

# MICROSPOROPHYLL AND MICROSPOROGENESIS

The stamens or microsporophylls are the male organs of the flower.

Each stamen consists of three parts; Filament, anther and connective.

The filament is the slender stalk of the stamen and the anther is the expanded head borne at the tip of the filament.

Each anther consists of two lobes connected together by a sort of midrib known as connective.

Each lobe of the anther contains two Pollensacs or microsporangia. Thus there are four chambers in each anther.

But in many cases there are only two and sometimes even only one.

Within the each Pollen-sac or microsporangia shows granular mass of cells called the Pollengrains or microspores.

## DEVELOPMENT OF STAMEN

During the development of stamen, there is growth in length, width and thickness.

Early development takes place by apical and marginal meristems.

The stamen primordium develops as a crescent shaped projection on the surface of the thalamus.

As the primordium increases in size, the bulging areas show the position of the sporangia.

### Anther and microsporangium (Pollen sac)

The cross-section of a young anther consists of a homogeneous mass of meristematic cells surrounded by an epidermal layer.

Further growth of the anther makes it four lobed.

### Development of microsporangium:

In each lobe a few cells in the hypodermal region become differentiated by their large size.

The make the archesporium; There is much variation in the no. of cells of archesporium.

The archesporium consists of two or three cells

The microsporangial initials or the archesporial cells divide periclinally forming a Parietal layer and a Primary sporogenous layer.

The cells of the Primary Parietal layer lying beneath the epidermis divide repeatedly both Periclinally and anticlinally giving rise to three to five concentric layers forming the wall of the young sporangium.

The cells of the Primary Sporogenous layer may either function directly as Pollen mother cell or divide to form a large no. of cells.

The epidermis along with 3 to 5 layers derived from the Primary Parietal layer form the wall of the sporangium. The cells of the epidermis divide anticlinally only.

The layer next to the epidermis is the endothecium become radially elongated and form their inner tangential walls. and fibrous bands develop upwards and terminate near the outer wall.

By the development of the fibrous bands of thickening the endothecium becomes hygroscopic and is mainly responsible for the dehiscence of the mature anther.

The cells of the endothecium are thin walled along the line of dehiscence of each anther lobe.

Pollen grains are discharged from the Pollen sacs is called stomium.

On the maturity of the anther a strain is exerted on the stomium due to the loss of water by the cells of the endothecium, with the result the stomium ruptures and the anther dehisces.

## Tapetum:

The innermost layer of the wall layers develops into a single layered tapetum.

The cells of the tapetal layer have dense cytoplasm and conspicuous nuclei.

The tapetal nuclei may divide once or more.

The tapetal layer is of great Physiological significance since all the food material entering into the sporogenous tissue diffuse through this layer.

Ultimately the cells of the tapetal layer disorganise.

The tapetum plays an important role in the development of Pollen. They generally stores starch and proteins which are used for the development of Pollen.

Tapetum also transports the nutrients to the inside of the anther locule.

## Sporogenous tissue:

The Primary sporogenous layer cells give rise to the microspore mother cells or Pollen mother cells.

The sporogenous cells in normal way divide several times meiotically before functioning as Pollen mother cells.

In the beginning of their formation the microspore mother cells remain closely packed but as the anther enlarges in size, the Pollen sac also increases in size, so the microspore mother cells also enlarge in size, become spherical in shape and get loosely arranged.

Some of the sporogenous cells are non functional and serve as the food material for the functional microspore mother cells.

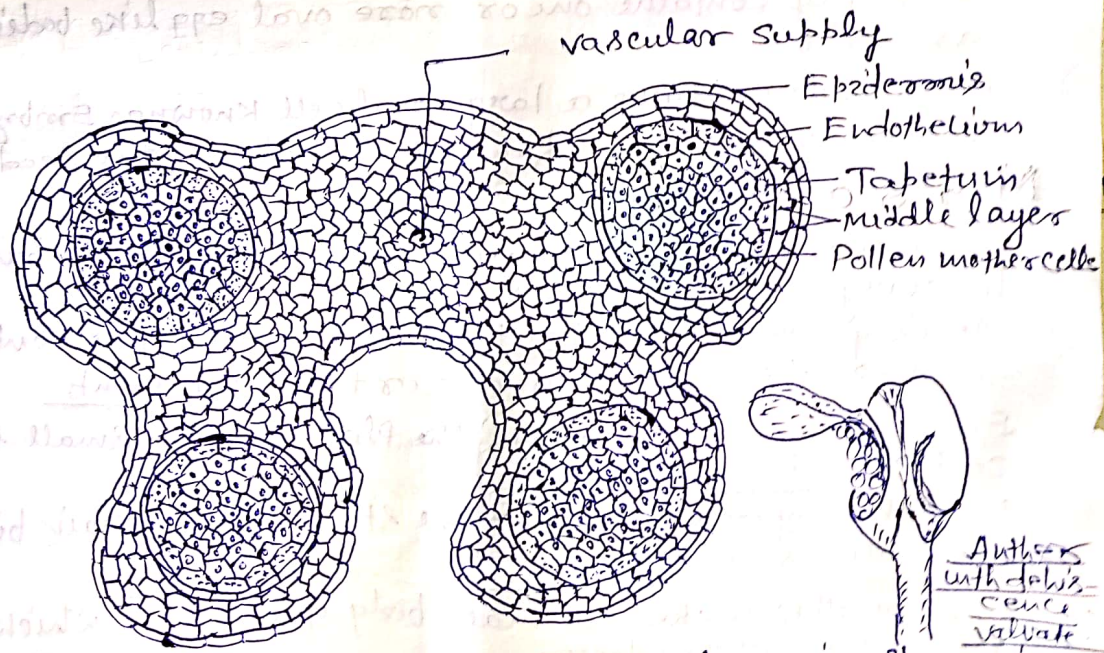
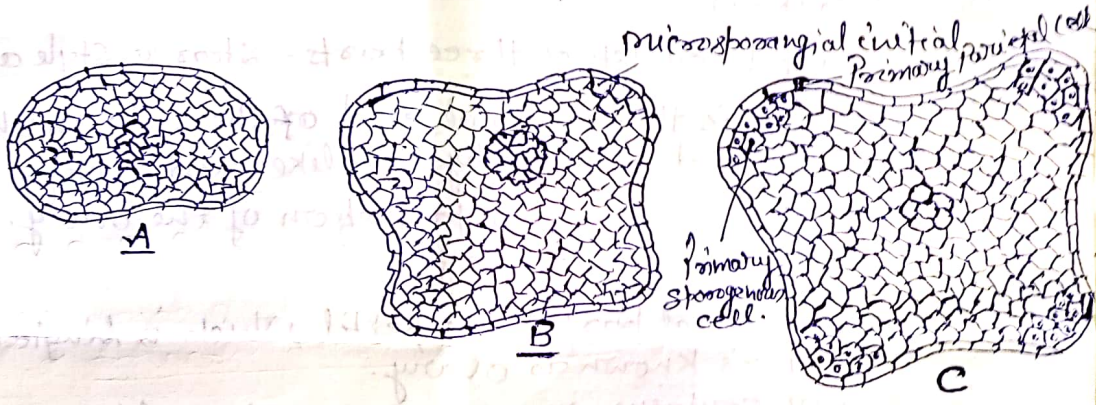
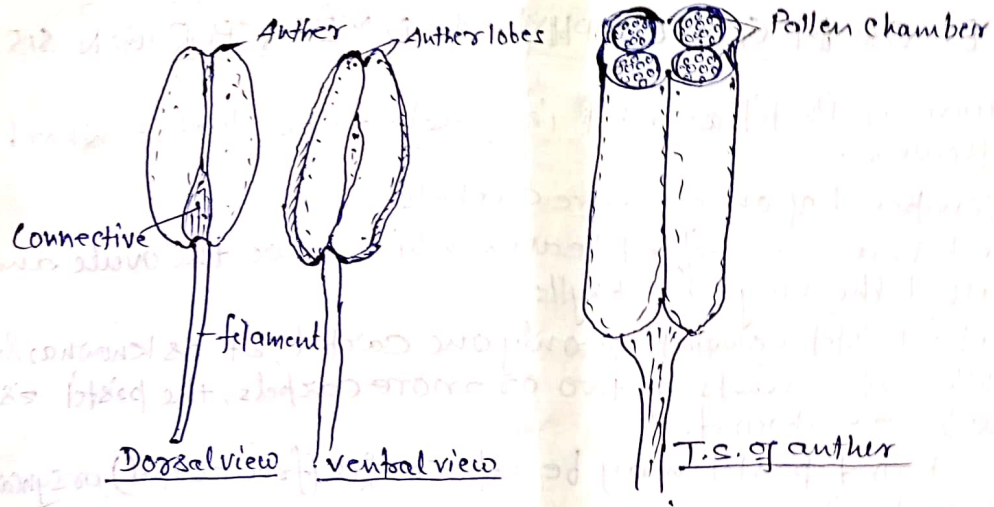
## MICROSPOROGENESIS:

The microspore mother cells become rounded and loosely arranged.

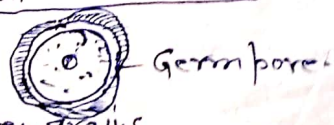
Although all the mother cells are capable of giving rise to Pollen grains but some of them may degenerate and serve as food material for the remaining cells which give rise to Pollen grains.

Each functional spore mother cell gives rise to four microspores or Pollen grains.

The nucleus of ...



Various stages of the development of microsporangium (Pollen sac) up to the formation of Pollen mother cells.



Pollen grains may become functional ... as ... bacteria like lateral tubes.

The nucleus of each Spore mother cell divides twice to form four nuclei, the first division being the reductional one (i.e. Meiosis I) and the second division being the ordinary mitotic one (i.e. Meiosis II).

### Dehiscence of the anther.

When the Pollen grains mature, they exert some pressure from within on the wall, with the result the anther bursts and sets free the Pollen grains.

The dehiscence of anther takes place in four different ways:

Longitudinal, Transverse, Porous, valvular.

### Dehiscence of microsporangium:

On the maturation of the anther the middle layers and the tapetum disorganise.

Then the fully developed sporangial wall consists of epidermis and endothelium.

The sterile partition wall between the two Pollen sacs disintegrates and the two Pollen sacs unite together forming one compartment.

The Pollen grains or microspores are released out generally through the stomium.

### The Pollen grains

The Pollen grains are the male reproductive bodies of a flower, and are contained in the microsporangia.

They are minute in size.

Each Pollen grain consists of a single cell, possessing two coats - the exine and the intine.

The exine which is provided with spinous outgrowth and smooth. While the intine is a thin, delicate, layer lying internal to the exine.

The exine possess one or more than places known as Germ pores.

The Pollen tubes make their way through these germ pores when the Pollen grains germinate.

The Pollen grains germinate on the stigma and each form a slender tube called Pollen tube which elongates through the tissue of the Gynoecium carrying the two male gametes in it.