

Topic: Pinus; Reproductive Structure

B.Sc. Botany Hons. II

Paper: III Group: A

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Structure of the gametophytes

Male gametophyte:

The microspore is the first cell of the male gametophyte. Microspore begins to germinate within the microsporangium and produces an extremely reduced male gametophyte. The microspore first divides to form a very small first prothellial cell and a large cell. The large cell then cuts off a second prothellial cell adjacent to the first one and the remaining of the large cell forms the antheridial cell.

The two prothellial cells soon degenerate. The antheridial cell again divides to form a small generative cell above and a large tube cell below. The nucleus of tube cell is known as tube nucleus which regulates the growth of the pollen tube.

The microspores are dispersed with the help of wind. Further development of microspores takes place when it reaches the ovule due to pollination. A number of microspores reach the megasporangium (ovule) where they are attached with

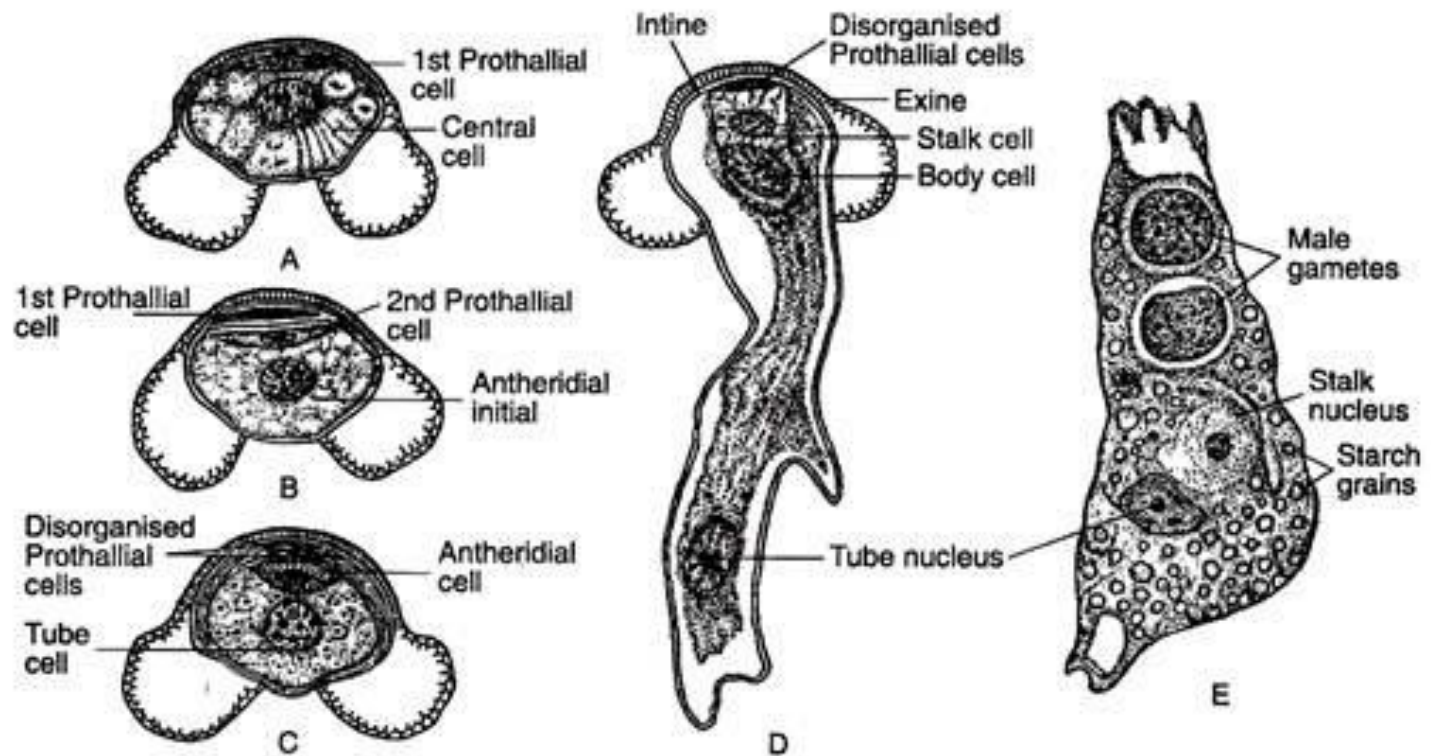


Fig. : *Pinus* : A-E. The stages in the development of male gametophyte

sticky mucillagenous substance from the micropyle.

When mucillagenous substance dries up, some of the microspores are drawn inside on to the apex of the nucellus. Later on, the spore coats split between the wings. Then the tube cell protrudes and grows to form the pollen tube. Ultimately, the pollen tube penetrates the nucellus.

The generative cell then divides to form a sterile stalk cell and a fertile body cell (spermatogenous cell). The body cell further divides to form two non-motile unequal male gametes (sperms).

Female gametophyte:

The functional megaspore is the first cell of the female gametophyte. It germinates within the megasporangium. The functional megaspore enlarges in size, its nucleus divides repeatedly by free nuclear divisions to form about 2,500

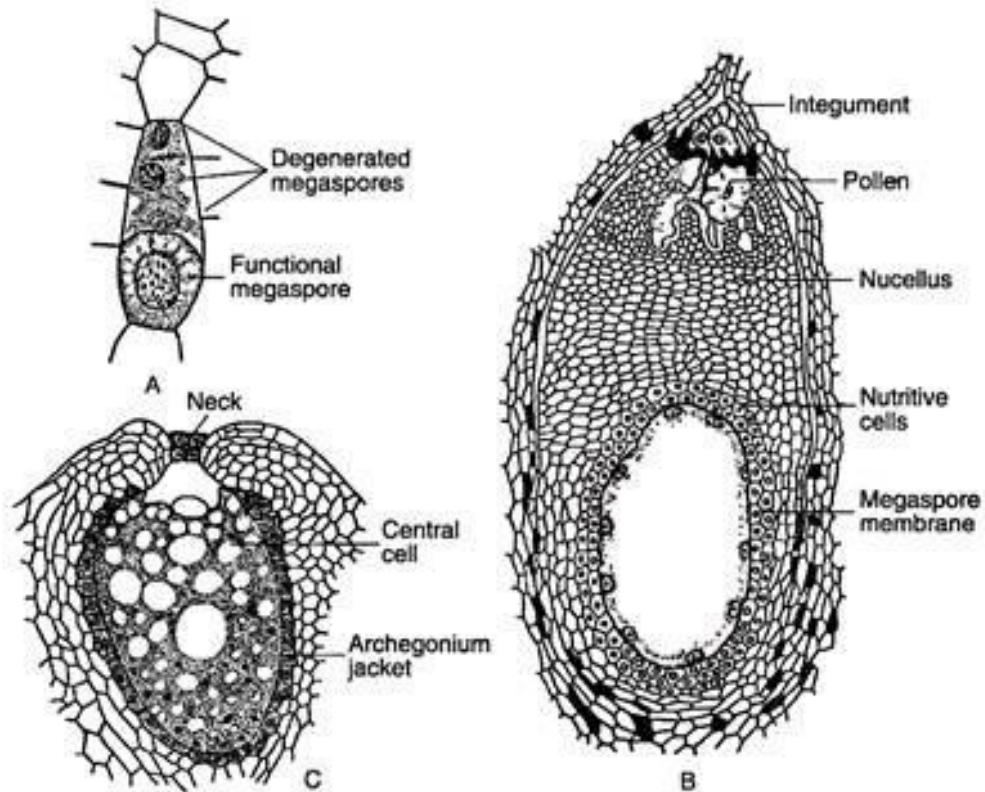


Fig. : *Pinus* : A. Linear tetrad showing large functional megaspore, B. Free nuclear stage of female gametophyte, C. An archegonium

daughter nuclei. All the nuclei lie in the cytoplasm of the megaspore.

After that, a large central vacuole is produced, whereby the cytoplasm together with the nuclei moves towards the periphery. After pollination, development of the female gametophyte takes place again.

The walls are broken down around the nuclei and ultimately, a solid mass of thin walled cells are formed. The massive tissue thus formed within the megaspore. It is known as the female gametophyte. It is often referred to as the endosperm. The endosperm tissue is haploid (n).

A few flask shaped archegonia (2-3) are formed from the superficial cells (archegonial initials) that lie towards the micropylar end of the female gametophyte.

A mature archegonium consists of a neck of eight cells, one ventral canal cell and a large egg. There is no neck canal cell.