

Sporophyte of Marchantia

The fertilized egg i.e. Zygote ($2n$) enlarges in size and fills up the whole venter. The zygote secretes a cellulose wall around it. It divides and redivides to form an embryo.

Postfertilization changes in the associated gametophytic

tissue: Following fertilization stalks of archegoniophore elongates from the upper surface of the disc develop green cylindrical processes ^{paper, stout} called the rays, the cylindrical sheath perigynium, a two-lipped membrane, the perichaetium on either side of a row of archegonia are developed.

Development of sporogonium: The first division of the zygote in relation to the axis of the archegonium is transverse forming an upper-epibasal and a lower-hypobasal cell. A second division at right angles to the first results in a quadrate embryo in M. polymorpha and M. domingensis. But in M. chenopoda, the second division is parallel to the first resulting a three celled filamentous embryo. The upper cell which is on lower side develops into the capsule and the lower cell into foot and the middle cell into seta.

The quadrant globose embryo divides to produce the octant stage. At this stage, the embryo grows vigorously. The four epibasal octant (अधो) nearest the neck of archegonium by repeated cell divisions gives rise to capsule. The four hypobasal octants form the foot & seta. Periclinal divisions appear in the embryonic capsule portion resulting the separation of outer single layered amphithecium and inner mass of endothecium. The amphithecium cell divides

Jill = अरुण

associate =
सहकार
सहायक

adrate =
कर्मकार,
पुरु पकौठाक

orously =
अ-युक्त,
healthy.

Jusiform =
जुसिफॉर्म

to form a single layered capsule wall whereas the endothecium forms the archesporium. The archesporium divides mitotically to form the sporogenous tissue. The sporogenous tissue differentiates into elater mother cell & spore mother cells. The elater mother cell elongate to form long slender diploid fusiform elater which have two spirally thickening bands on the inner surface of its wall. The spore mother cell divides by meiosis and forms haploid spores.

Structure of mature sporogonium:-

The mature sporogonium is somewhat elongated structure differentiated foot, seta and capsule.

Foot: It is bulbous parenchymatous structure. It is embedded in the tissue of the female receptacle on its lower surface. It is an absorptive and anchoring organ.

Seta: The seta is an intermediate zone connecting the foot with the capsule. It is a very short structure having vertical rows of cells. With the formation of spore tetrads in the capsule the seta elongates slightly. The slight and sudden increase in the length of the seta pushes the capsule up causing ruptures of all the surrounding sheaths like calyptra, perigynium and perichaetium. Physiologically it transports water and food nutrients from foot to capsule.

Capsule: The capsule is oval or elliptical structure attached with seta. It is surrounded by a single layer of jacket at the base where it is more than one layer in thickness. The jacket cells have

slight = थोड़ा
थोड़ा, थोड़ा

Transport =
परिवहन

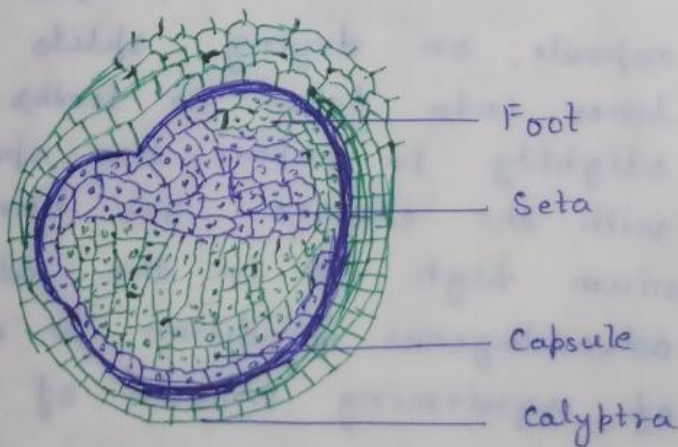
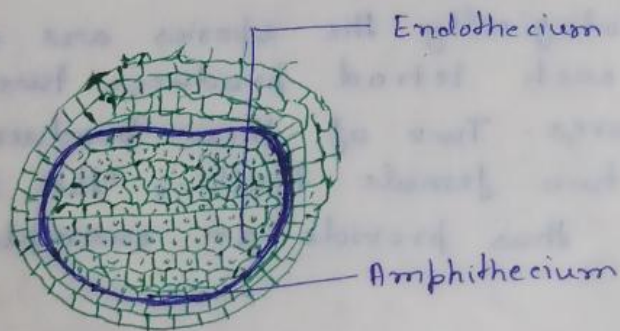
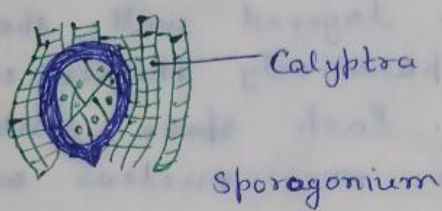
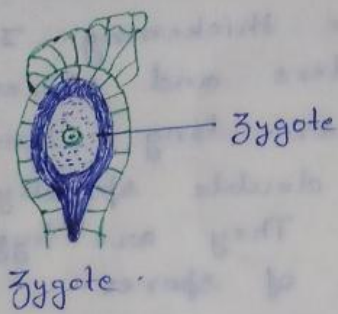
more or less annular ^{striae} thickening. Inside the jacket, there are elaters and spores.

Elaters: The elaters are long, slender fusiform structure. They have double spirally thickened bands on their walls. They are hygroscopic and help in the dispersal of spores.

Spores: The spores are tiny, rounded structures encircled by two layered wall - the outer smooth or reticulate comparatively thicker exine and inner thin intine. Each spore contains a tiny mass of cytoplasm, one nucleus and reserve food. Morphologically the spores are all alike but genetically each tetrad produces two different kinds of spores. Two of these produce male thalli and other two female thalli, the spore of marchantia thus provide an example of physiological heterospory.

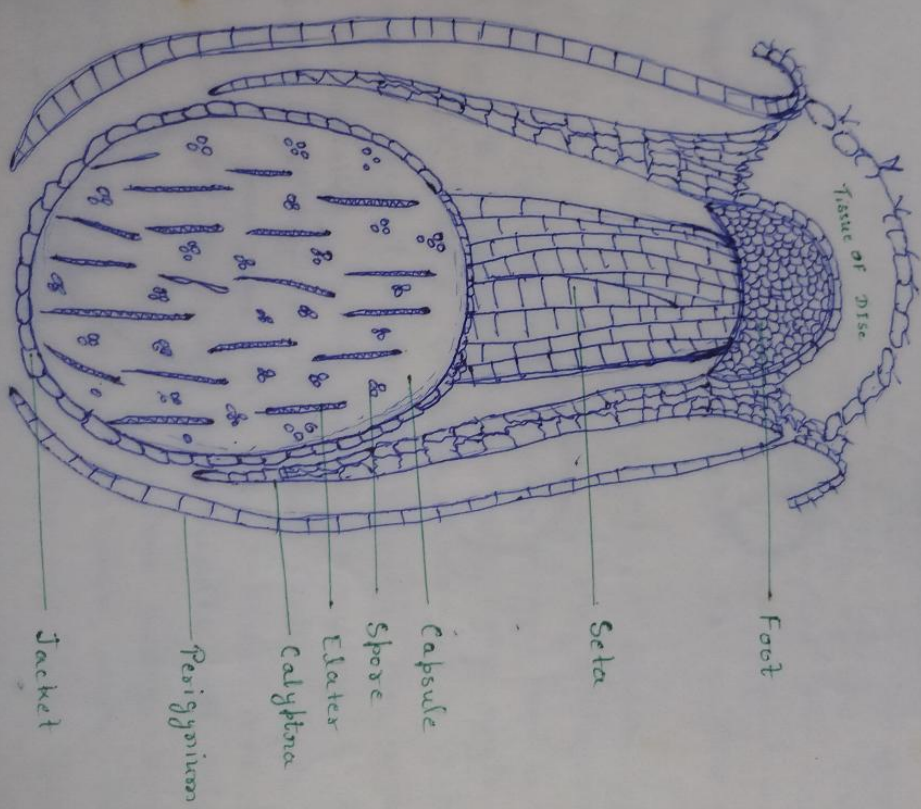
Dehiscence of capsule: The mature exposed yellowish capsule, on drying, splits vertically along 4 to 6, lines into lobes or teeth. These teeth roll back slightly to expose the spore mass intermingled with the elaters. The hanging position of sporogonium high up in the air is an additional advantageous condition to eject spores with the air of squirming motion of elaters.

Germination of spores: - The spores after liberation shed on the soil and germinates immediately under favourable conditions. After germination the irregular small thallus is formed which gradually increases in size to form the full Marchantia thallus.



Development of Sporogonium

Note: - 3112 621111 figure 21 of Sporogonium from fig. 4 213 21



L.S. OF Mature Sporegonium