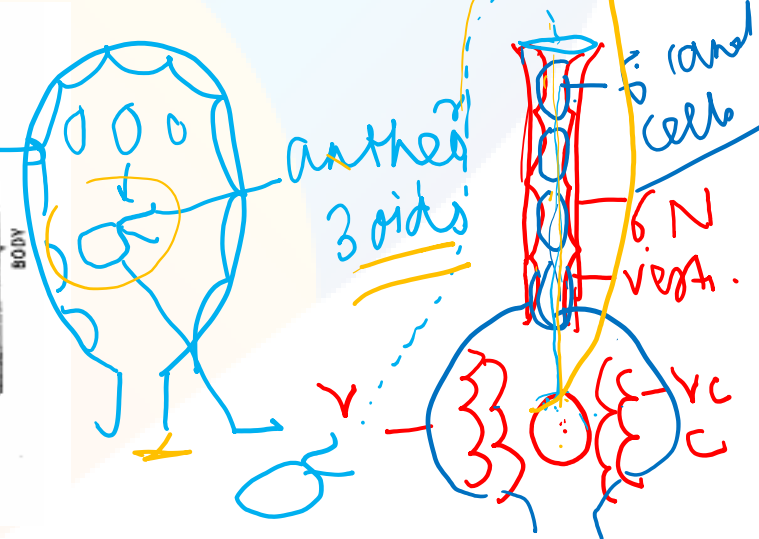
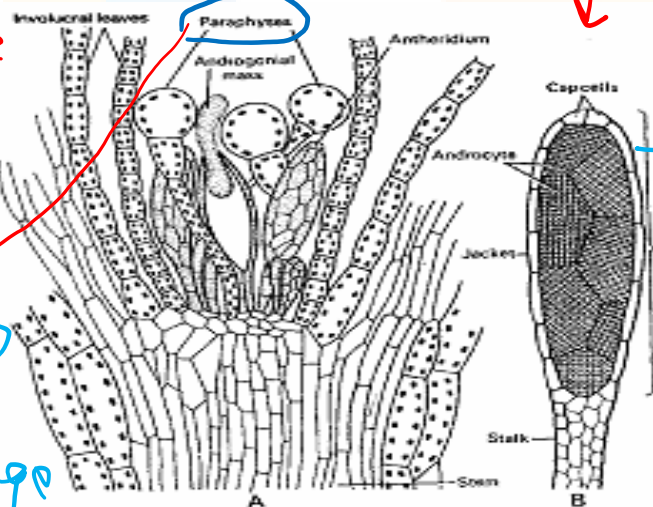
Life cycle of funaria



Funaria- Antheridia and Archegonia



Game to phyte
 Funaria
 Absorbs H_2O
 Secretes mucilage



Life cycle of Funaria

