

DEPARTMENT OF BOTANY
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BY: DR. RANJANA
ASST. PROFESSOR
(GUEST)

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B.Sc. PART I PAPER - II

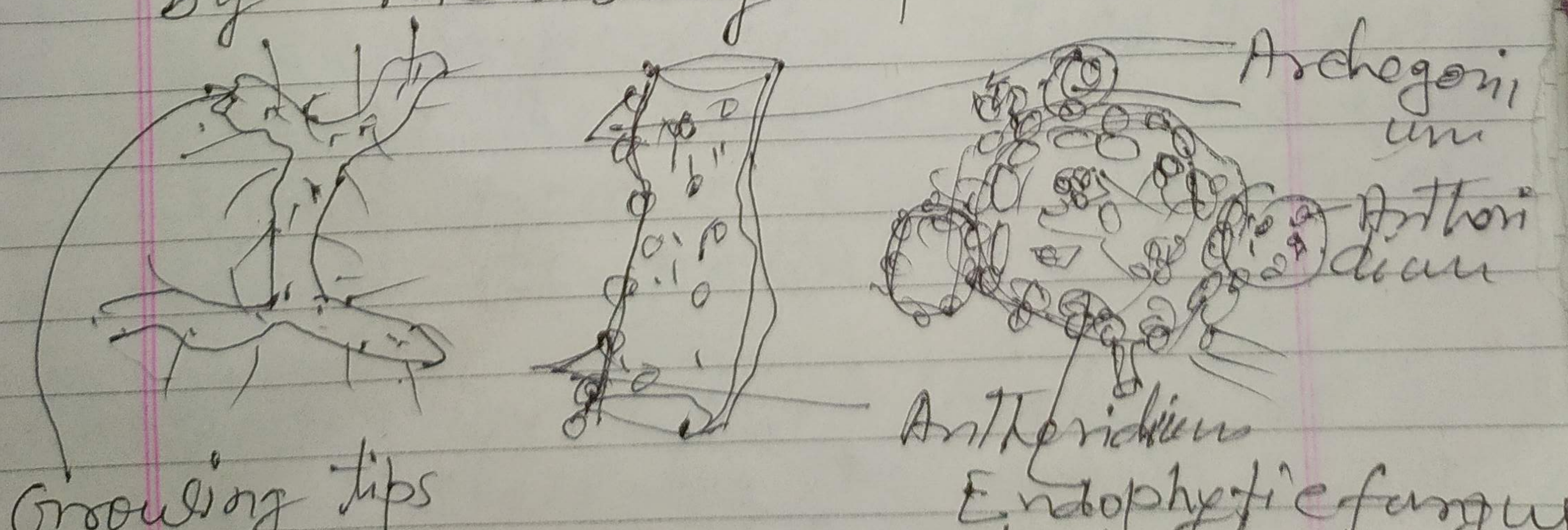
CORE CONCEPT OF ~~P~~TERIDOPHYTE

PSILOTUM III:

Gametophyte: The mature gametophyte shows a striking similarity with a piece of sporophytic rhizome. It grows as saprophyte with an associated fungus.

Spores germinate exosporeally to form the gametophyte. The mature gametophytes are brown cylindrical subterranean, radially symmetrical and usually dichotomously branched, but may sometimes become irregular.

The surface of the gametophyte is covered by long unicellular, brownish rhizoids. It grows by means of apical meristem.



The T.S of gametophyte section reveals cutinised peripheral

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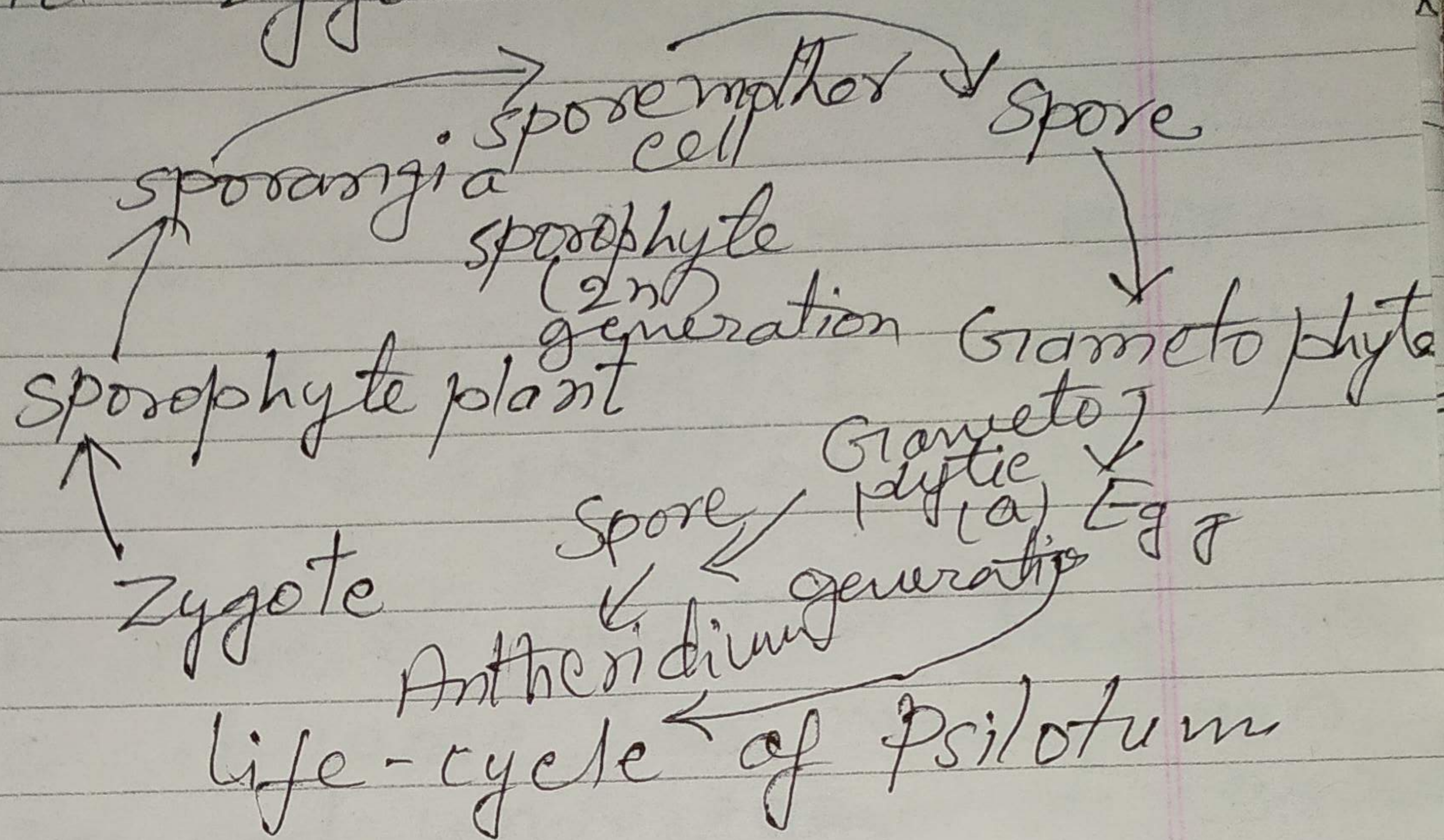
cells which encloses many-layered thin walled parenchymatous cells. The centre is occupied by xylem with annular & scalariform and reticulate tracheids & surrounded by xylem phloem and an endodermis.

Thus *Psilotum* is only plant in the plant kingdom where the vascular tissues develop in the gametophytic generation. The external resemblance of the sporophytic rhizome and gametophyte couple with the presence of vascular tissue in the gametophyte.

Sex organs: The gametophytes of *Psilotum* are monoecious. Sex organs Antheridia and Archegonia. Antheridia are superficial and scattered over the surface of the gametophyte. Antheridia are more in number than archegonia. The antheridium develops from a single superficial cell of the prothallus. The archegonium is also developed from a single superficial cell of the prothallus.

Fertilization: Fertilization is accomplished by the union of a multiflagellate sperm and egg.

resulting in the formation of a diploid zygote.



Embryo (New Sporophyte):
 The diploid zygote is the mother cell of the sporophytic generation. The first division of zygote is transverse forming an outer epibasal cell and an inner hypobasal cell. The apical epibasal cell ultimately gives rise to sporophytic branch system (aerial and underground) while the lower epibasal produces the foot. This type of embryony where the shoot forming apical cell is directed outward is called exoscopic mode of embryo development. The foot anchors the young sporophyte securely to the gametophyte and absorbs nutrients until the sporophyte.