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Sporophyte of *Psilotum*:

The sporophyte reproduces by vegetative propagation as well as by spore production.

1. Vegetative Propagation:

The sporophyte increases its number by the production of gemmae or brood bodies. These are formed on the rhizome and are usually restricted to the tips or the axils between the branches. Each gemmae is an oval body, one cell in thickness having an apical cell with two cutting faces. The cells are rich in reserve food especially starch. The gemmae detach from the plant body germinate and give rise to a new plant of *Psilotum*.

2. Spore Production:

The sporophyte reproduces asexually by the formation of spores. Spores are produced in special trilobed structures called synangia which are generally restricted to the upper portions of the aerial shoots where they are borne in the axils of minute bifid scales.

Development of the Synangium:

Our knowledge of the development of synangium is mainly due to the work of Bower (1935). The development is apparently of the eusporangiate type, even though each sporogenous mass appears to originate from a single cell. According to Bower (1935) the synangium arises as an outgrowth on the adaxial face of the appendage.

The first division of the synangial initial produces an outer jacket initial and an inner archesporial cell. The jacket initial undergoes a number of anticlinal and periclinal divisions to produce the multilayered wall of the synangium.

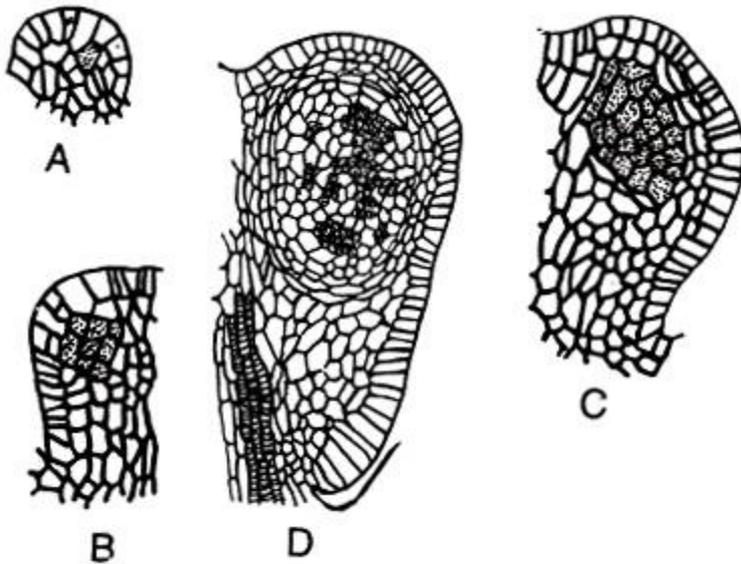


Fig. 22. *Psilotum*, Stages in the Development of Sporangium

Meanwhile, the archesporial cell divides in all the planes to form a large number of sporogenous cells. There is no well defined tapetum. In the sporogenous tissue some cells here and there distinguish themselves by their dense granular cytoplasm from the remainder. These are the spore mother cells. Rest of the sporogenous cells gradually degenerate. The spore mother cells undergo reduction division to produce tetrads of haploid spores.

Structure of the Mature Synangium:

The wall of the trilobed synangium is made up of 4-5 layers of cells. The outermost layer of the wall is prismatic. Within the synangium there are three chambers of spore cavities containing spores. All the spores are of the same type.

Dehiscence of the Synangium:

When the spore mother cells are undergoing reduction division some of the wall cells thicken except in a small vertical row marking the future line of dehiscence. The synangium splits open along this line liberating the spores.

Structure of the spore: Spores vary in shape from bilateral to tetrahedral type. Their average size is 0.065 x 0.032 mm.

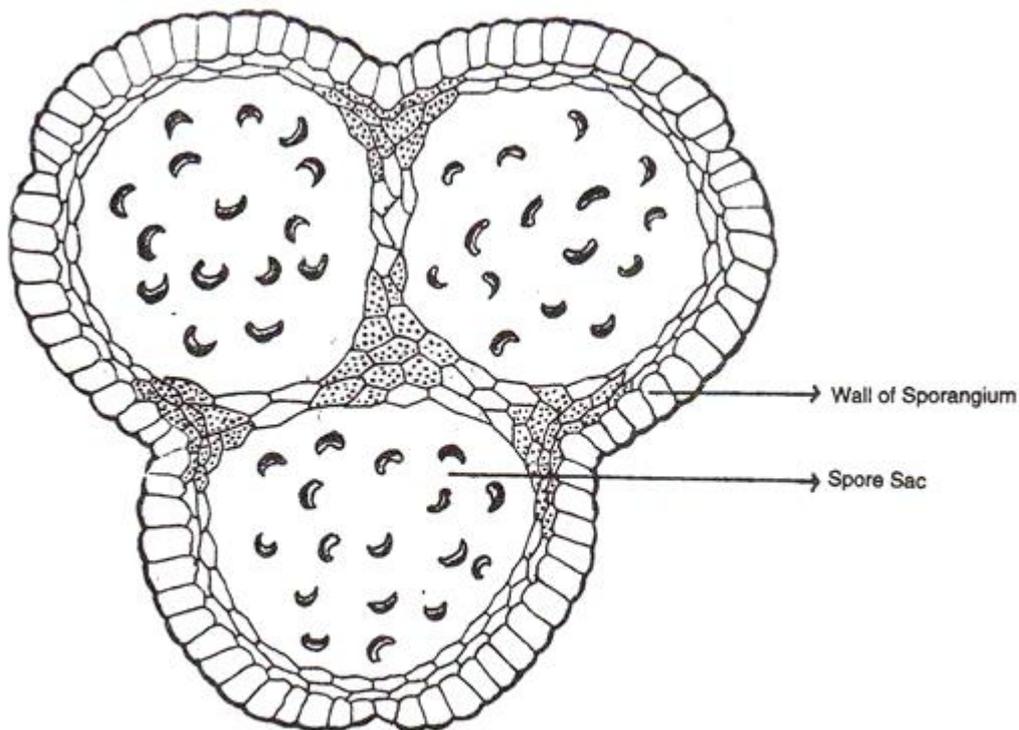


Fig. 24. *Psilotum*, T.S. of Mature Synangium with Spores

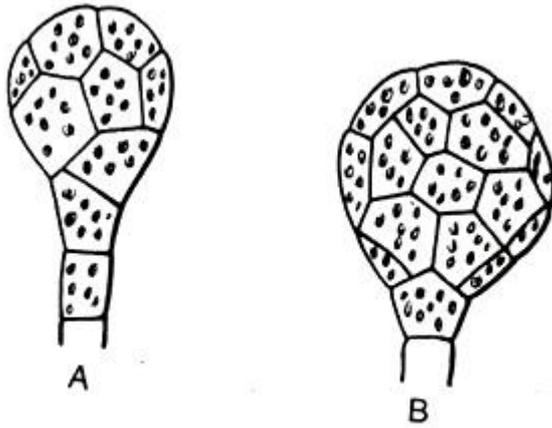


Fig. 25. *Psilotum* : Sporophytic Gemmae (Note the starch grains in cells)

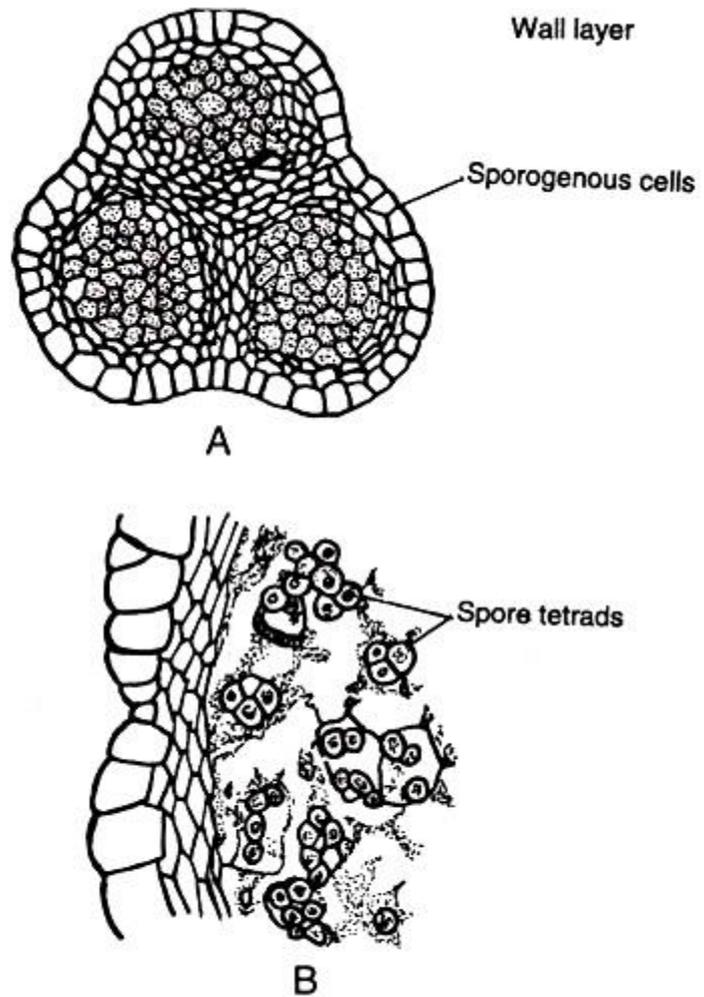


Fig. 23. *Psilotum*
 A. T.S. of Young Synangium, B. Sectional View (a portion) of Synangium with Spore Tetrads
