

REPRODUCTION → The gametophyte reproduces through the following methods —

1. Vegetative Reproduction

2. Sexual Reproduction

1. Vegetative Reproduction →

- ⑤ By death and decay of older parts.
 ⑥ By Tubers as in Greenthallus.

2. Sexual Reproduction

① **Position of the sex - organs** → Plants are dioecious. Antheridia and Archegonia occur on ventral surface of the thallus in Sphaerocarpus and Greenthallus. In Riella the antheridia and archegonia are respectively formed on the free edge of the wing and on the stem at the base of the wing.

They are individually covered by a flask like smooth or longitudinally folded envelope.

ANTHERIDIUM

① **Development** → It is peculiar because it forms a type intermediate between those observed in the Marchantiales and the Zingermanniiales.

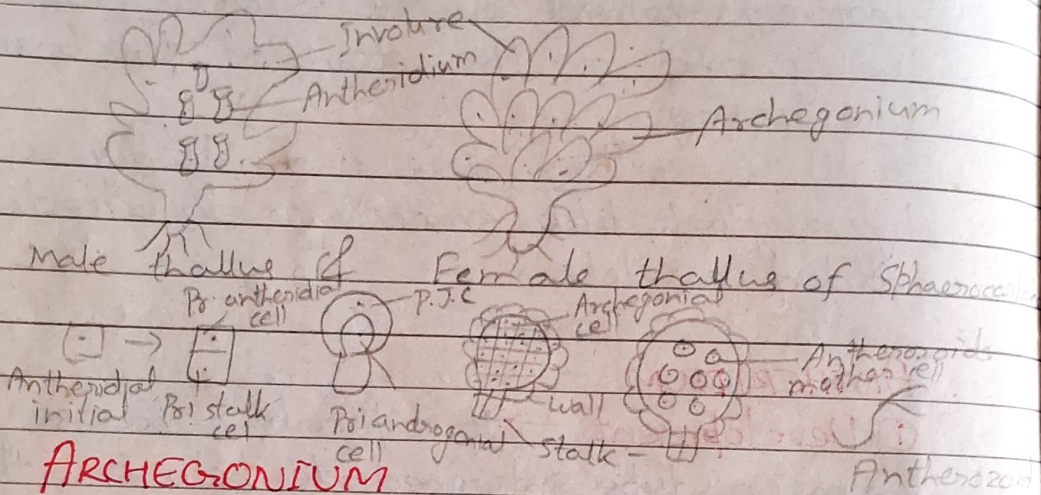
The antheridial initial divides transversely into an upper and basal cell which takes little part in the formation of the stalk.

The upper cell divides to form three superficial cells. The lower cell of the stalk where as the upper two cells undergoes vertical division to form an octant. Then by a periclinal wall the cell wall cell is cut off from

the group of primary sperm cells.

(iii) **Mature Antheridium** → The envelope of the antheridium is formed from the surrounding cells of the thallus.

It is short stalked in Sphaerocarpus and Riella but in massive stalked in Greothallus. The base is oval with a rounded or conical apex. Sperms are bicilliate and spiral.



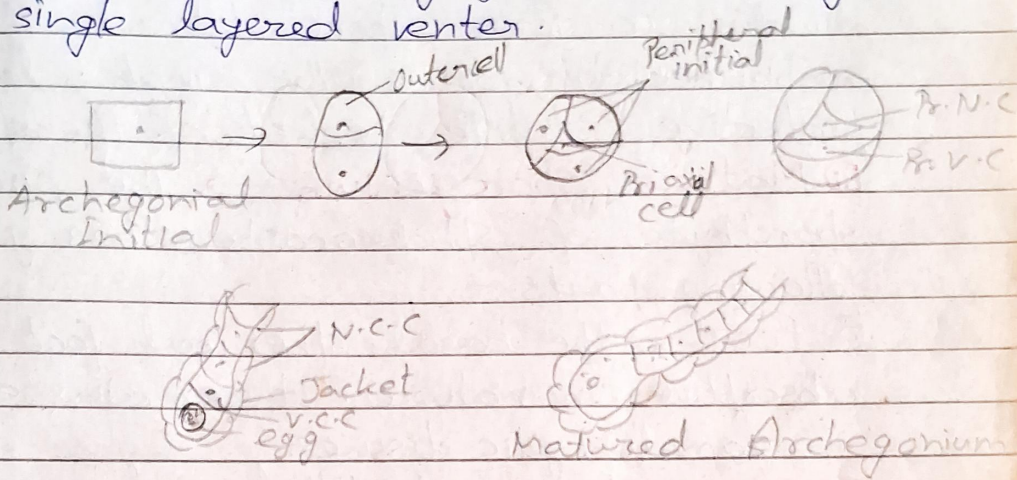
ARCHEGONIUM

① **Development** → The archegonia shows a typical liver wort development with one or two peculiarities.

The first division of the elongated mother cell is transverse forming a smaller outer cell and a comparatively bigger lower cell. The lower cell divides into nearly equal superimposed cells. The outer cell undergoes three successive vertical intersecting divisions to form three peripheral initials and a medium primary axial cells. They give rise the

typical archegonium in a typical Hepaticopsida manner.

iii Mature Archegonium → It is sessile with 6-9 neck canal cell. The egg is very large. It nearly fills the cavity of the single layered venter.



SPOROPHYTE

(i) Development → It starts with the elongation of the zygote. The 1st division is transverse, resulting in the formation of two nearly equal cells. The lower cell gives rise to the foot of the sporogonium, whereas the upper cell gives rise to a short neck-like seta and the spherical capsule. This is an approach towards the Marchantiales.

The upper cell divides transversely and then vertically into an octant and then a super-spherical mass of 20-40 cells. This is followed by differentiation of the amphithecium from the endothecium by a periclinal

division. The endobium differentiated into chloroplast and starch grains which are finally replaced by oil droplets. These are potential spore mother cell that divides to form spore tetrad. The amphithecium forms the single layered protective sterile jacket of the sporangium.

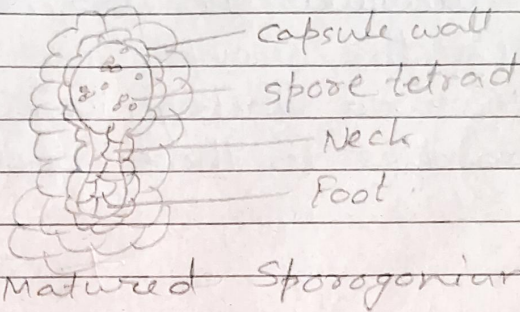
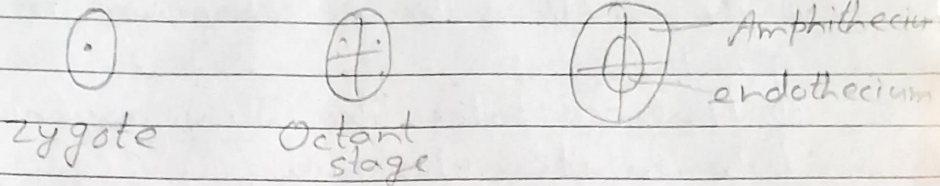
① **Mature Sporangium** → The single sporophyte of *Saprolegnia* has got the following parts -

② **FOOT** → The basal, spherical foot is absorptive in nature. It remains embedded in gametophytic tissues.

③ **SETA** → It is ill developed and membranous.

④ **CAPSULE** → The spherical capsule has a single layered jacket without any annular thickening. The capsule cavity contains spore tetrad that separate before the capsule opens in *S. cristata*. In *S. demeli* the 4 spores separate at maturity and in *S. trevisanii* 4 spores of the tetrad remain united within a common outer spore coat.

The spore show genotypic differentiation of sex out of 4 resulting plants 2 are common male and 2 female.



AFFINITIES

1. With Marchantiales → Sphaerocarpaceae are closely allied to Marchantiales in following features -

- (i) Thalloid plants or gametophore.
- (ii) Apical growth of the thallus is the same as in Riccia.
- (iii) Both have smooth walled rhizoids.
- (iv) Ontogeny of sex organs are of Marchantiales type.
- (v) Embryogeny is of Marchantiales type.
- (vi) Capsule wall is single layered in both Sphaerocarpaceae and Marchantiales.
- (vii) Spore mother cell become spherical before tetrad division as in Marchantiales.
- (viii) Germination of spore is like that of Riccia.

2. With Zugermanniales →

- (i) The thallus in Sphaerocarpaceae shows a tendency to form leaves as in Zugermanniales.

- ⑩ The thalli lack air chamber in both the groups.
- ⑪ Sphaerocarpaceae like Jurgenmanniales lack tuberculate rhizoids.
- ⑫ Multicellular globular hairs are present in both the groups.
- ⑬ Mature archegonium in Sphaerocarpaceae resembles to those of Jurgenmanniales.

— + —