

Embryology

Mikrosporoogenesis

① Mikrosporangium

Structure

Stamen

Filament

— Anther —

2

— Anther lobes

Connective

each has 2 pollen sac
or mikrosporangia.

Development Young anther → Homogenous mass of meristematic cells surrounded by epidermis.

4 corner

hypodermal cells

large size, prominent nuclei

↓
— Archisporium

In Malvaceae

Asteraceae

↓ vertical row of archisporial cells



Archisporial cells, प्रमुख कोशिका

↓
Pari. Parietal Cells

प्राथमिक निर्माण कोशिका

3-5 layers

पराक्रांकोष भित्ति — Anther wall

- Epidermis
- Endothecium
- Middle layer
- Tapetum

↓
Pari. Sporogenous Cells

मा. बीजाणु जनन कोशिका

↓
लघु बीजाणु जनन कोशिका

Micropore Mother Cell

↓ Meiosis

Micropore tetrad

↓
Pollen grain

Diagram on board

The Anther Wall

1. Epidermis: Outer most layer

आंतरांतर

Stretched in xerophytic

Stomata in Alangium

2. Endothecium: आन्तरिक

- mostly single layer but > 1 eg. Coccinia indica
- max. development, when pollen grain mature
- fibrous thickening band U-shaped
- Overlapping spiral in Melothris maderaspatana
- Anther to dehiscence longitudinally
- band absent at junction of pollen sac
- band also absent in cleistogamous flower & dehiscence by apical pore

→ Presence of fibrous band



differential expansion of inner & outer tangential walls

&

hygroscopic nature of endothelial cells

→ Play imp. role in dehiscence of anther.

3. Middle layer: मध्य स्तर

1-3

short-lived, degenerate before meiosis

Persist in Coccinif, Ranunculus,
Helleborus, LiliumGlossy → middle layer in fibrous band

4. Tapetum: पतिका

usually single layer

Coccinif multiple layers

→ food material passes through it

→ cells are large & centripetally extended.
dense cytoplasm, prominent nuclei→ pigmented in Anemone→ Usually homogenous, completely surrounds.
But in some like Alectra thomsoniiNigella damascena

→ P-tapetum (protuberant side) small

→ C-tapetum (connective side) large

→ tapetal cells usually become multinucleate
(Remain uninucleate → Orchids, cucurbits)

[Nuclear div. in tapetal cells.

→ By endomitosis

→ By normal mitosis

→ By formation of Restitution Nuclei

Types of tapetum

① ^{अमीबीय} Amceboid or ^{प्लास्मोडिस्म} plasmodial tapetum (Primitive)

Wall break

eg. Actaeg

↓
Protoplast full

Alisma

↓
tapetal periplasmodium

Typha

↓

Nutrition to pollen grain

Exine pattern by providing sporopollenin

② ^{स्रावी या ग्रंथीय} Secretory or glandular tapetum (Advanced)
remain attached to middle layer

Pro-Ubisch bodies ↑ during meiosis

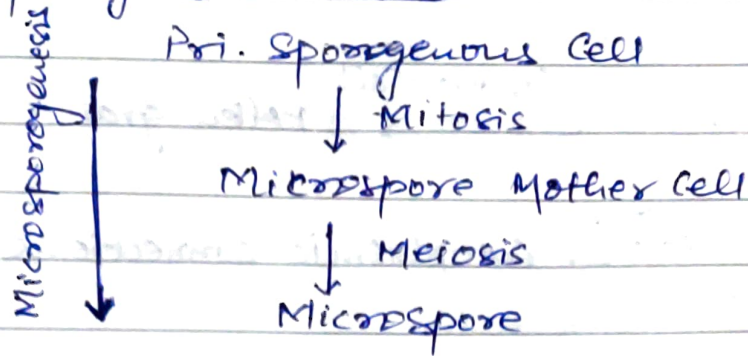
↓

Ubisch bodies → Exine pattern.
Nutritive

Function of tapetum

- development of pollen grain
- Nutrition
- Exine pattern.

Sporogenous tissue



Gentianaceae — No Tapetum

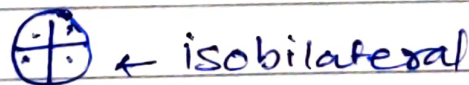
Sporogenous → nutrition.

② Microsporogenesis.

1. Stimule → veg. apex for meiosis
2. Callose wall
3. Plasmodesmata connection.
4. cyperaceae → only one microspore is functional

cytokinesis

[I] Successive type: (Monocots) — Meiosis I
— wall formation
— Meiosis II



[II] Simultaneous type: (Dicots)



- Meiosis I
- Meiosis II
- wall formation

Magnolia
Coccoloba
Atriplex



Decussate

Aristolochia
Butomopsis



T-shaped



Linear

Halophila

Microspore / Pollen Tetrads

→ Tetrad $\xrightarrow{\text{Callose wall}}$ Pollen grain

→ Ooclude → cytoplasmic connections.

Drumys
Ammon
Acacia
Dioscorea
Typha
Elaeagnus

— in group

Compound pollen grain.

→ Asclepiadaceae → Pollinium

→ loose group Massulae.

Ericaceae

Empetraceae

— Pollen grain remain in Tetrahedron



(stomach) → 2 eggs → 2 cells

→ 2 cells → 2 cells

Development of Male Gametophyte

[I] Formation of generative & vegetative cells

Pollen enlargement - vacuole

Pollen grain

↓ Mitosis

Large Vegetative Cell & Small generative cell

↓

Initially attached to
intine of pollen wall
but later detached

Nucleus migrates

Asymmetrical spindle



Generative cell / Vegetative cell

2 celled stage Pollination

3 celled stage Pollination

Common

↓
less viability

Gen. cell Prophase

Holoptelea

Podulacq

Euphorbia

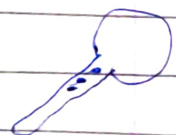
Lilium

Stigma

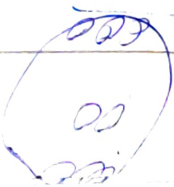
Pollen tube

MGU

Male Germ Unit
Rüssel



Nemec Phenomenon



Signature.....

