

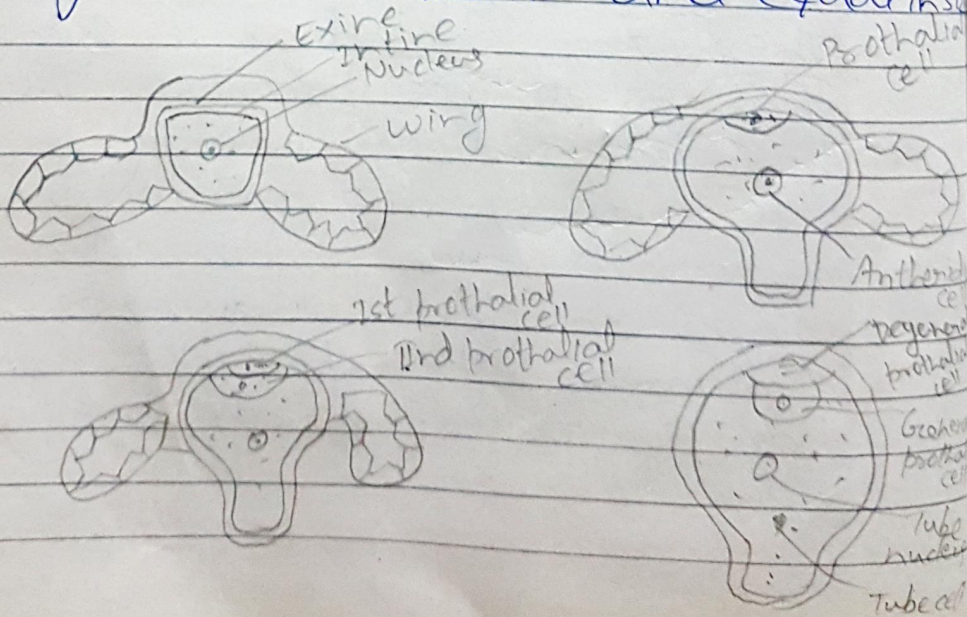
Q. Mention in detail the development and structure of male gametophytes in gymnosperms with reference to the type studied by you.

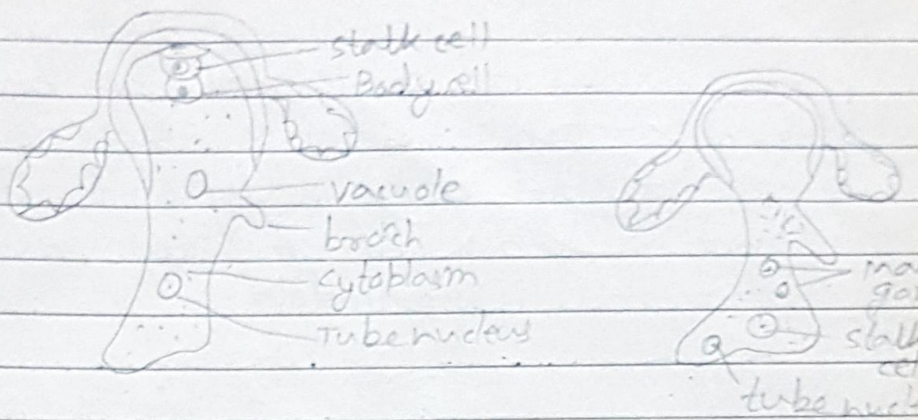
INTRODUCTION → Gymnosperms are hetero-sporous. The microspore mother cell divides reductionally into haploid microspores which represent the first cell of micro or male gametophyte. The male gametophyte in gymnosperm shows variation regarding their release from sporangia the number of male prothallus cells, size and motility of male gametes and then time of formation and discharge. They are endosporic and complete their development partly in the microsporangium and partly in the pollen chamber.

STRUCTURE OF MICROSPORE → The microspores are unicellular and haploid structures. They are tetrahedral in Cycas and show a distinct polarities. They are biwalled and uninucleate. In Taxus the uniapecturate and spheroidal microspores have smooth exine. They are winged in Pinus and Abies. In Cryptomeria, the spherical microspores have a well marked papilla on one side.

DEVELOPMENT & STRUCTURE OF MALE GERM -ETOPHYTE IN GYMNOSPERM →

PINUS → In Pinus the microspore divides twice to give rise two prothallial cells and a antheridial cell which again divides to give rise the tube nucleus and a generative cell. Now it is four celled stage. The microsporangial wall ruptures to release the semi germinated microspores. They become transferred pollen chamber like Cycas through pollendrop mechanism. The tube nucleus elongates to form the pollen tube. It unlike Cycas functions as a sperm carrier. The generative cell divides to give rise the stalk cell and the body cell. The nucleus of the body cell migrate into pollen tube and then divides mitotically into two nuclei. They form the male gametes. They are non-motile and equal in size.



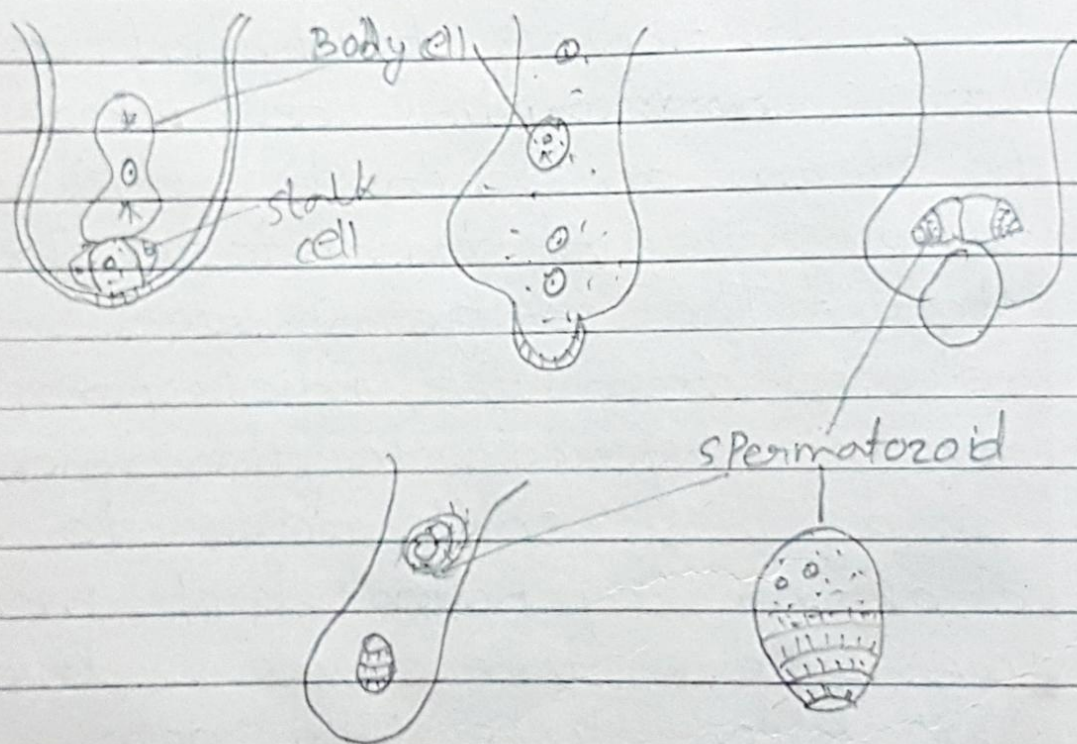
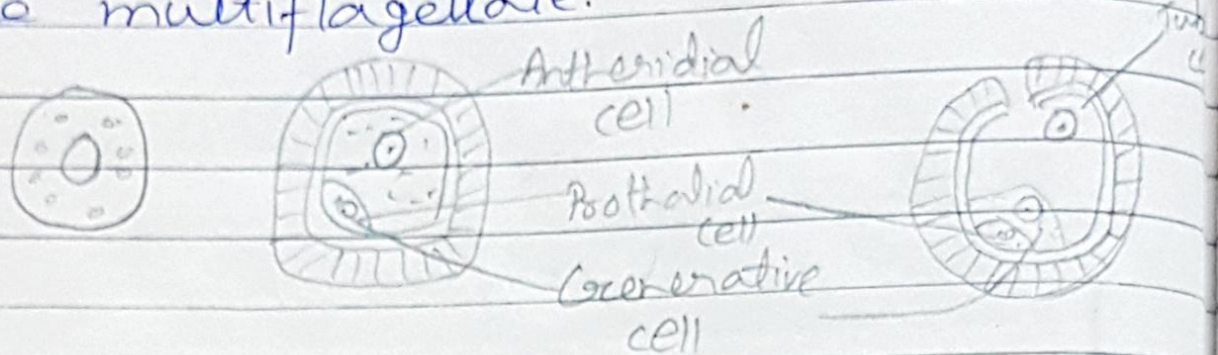


Germination of Pollen grain in *P. roxburghii*

CYCAS → In cycas the microspore divides to a lenticular prothallial cell and a large antheridial cell which divides to form a generative cell and a tube cell. At this stage three celled stage. The semigerminated microspore released from the microsporangium. They are transferred to the microphyle by wind. They shift down to the pollen chamber by pollen drop mechanisms where tube nucleus develops into the pollen tube. The generative cell divides into the stalk cell and the body cell. Each body cell divides to form the two multiciliate large sized sperms or male gametes.

In micro-cycas the stalk cell divides into 10 or 11 body cells all of which divide to produce 20 or 22 sperms. In

Ceratium, there are two male prothallus cell, a stalk cell, a body cell and a tube nucleus. The generative cell divide antichlorally into stalk cell and a body cell. The two male gametes are multiflagellate.



Development of Male gametophyte in *C. ceratium*