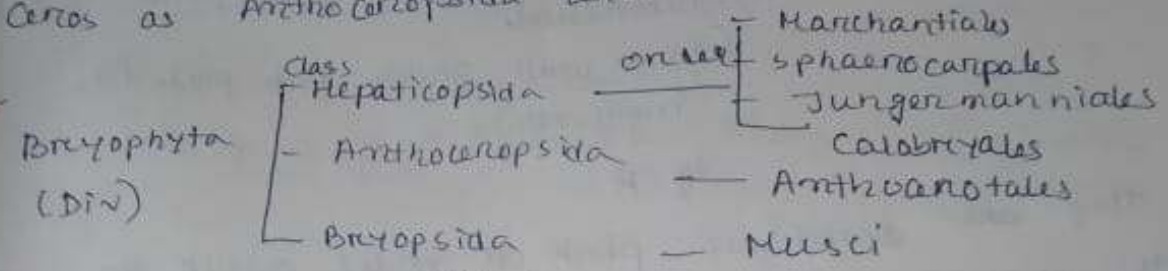
Rothmaler and Proskauer supported above classⁿ.
According to ICBN they called Hepaticae as Hepaticopsida, Anthoceros as Anthocerotopsida and Muscias Bryopsida



Riccia

External features / Morphology of Riccia:

→ The gametophyte is flat, prostrate, dorsiventral, dark green and dichotomously branched.

→ The branches are linear to wedge shaped.

→ Riccia form rosette like str. due to P/of several dichotomies close to each other.

→ In most species of Riccia midrib is found on the dorsal surface.

→ The midrib is represented by shallow groove, known as dorsal groove or furrow.

→ At the apical portion midrib ends in a depression, known as apical notch.

→ The ventral surface of the thallus bears rhizoids and scales. The rhizoids are

of two types : i) Smooth walled rhizoids (Inner walls are stretched and smooth) eg: R. melanospora

ii) Tuberculate (Inner wall grows into plate like ingrowth)

eg: R

* They are sometimes pink or violet colour due to presence of anthocyanin pigment
* the ♂ and ♀ sex organ opens on dorsal surface through ostiole
* Riccia are generally terrestrial (R. frostei, R. cruciata) and R. fluitans an aquatic sp.

Classification :

Div: Bryophytes

Class: Hepaticopsida

~~Order :~~
~~Sub-class :~~

Order : Marchantiales

Family : Ricciaceae

Genus : Riccia

Anatomy :

Anatomically, the thallus is differentiated into a dorsal photosynthetic and a ventral storage region.

A. Photosynthetic Region
B. Storage Region

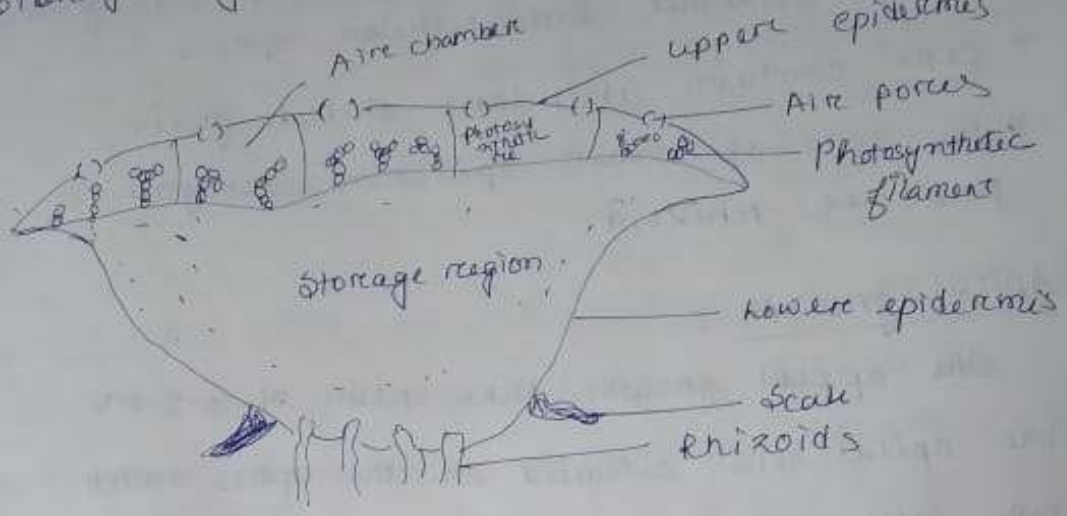


Fig: V.T of thallus.

1. Photosynthetic zone:

→ consists of compactly arranged vertical rows of chlorenchymatous cells (assimilatory filament) separated by narrow vertical air chamber.

→ In most sp. the air chambers in photosynthetic region are usually in a single row but in R. robusta, R. cruciata and R. fluitans occur many irregular rows

→ Cells possess chloroplast and perform photosynthesis.

→ The pores helps in gaseous exchange.

2. Storage region :

→ Consists of compact, colourless parenchymatous tissue without intercellular spaces

→ Cells contain abundant starch grains

→ Few cells of lower epidermis elongate to produce rhizoids.

Apical growth :

The apical growth takes place of 3-5 one more apical cells situated in the apices notch. These cells appear triangular in vertical L.S and rectangular in transverse section. The apical cell derives from on dorsal and ventral sides. The ventral derivatives of the apical cell form only lower epidermis, rhizoids and scales.

Reproduction : In Riccia, reproduction takes place by vegetative and sexual methods.

Vegetative reproduction :

Fragmentation : In this method progressive death and decay of the older part of the thallus from posterior end reaches the dichotomy,

the two surviving branches become separate. Then each surviving branch grows independently by apical growth and finally develops into a new plant

→ Adventatious branches: In some sp. (R. fluitans) special adventitious branches, similar to parent thallus, arise from the mid-ventral surface of the thallus.

→ Tubers: In some sp. (R. discolor, R. perennis), at the end of growing season, the apex of the thallus grows down into the soil and becomes thick forming a ~~thick~~ thicker tuber like body.

→ Persistent apices: In R. discolor, ~~at the end of growing period~~, the apices of ~~thallus~~ grows down ~~into the soil become thick forming tuber like body~~. at the end of growing period, the apices of thalli grow down into soil. ~~The~~ plant under unfavourable cond^{n}, these apices come up and develop into new plant.

→ Gemma like body: In R. glauca, gemma like bodies are formed at tips of rhizoid. These str. ultimately develop into new plants.

Sexual reprod^{n} :

Sexual reprod^{n} in Riccia is oogamous type

i.e., union bet^{n} a motile flagellate male gamete and resting non-flagellate female gamete takes place. The gamete bearing organs multicellular and are called antheridium (male) and archegonium (♀) respectively.

Antheridium :

→ A mature antheridium is pear shaped with an open antheridial chamber. The chamber communicates with dorsal surface by pores.

→ The antheridium is attached to the base of the antheridial chamber by few celled stalk.

→ The antheridial body has flat broad base and a conical apex.

→ The body is surrounded by single layered cells

→ A central mass of cuboidal cells enclosed by jacket layer are the androcyte mother cell

→ Each androcyte mother cell, divides diagonally to produce two triangular androcyte.

→ Next gelatination of jacket cells towards the apex makes it more breakable.

→ Each androcyte ultimately metamorphoses into single spermatozoid.

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→ Metamorphosis cell wall archegonial get disorganized to form semi fluid mucilage content, in which mature antherozoids float freely.

→ The antheridium containing antherozoids, oozes out of the antheridial chamber to dorsal surface.

Archegonium:

→ The archegonium is differentiated into a basal swollen part the venter and an elongated protruding tubular portion, the neck.

→ The venter consist of single layered wall having more than six cell and encloses lower large egg with upper small ventral canal cell.

→ The tip of the neck covered by four specialized cells called cover cell.

→ When archegonium matured the canal cell degenerated.

→ Before fertilization the mucilagenous mass imbibes water.

→ Structure of archaegonium: Flask shaped.

i) Stalk

ii) Swollen venter: consist of single layered cell, it encloses a venter canal cell and at contain large naked egg.

iii) Long neck: six vertical rows consists of 6-9 tiers of cells.

→ Inside sporogonium are present many spore mother cells which remain surrounded by a capsule wall and 2 layered calyptra.

→ SMC divide reductionally, each of them thus forms four haploid spores.

→ Single layered calyptra is formed at later

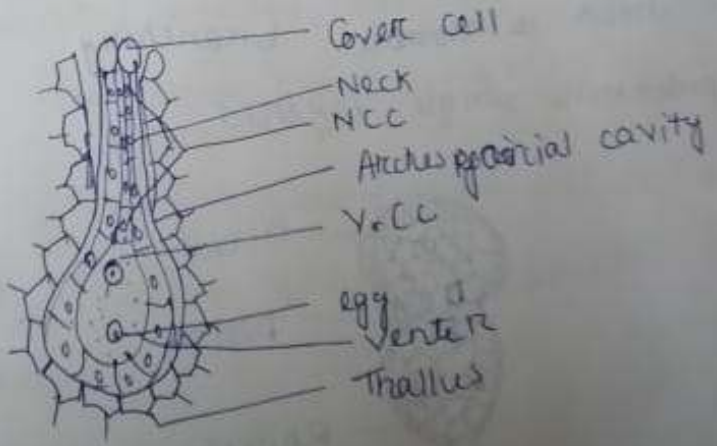
→ Elaters are absent

Spore:

→ It is the 1st cell of gametophytic region.

→ Shape of the spore is round or pyramidal

→ Spores germinate to sporophyte



↑ mature of Archegonium

Fertilization :

→ Water is needed for dehiscence of antheridia, opening of archegonial flask neck, movement of antherozoids to archegonia.

→ At maturity, the NCC and VCC disintegrate and become mucilagenous.

→ A passage is created at the opening of archegonial neck through which some mucilaginous substance oozes out.

→ Some of antherozoid enter into NCC.

→ A single antherozoids reaches first, fuses with the egg.

→ Fusion results form of diploid zygote.

Sporogonium :

→ It is simple and made up of only capsule or spore sac.

→ Foot and seta are absent.

→ It remains embedded in the gametophyte, non green str, depending entirely on the gametophyte for food.