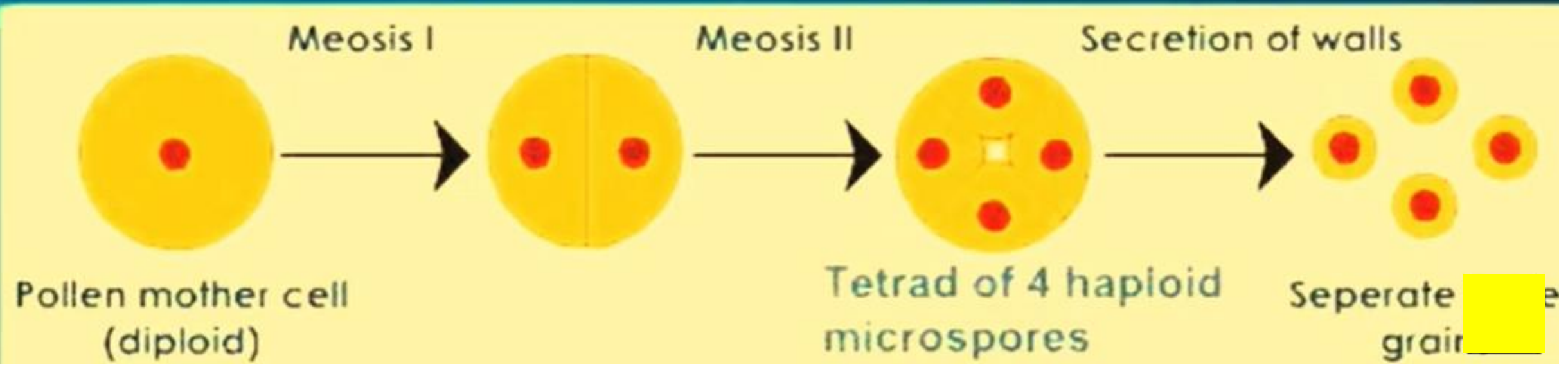


# Taxonomic Evidences

- The study of the structure of pollen grain (mainly the pollen wall) is very significant in plant taxonomy because every genera has a specific characteristic pollen wall.
- This has helped to establish the evolutionary history of angiosperms.
- The taxa shows single morphological pollen type is considered stenopalynous, whereas taxa which have different type of pollen grain are considered as eurypalynous.

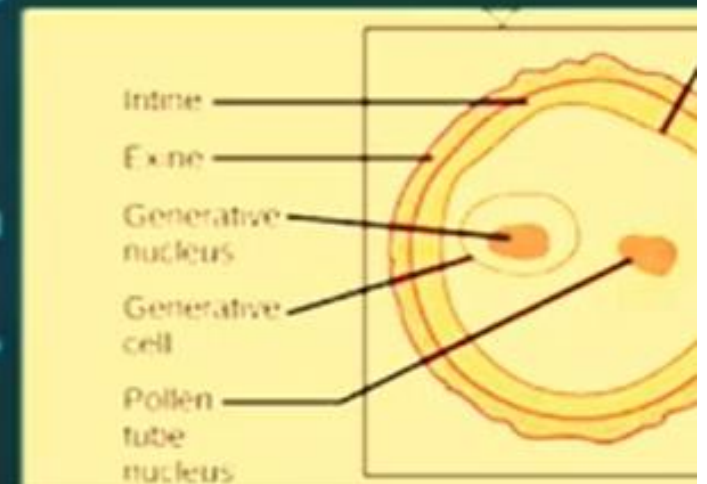


- The stenopalynous groups are of considerable significance in plant taxonomy.
- The following characteristics of pollen grains are considered by taxonomists to segregate different taxa:

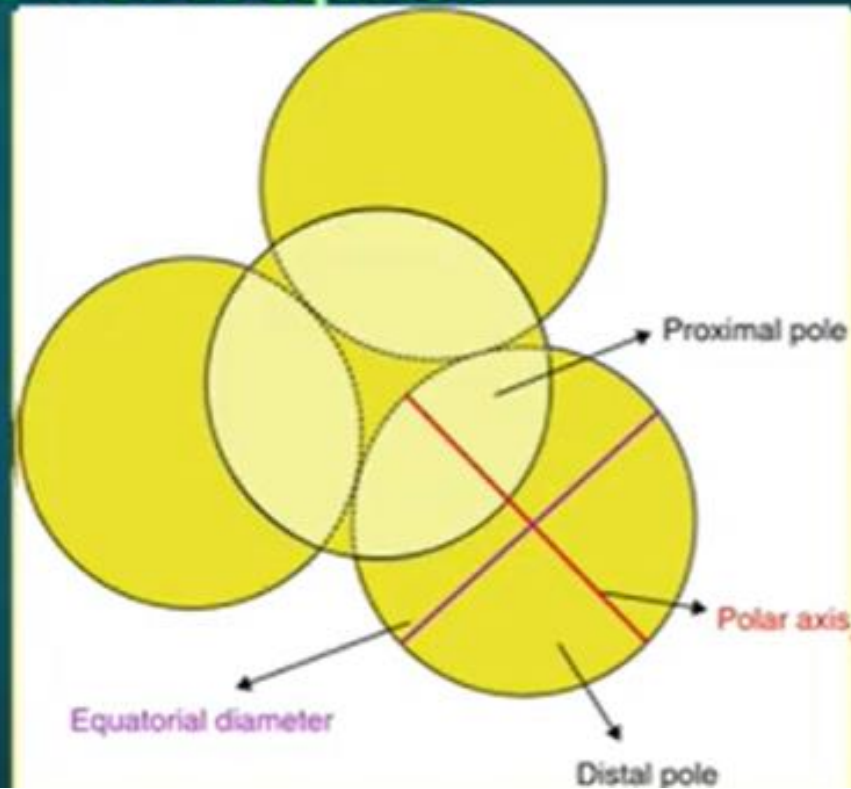


## The number of nuclei present at the time of dispersal

- The primitive angiosperms are shed at 2-nucleate stage, whereas in advanced groups, pollens are shed at 3 nucleate stages.
- In most angiosperms pollen grains have radial symmetry.
- Bilateral symmetry only occurs in some primitive groups like gymnosperms.
- In most angiosperm, the pollen grains are globose in shape but in some other members they are boat shaped, ellipsoidal and fusiform in shape.

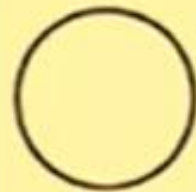


- Initially pollen grains form tetrads and the outer end of grain is termed distal pole, whereas the inner end where grains joint as proximal pole.
- The line running around the pollen at right angles to the polar axis is termed as equator.



- The pollen grains of angiosperms are separate prior to release, these single pollen grains are called as monads, in rare cases pollen grains are dispersal in fused pairs or four they are known as dyads and tetrad respectively.
- Following five different types of tetrads are

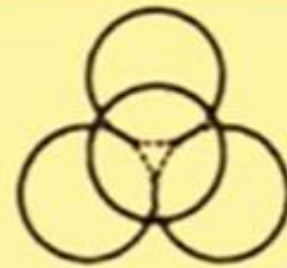
differentiated:



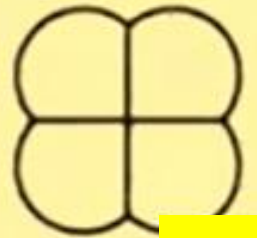
A



B

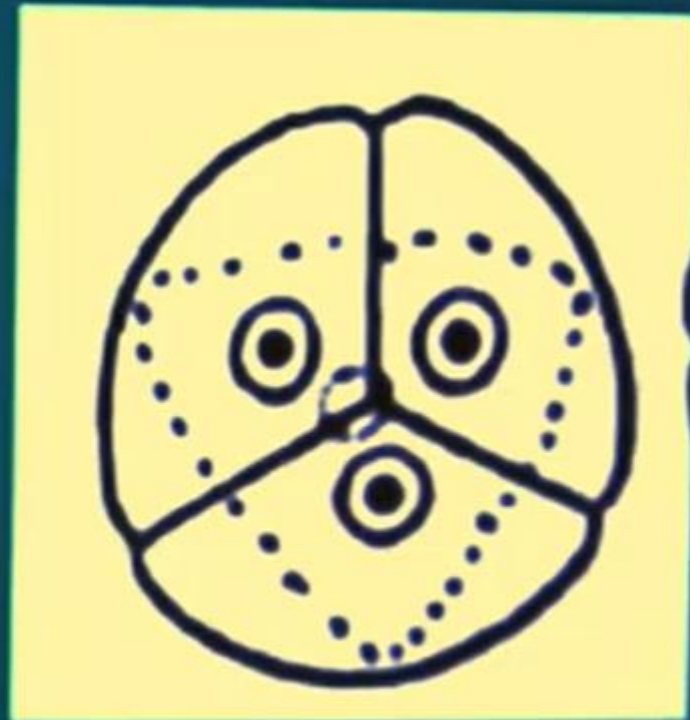


C

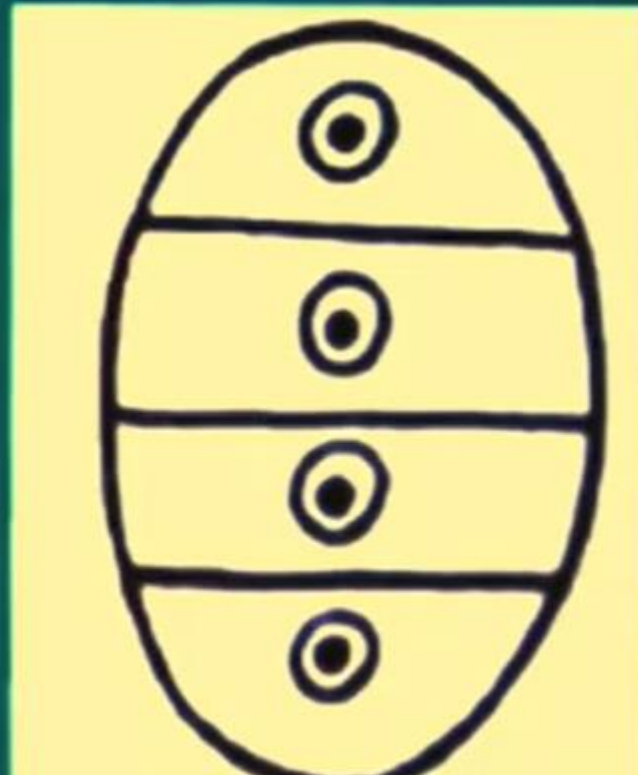


D

1. **Tetrahedral tetrad:** Four pollen grains form a tetrahedron are arranged in a sphere e.g. family Ericaceae.

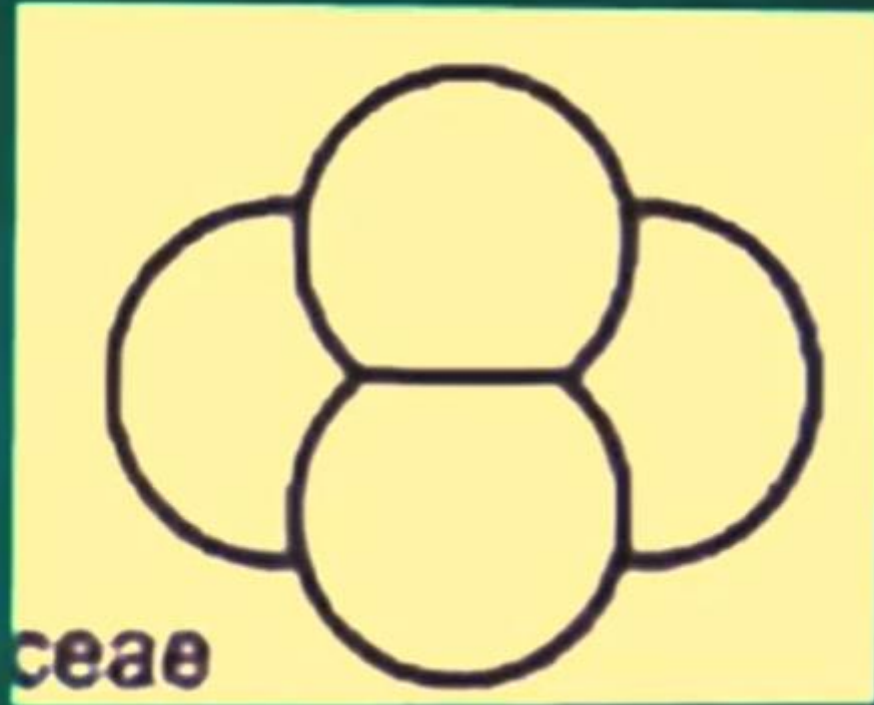


**2. Linear tetrad:** Four pollen grains arranged in a straight line e.g. Typha.

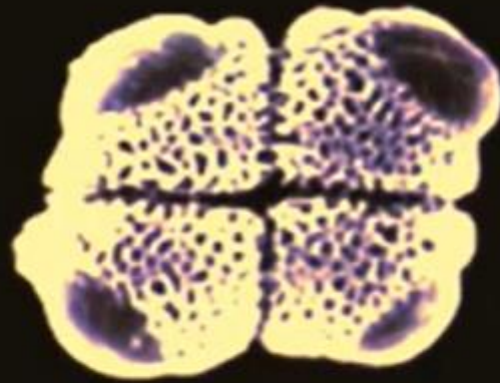




3. **Rhomboidal tetrad:** 4 pollen grains are in a single plane.

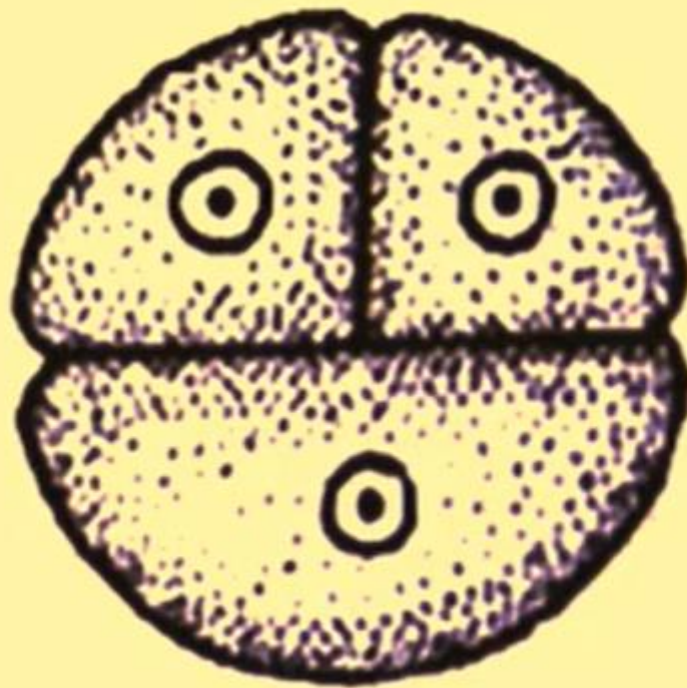


- 4. Tetragonal tetrad:** Four grains are in one plane and equally spaced as in Philydrum.



**Tetragonal tetrad  
Philydraceae  
(Pollen of mint family)**

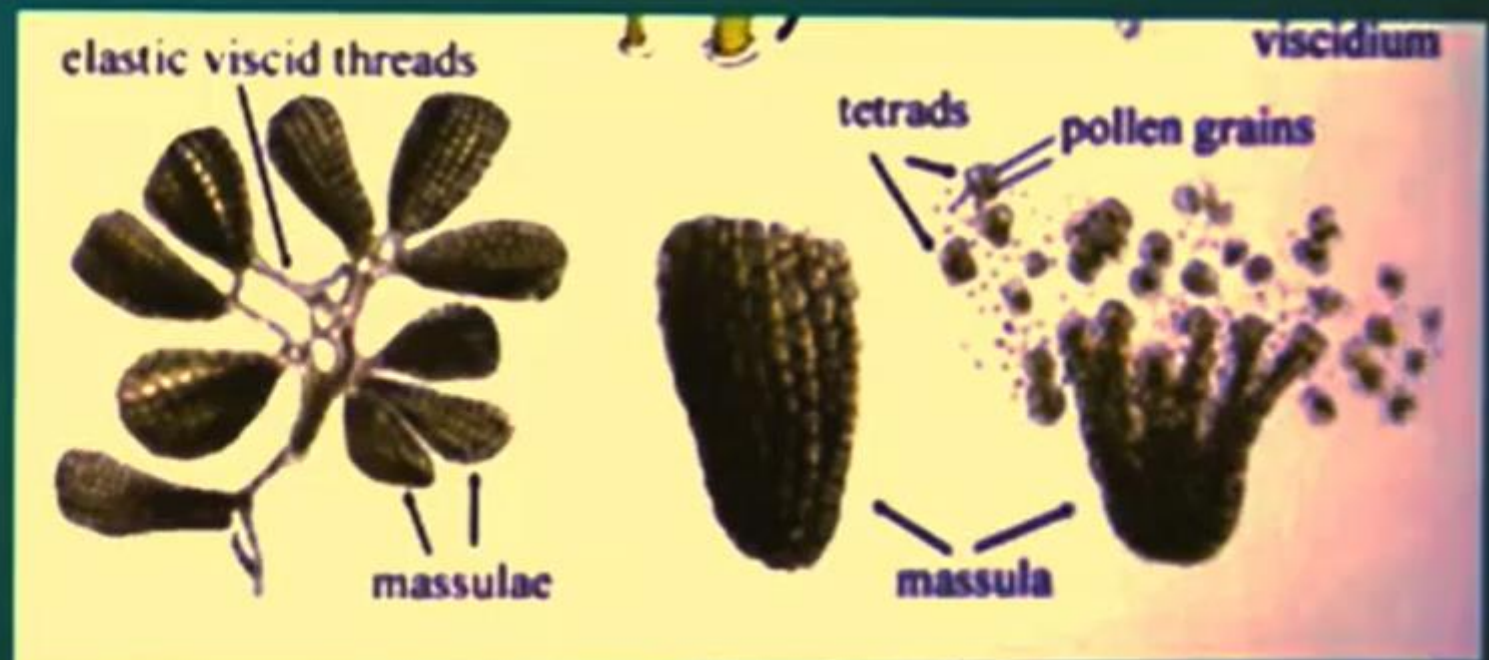
5. **Decussate tetrad:** Four grains in two pairs, arranged at right angles to one another, as in genus *Lachnanthes*.



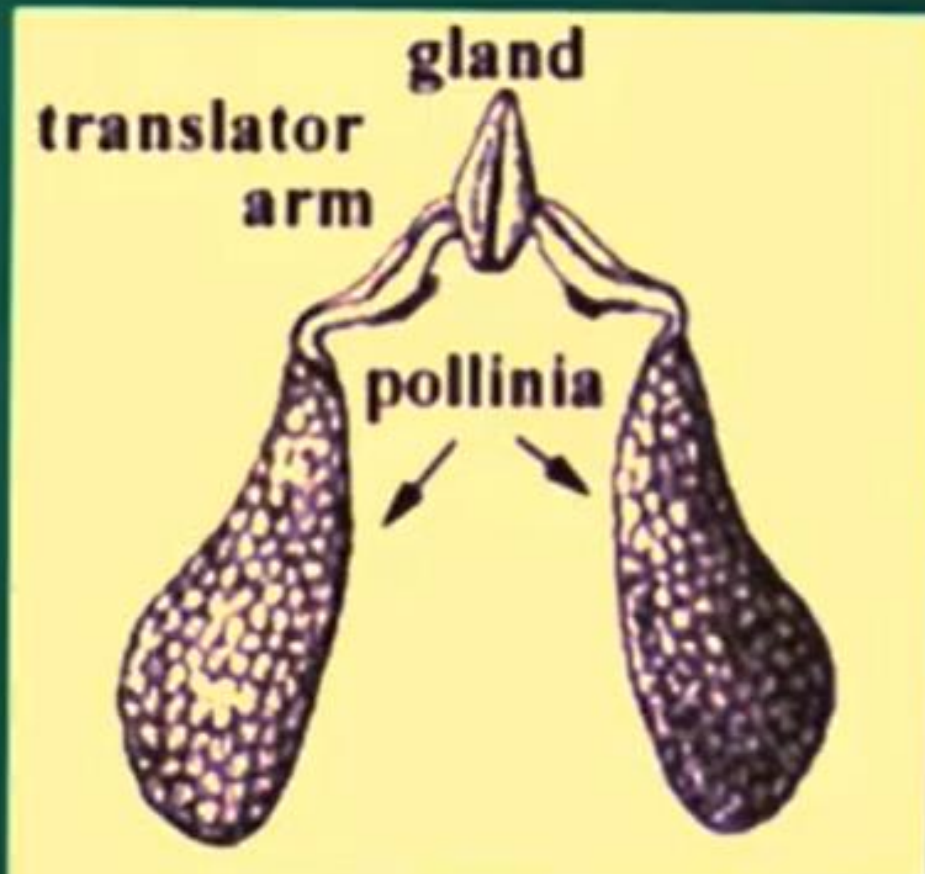
- In *Calliandra* of Mimosoideae, the pollen grains are attached in a group of more than four.
- These pollen grains represent a polyad which is made up of 8-10 pollen grains.



- Whereas in some members of family Orchidaceae, e.g. genus *Piperia*, pollen grains are connected in an irregular group known as massulae.



In subfamily Asclepiadaceae and several members of the orchidaceae, all pollen grains of a theca are fused into a single mass which is called as pollinium.



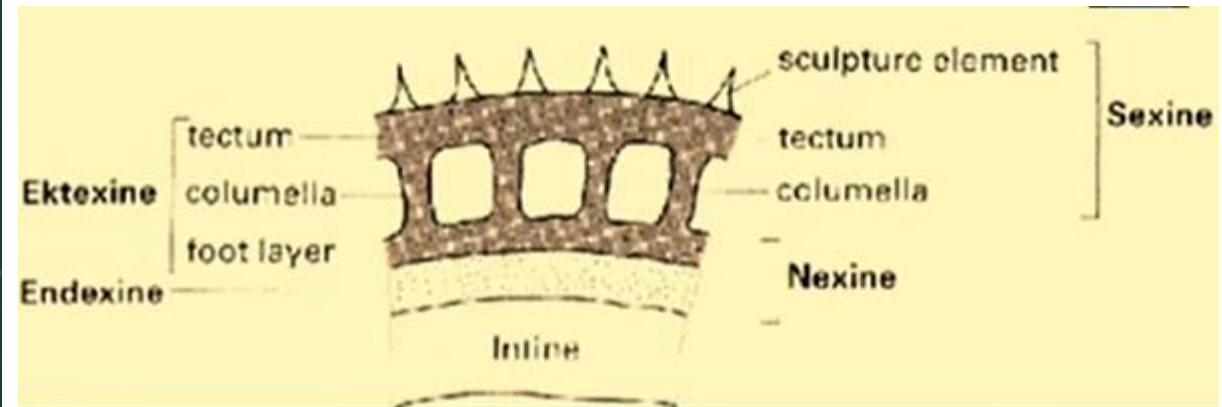
# Pollen wall

The pollen grain wall is made up of two layers, outer exine and inner intine.

The exine is hard due to sporopollenin which is resistant to decay.

Pollen wall sculpturing is structure present on the outer surface of exine wall.

The common types of sculpturing include: baculate, echinate, spinulose, foveolate, reticulate, fossulate, verrucate, gemmate, psilate, and striate.

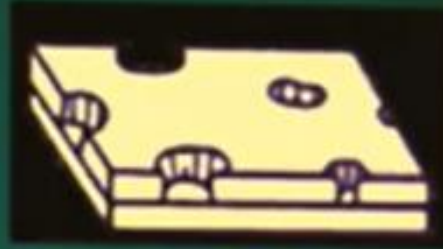




Punctate (बिंदुकित)



Psilate (मृदु)



Foviolate (गर्तिका युक्त)



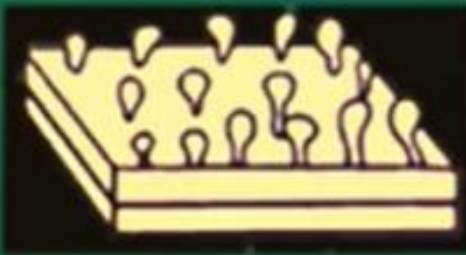
Reticulate (जालिकामयी)



Fossulate (खांच युक्त)



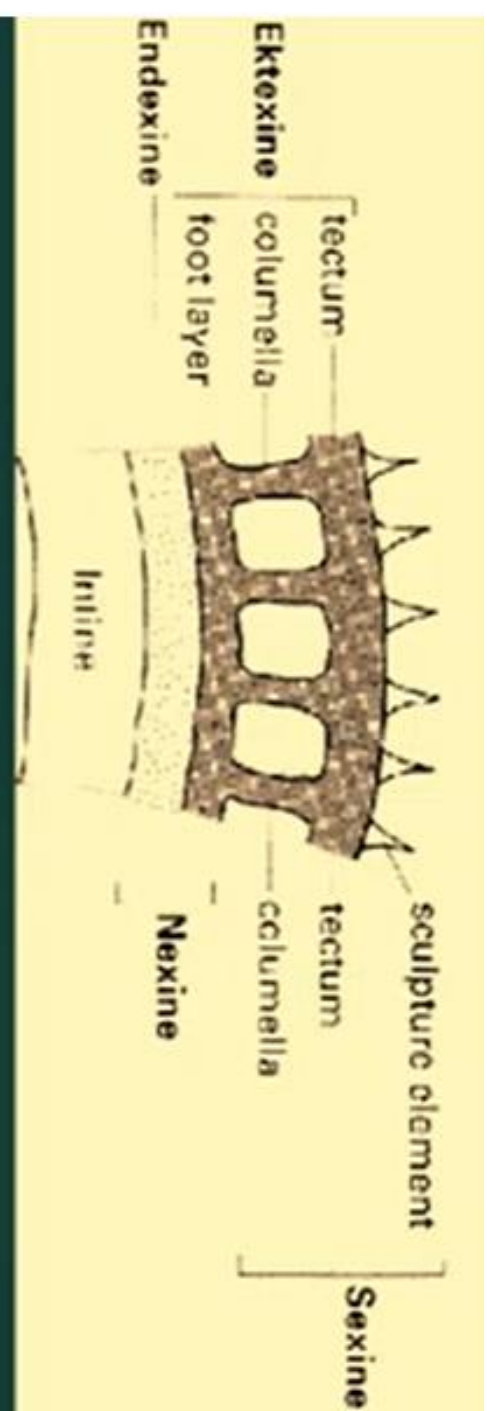
Bacculate (दंडाकार)



Pilate



Echinate (कंटकीय)

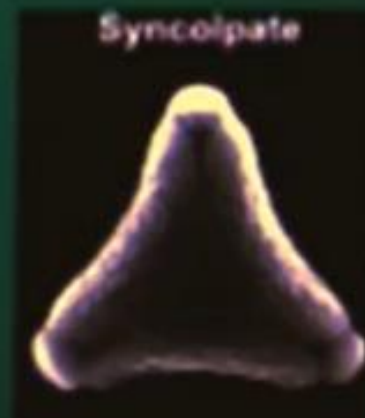
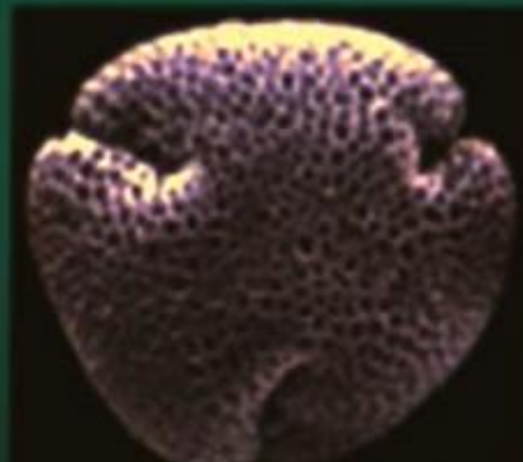
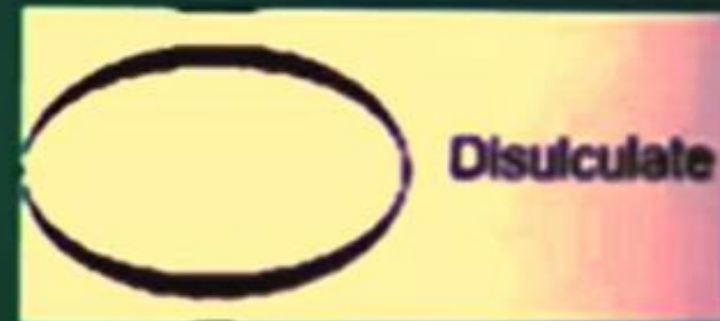




- **Pollen aperture is a region where the pollen tube comes out, the exine may be in aperturate (without an aperture) or aperturate.**
- **Aperturate may be single pore (monoporate), a single slit running at right angles to the equator (monocolpate), three slits (tricolpate), three pores (triporate), three slits each with a geminate pore in middle (tricolporate) and with many pores (multiporate).**



- Pollen with one or more slits located at the polar end is accordingly termed, monosulcate, disulcate and trisulcate, depending on the number of slits. Pollen grain with slits joined at poles is termed syncolpate.



- **The role of pollen grains in systematics in Nelumbo is a good example which is separated from Nymphaeaceae and kept into a distinct family Nelumbonaceae and this is largely supported by the tricolpate pollen of Nelumbo as against the monosulcate condition in Nymphaeaceae.**

**THANK YOU**