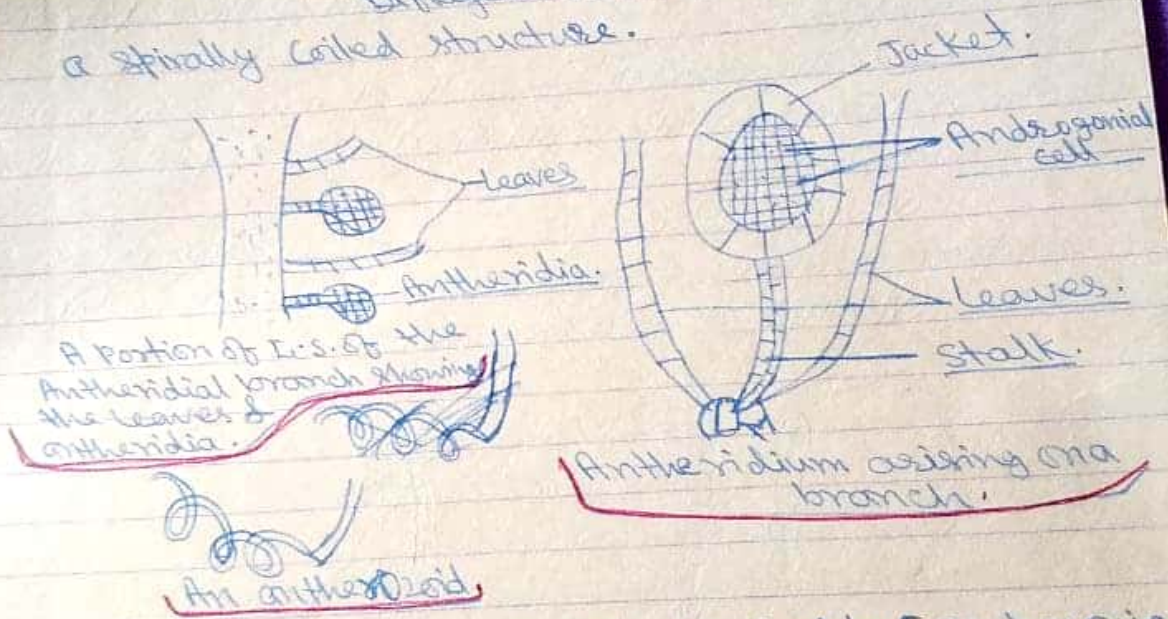


(i) Antheridium: → The antheridia are born by the antheridial branches in acropetal succession situated in between the leaves.

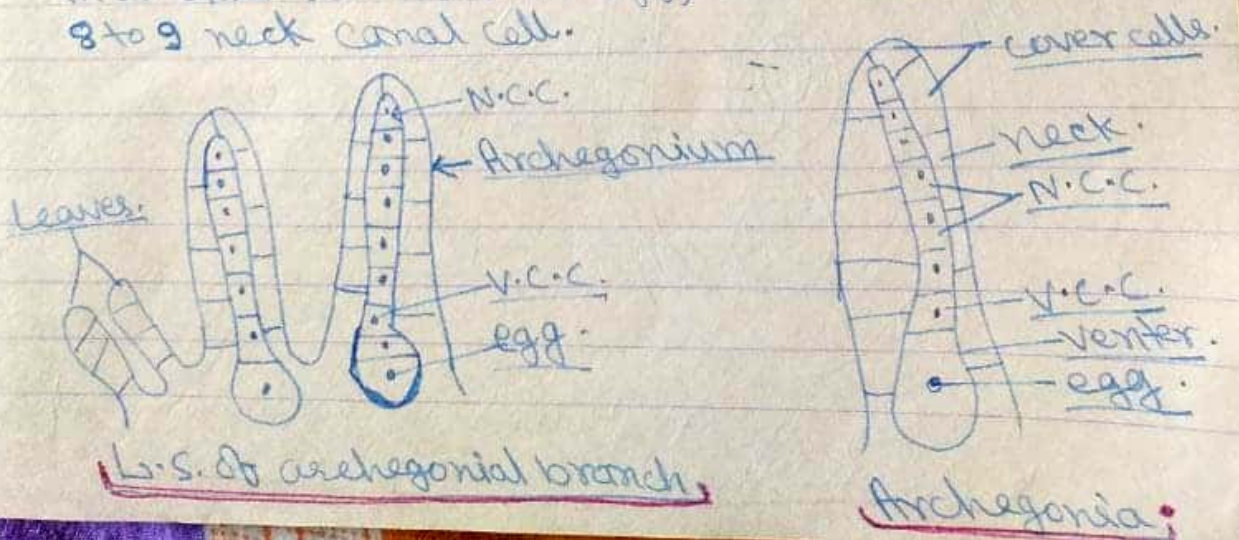
The mature antheridium has long stalk and a nearly spherical or oval body. The multi-layered stalk is made up of 2 to 4 rows of cells. The body has a single layered jacket enclosing a large no. of androcytes.

Biflagellate mature antherozoid is a spirally coiled structure.



(ii) Archegonia: → A row of 1 to 5 archegonia develop at the apex of archegonial branch in a cluster.

A mature archegonium has a long stalk a massive venter and a long twisted neck. The neck has in an axial row inside the egg, the ventral canal cell & 8 to 9 neck canal cell.



Conclusion: → Sphagnum is a quite interesting genus combining such characters hepaticae, Anthoceros and still other of higher musci.

From the above account of affinities of sphagnum with various classes, it becomes evident that sphagnum combines the character of all the three classes of Bryophyte. It has some characters in common with the anthocerotae, where as other well marked characters of musci are possessed. This suggest that sphagnum forms a connecting link between anthocerotae & musci.

~~and~~

✓ Affinities: → Sphagnum shows relationship with the Hepaticae and the Anthocerotae on the one hand with the higher musci on the other.

Affinity with Hepaticae: →

① Resemblance of the thalloid protonema of Sphagnum with the Juvenile stage of some acrogynous Jungermanniales, such as Metzgeropsis pusilla.

② The development, position, form and dehiscence of antheridium in Sphagnum resemble with acrogynous Jungermanniales.

③ Origine development & position of archegonia resemble with acrogynous Jungermanniales.

④ Presence of rudimentary stomata as in Jungermanniales.

Affinity with ~~Anthocerotae~~ Anthocerotae: →

① The development of the archesporium from the amphithecium.

② The origine of columella from the whole of the endothecium endothecium.

③ green tissue in the capsule.

④ Large bulbous foot & rudimentary seta.

⑤ Absence of apical growth in the sporogonium.

Affinity with Bryopsida: →

① Erect leafy gametophyte.

② Rhizoids with oblique septa.

③ The structure of the leaf with living green cells associated with hyaline, dead cells with pores, as in Leucobryaceae.

④ Growth of the leaf & sex organs by the activity of the apical cell.

⑤ The multicellular stalk and massive venter of archegonium.

⑥ Dehiscence of capsule by a definite operculum.

⑦ Presence of a Pseudopodium as in the Andreaeales.

④

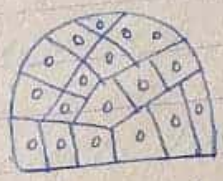
③ Growth: → The growth is by means of tetrahedral apical cell.

④ Leaf: → The leaves are sessile and entire without midrib made up of a single layer of cells. Cells are of two types.

- A) Narrow elongated living chlorophyll containing cells.
- B) Dead hyaline cells with rhomboidal outline having spiral or annular thickening and circular or oval pores on their walls.



Leaves at successive stages of development



Surface view of very young leaf.

⑤ Stem: → It has an axial cylinder of thin-walled, colourless elongated parenchymatous cells which merges out side into thick walled proserenchymatous cells. The outer most region of the stem is the cortex which is one or more layered in thickness. Some of the epidermal cells are modified into specialize retort cell in some cases.



T.S. of lateral branches of gametophyte.



Retort cell

Leaves showing retort cell

⑥ Sex-Organ: → The sex-organs are born on slightly modified short special branches. It may be monoecious or dioecious.

⑦ Sporophyte: → The sporophyte takes its origin from the single celled diploid zygote - a product of sexual fusion.

Sporogonium: → (i) The mature sporogonium is differentiated into an enlarged foot, a rudimentary constriction like seta and a large rounded capsule.

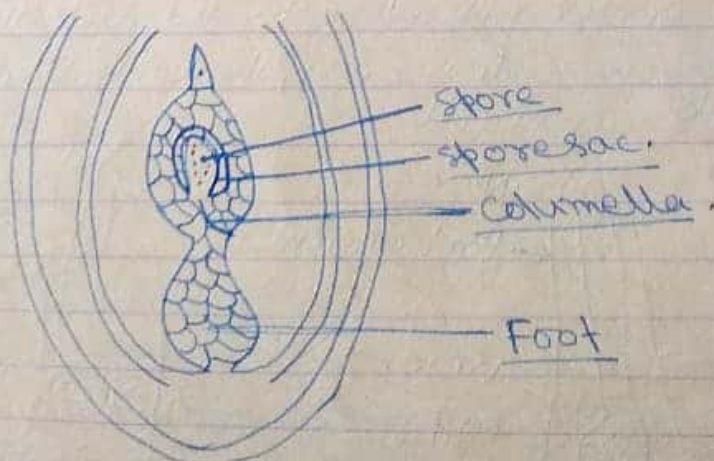
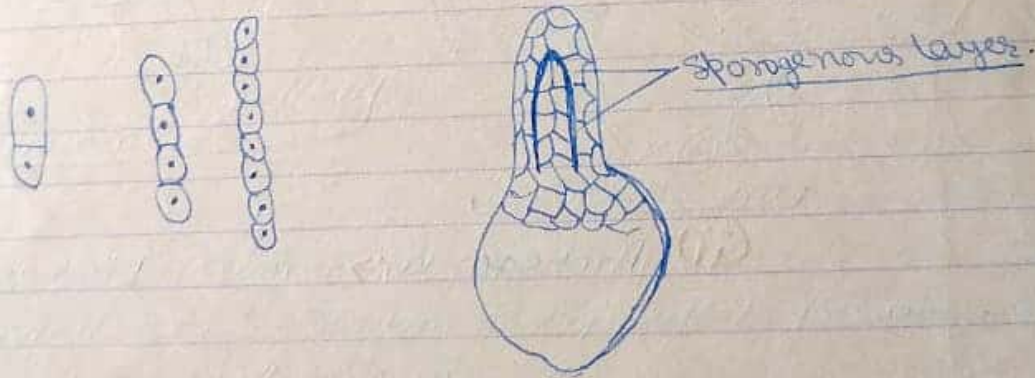
(ii) The presence of leafless, stalk like pseudopodium carrying the ripe sporogonium at its top.

(iii) The development of columella from the entire endothecium. It occupies the major part of the cavity of the capsule.

(iv) The development of the sporogenous tissue as an inner layer from the amphithecium. It caps the columella like a dome.

(v) The dehiscence of the ripe capsule by the separation of a disc shaped lid or operculum at its top.

(vi) The absence of peristome teeth.



L.S. of sporophyte and the surrounding gametophyte tissue.

Q. → Describe the salient feature of Sphagnum and discuss its affinities.

Ans. → Systematic position: →

- Division — Bryopsida or Musci.
- Class — Sphagnidae.
- Order — Sphagnales.
- Family — Sphagnaceae.
- Genus — Sphagnum.

Sphagnum is an interesting type showing a number of structural and developmental characteristics. Salient feature in the life-history of Sphagnum is as follows: —

① Distribution & Habitat: → A cosmopolitan genus which is aquatic, erect & perrenial characterised by the slow death of the older portions. The dead portions on partial decomposition form a compacted dark coloured substance called 'Peat'. Hence commonly the genus is called Peat moss, 'bog moss', 'turf moss'.

② Leafy gametophyte: →

① External characters: → The plant is a leafy gametophyte having an upright stem branching freely with clothing of small leaves. Dense clusters of short stout leafy branches at the apex represent the branches of limited growth. The terminal cluster of closely set branches protecting the apical bud form a conspicuous, compact head called 'Coma'. Branches of unlimited growth arise here and there.

② There is the complete absence of rhizoids.

③ Presence of strongly developed branches of limited growth at places called 'innovation' which on detachment grow into new plant.

