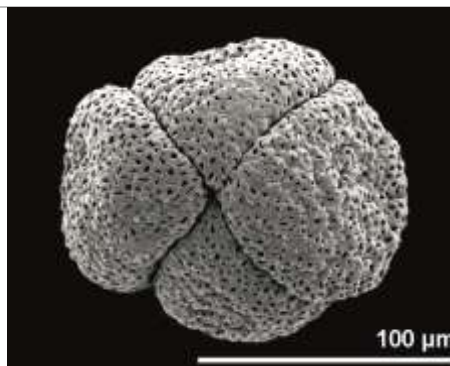


# Illustrated Pollen Terms

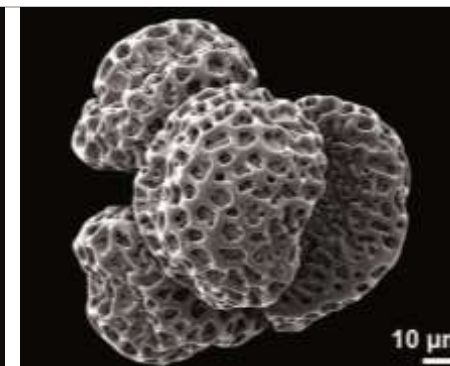
Pictures from PalDat are the main source for the illustrations.  
See also: Hesse et al (2009) Pollen Terminology. An illustrated handbook. Springer Vienna

## acalymmate

feature describing a dispersal unit of two or more monads enclosed by an exine, which is discontinuous at the junctions between the monads



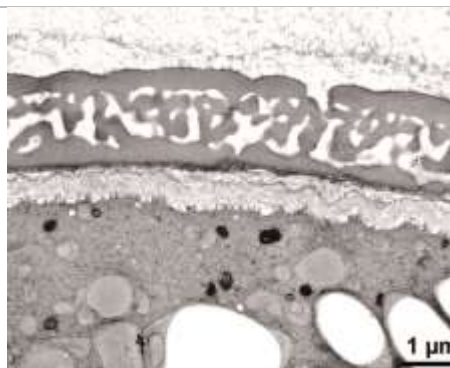
*Asimina triloba*



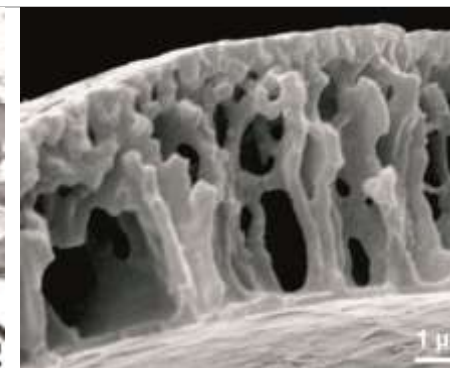
*Beschorneria yuccoides*

## alveolate

infratectum with compartments of irregular size and shape

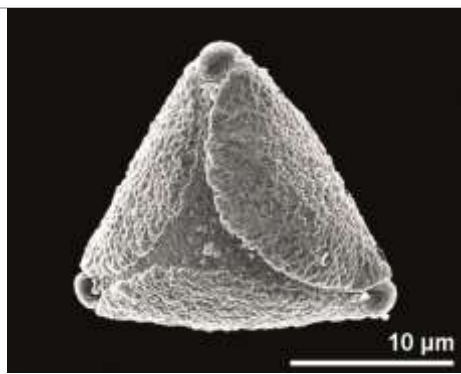


*Gonatopus angustus*

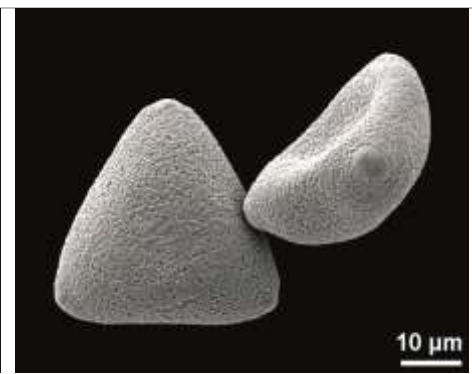


*Abies* sp. (fractured pollen wall)

**angulaperturate** pollen grain with an angular outline where the apertures are situated at the angles

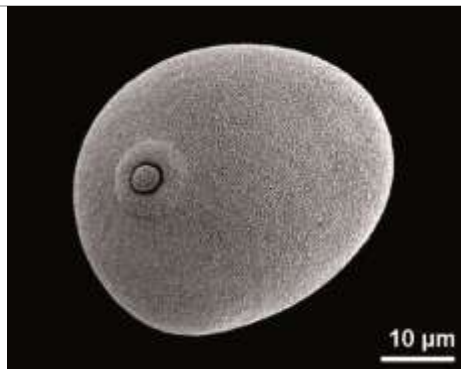


*Callistemon coccineus*

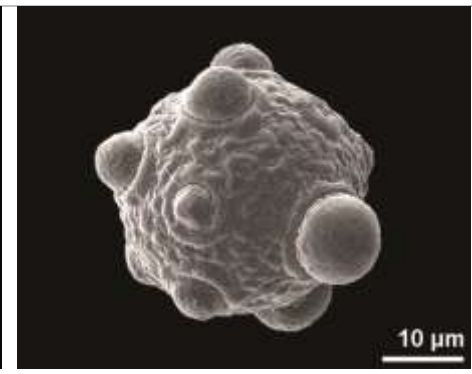


*Leucadendron brunooides*

**annulate** pollen grain with an annulus or annuli

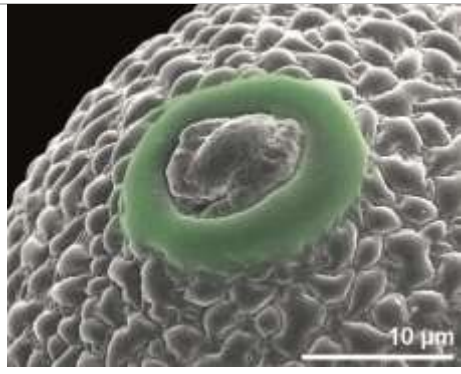


*Secale cereale* (ulcerate)



*Fumaria vaillantii* (pantoporate)

**annulus** (pl. annuli) ring-like thickening of the pollen wall surrounding a porus or ulcus

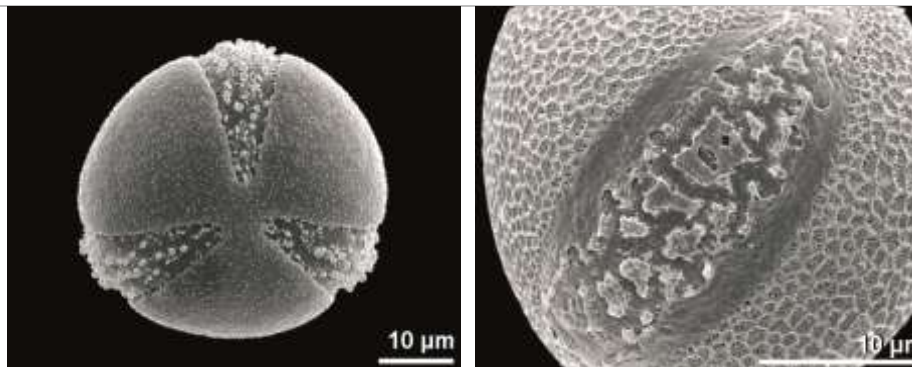


*Trichosanthes anguina*

**aperture** region of the pollen wall which differs significantly morphologically and/or anatomically from the rest of the pollen wall, presumed to function usually as germination site and to play a role in harmomegathy

**aperture membrane** exine layer covering an aperture; aperture membrane can be smooth or ornamented  
 Comment: The terms "smooth" and "ornamented" should be used when the feature is remarkably expressed.

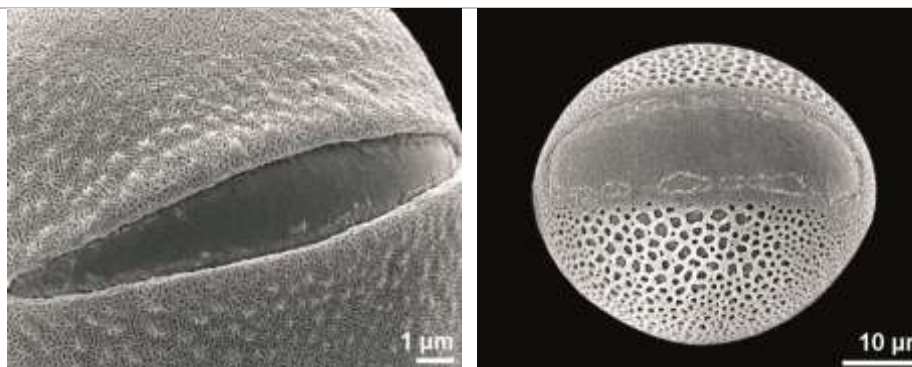
**aperture membrane ornamented**



*Convolvulus tricolor*

*Galeopsis tetrahit*

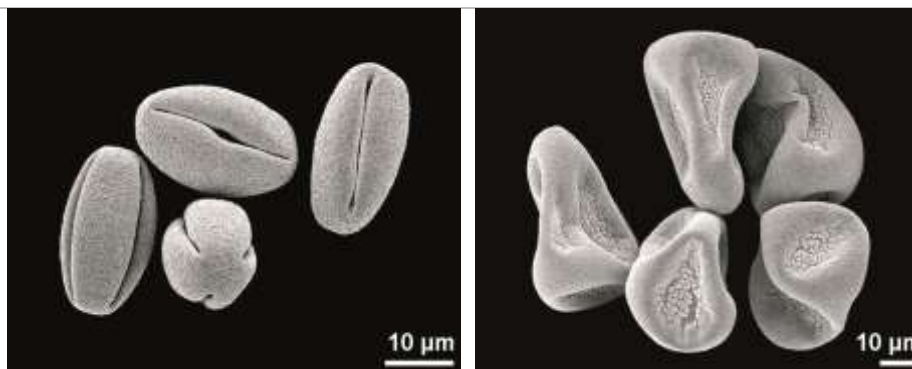
**aperture membrane smooth**



*Melampyrum subalpinum*

*Doryanthes palmeri*

**aperture sunken** infoldings of dry pollen as a consequence of harmomegathy

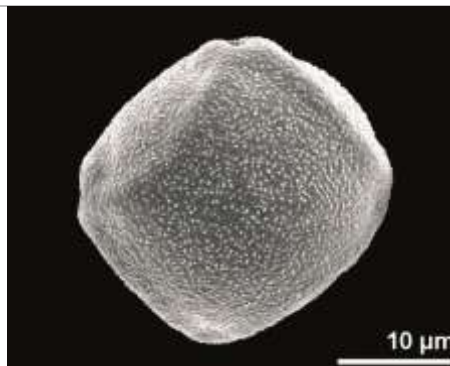


*Orthilia secunda* (dry pollen)

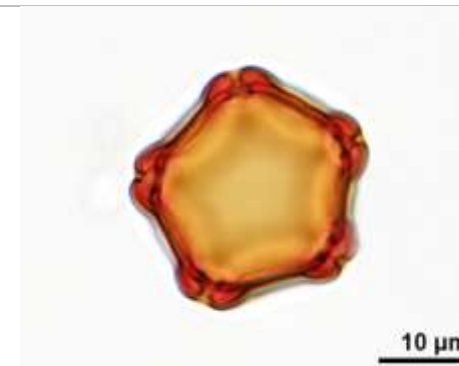
*Carex alba* (dry pollen)

**arcuate**

pollen grain with arcus



*Alnus incana*



*Alnus* sp.

**arcus** (pl. arcus)

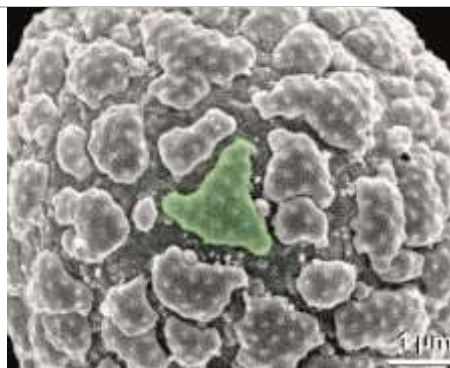
a curved wall thickening interconnecting apertures



*Alnus glutinosa*

**areola** (pl. areolae)

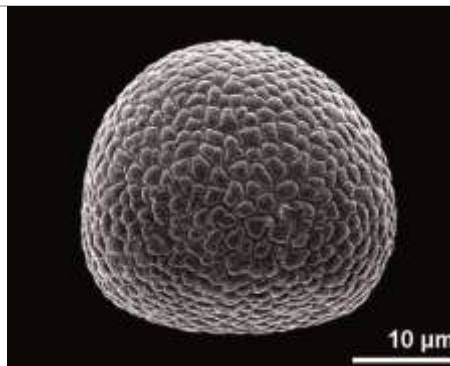
small, mostly convex exine island



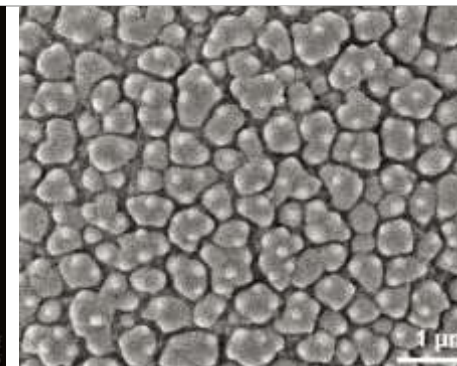
*Peperomia rubella*

**areolate**

pollen wall with areolae



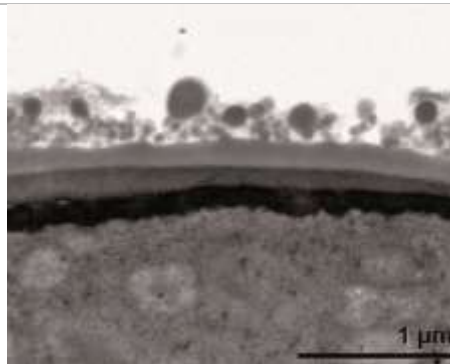
*Dracunculus vulgaris*



*Cynodon dactylon*

**atectate**

pollen grain lacking a tectum



*Rhabdophora africana*



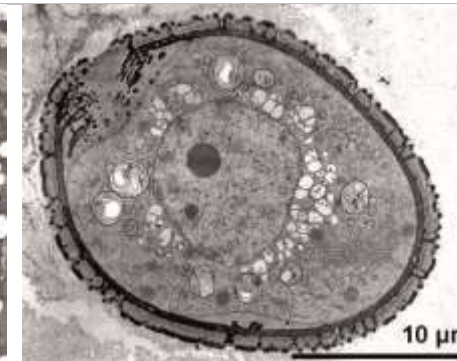
*Globba schomburgkii*

**atrium** (pl. atria)

space between diverging exine layers within the aperture



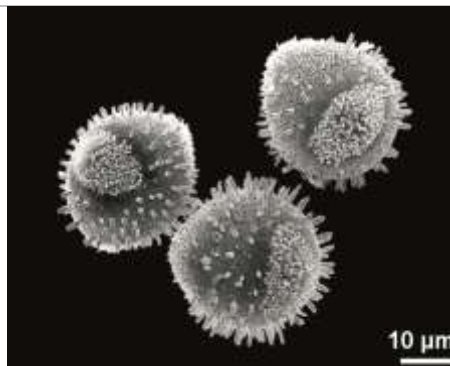
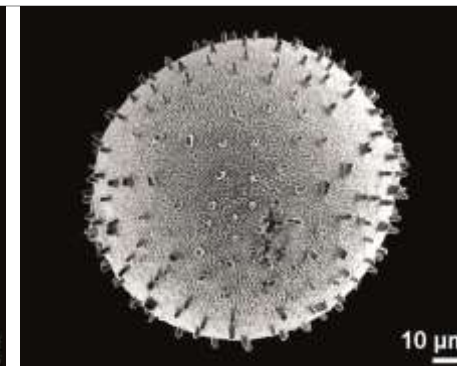
*Tilia platyphyllos*



*Tilia platyphyllos*

**baculate**

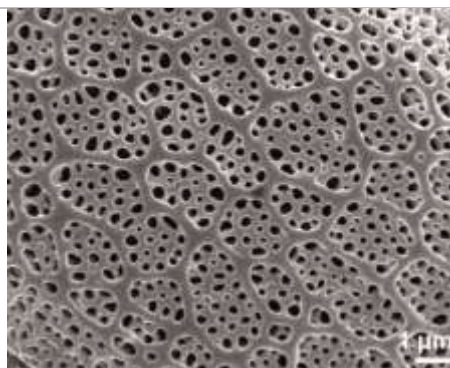
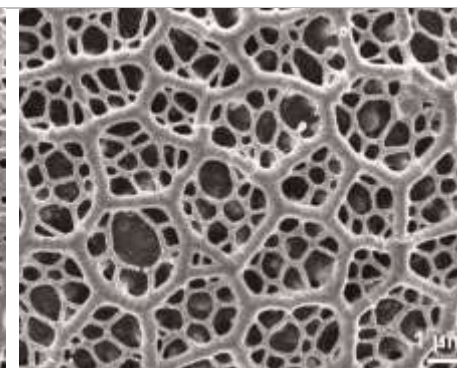
pollen wall with bacula

*Viscum laxum**Erythrochiton brasiliensis***baculum** (pl. bacula)rod-like, free standing element, more than 1  $\mu\text{m}$  in height and never pointed*Viscum laxum***bi-**

prefix meaning 2 (bireticate, bisaccate)

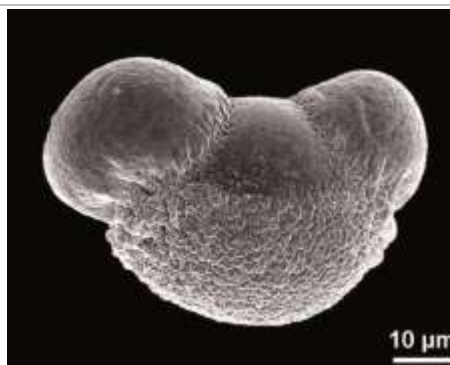
**bireticate**

special type of reticulate ornamentation, where the brochi of the large-meshed reticulum are filled by a small-meshed reticulum

*Prunella grandiflora**Salvia argentea*

**bisaccate**

pollen grain with 2 sacci



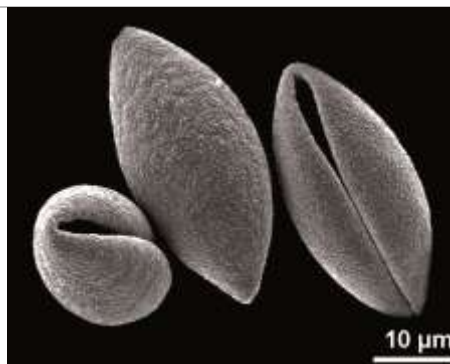
*Pinus mugo*



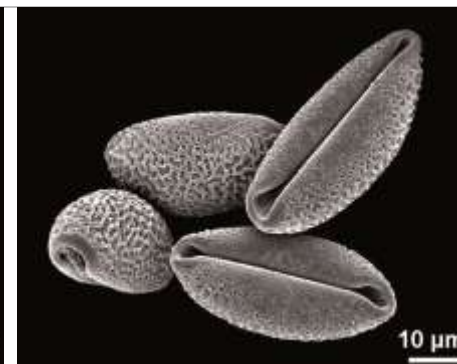
*Pinus heldreichii* (dry pollen)

**boat-shaped**

characteristic shape of sulcate pollen grains in dry condition as a consequence of harmomegathy



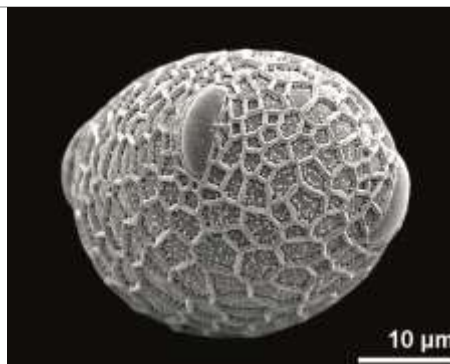
*Ginkgo biloba* (dry pollen)



*Lysichiton americanus* (dry pollen)

**brevicolpate**

pollen grain with brevicolpi



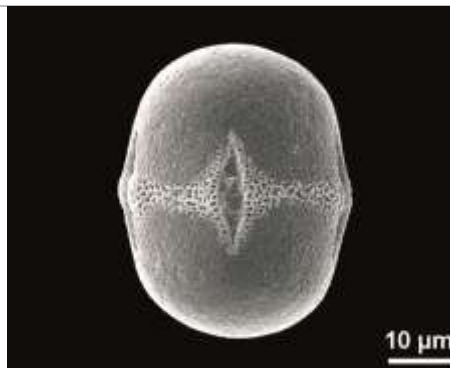
*Impatiens columbaria*



*Scabiosa ochroleuca*

**brevicolporate**

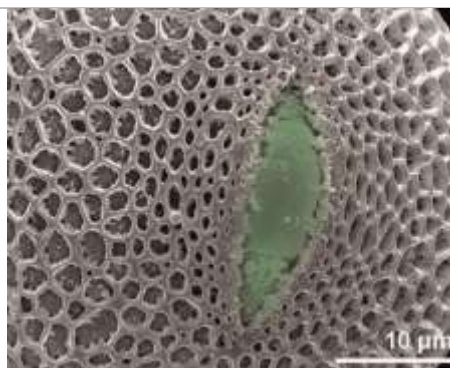
pollen grain with brevicolpori

*Pulmonaria mollissima**Symphytum orientale***brevi-**

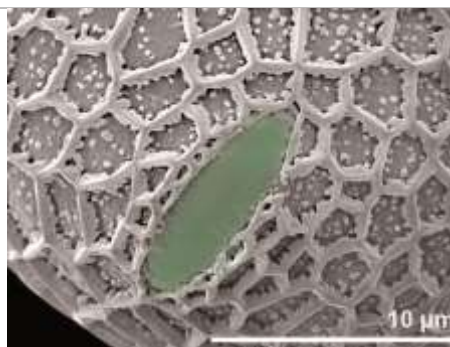
prefix meaning short

**brevicolporus**  
(pl. brevicolpori)

short colpus in a compound aperture

*Dalechampia roezliana***brevicolpus**  
(pl. brevicolpi)

short colpus

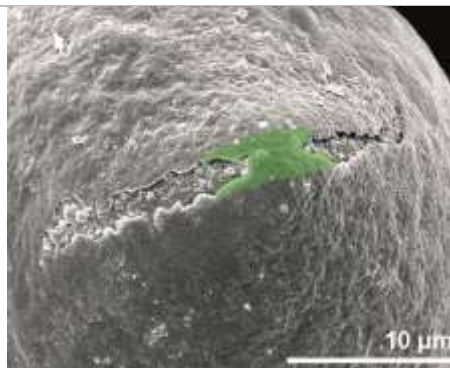
*Impatiens columbaria*



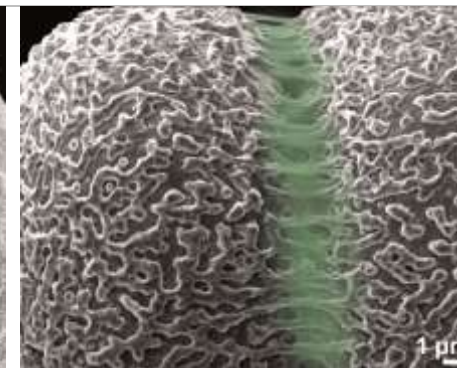
**bridge**

exine connection between the margins of a colpus in the equatorial region

*Comment:* The term is often used in a more general context, e.g., for exine connections within tetrads.



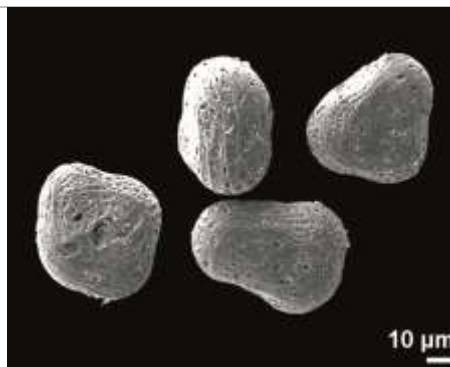
*Elaeagnus angustifolia*



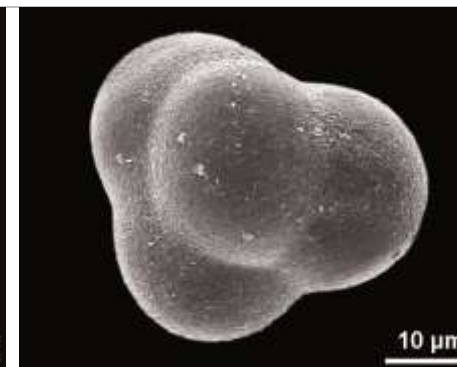
*Typha latifolia* (tetrad)

**calymmate**

feature describing a dispersal unit of two or more monads enclosed by a continuous ektexine



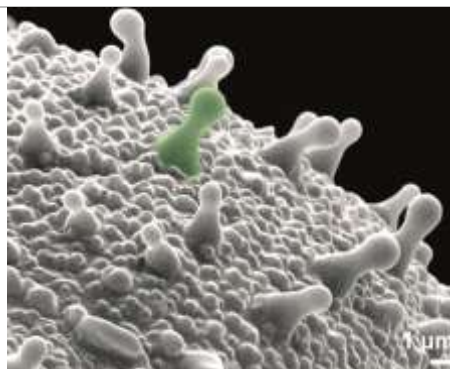
*Chlorospatha kolbii* (tetrads)



*Chlorospatha dodsonii* (tetrad)

**clava** (pl. clavae)

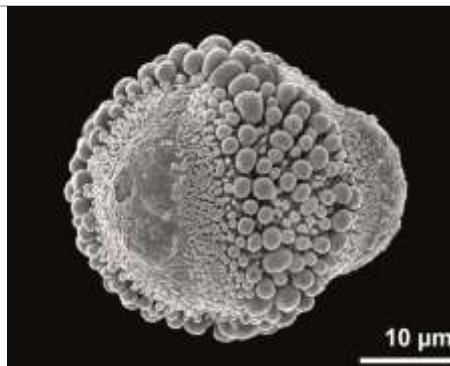
club-shaped element, higher than 1 μm



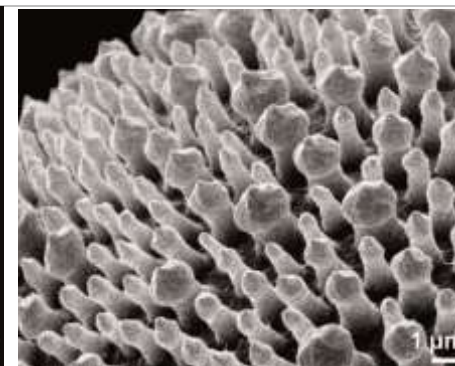
*Iris alata*

**clavate**

pollen wall with clavae



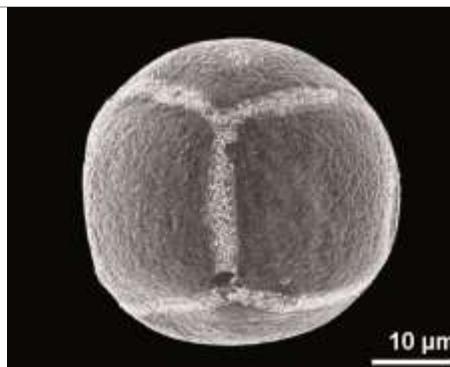
*Ilex aquifolium*



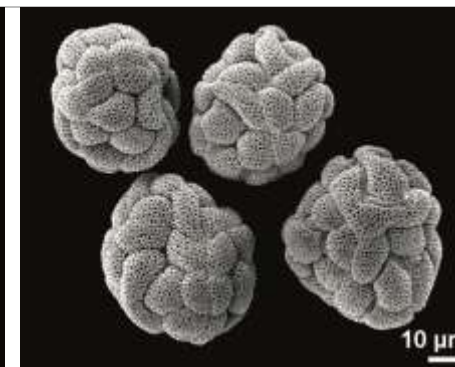
*Linum flavum*

**clypeate**

pollen wall, in which the exine is subdivided into shields



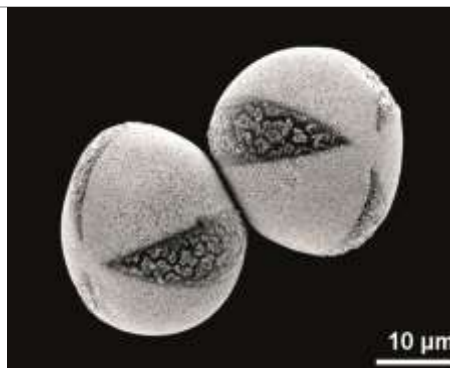
*Corydalis lutea*



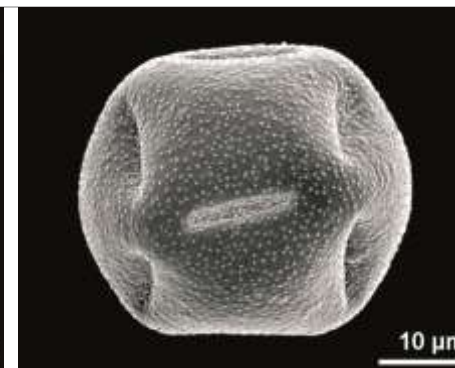
*Catalpa bignonioides* (tetrads, dry pollen)

**colpate**

pollen grain with colpi



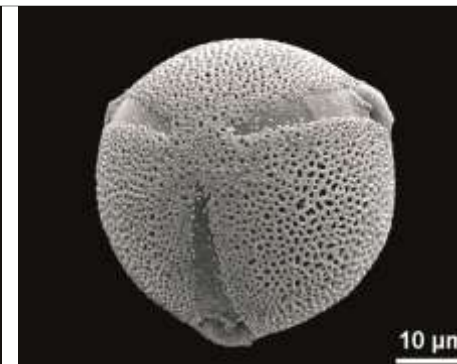
*Lamium maculatum*



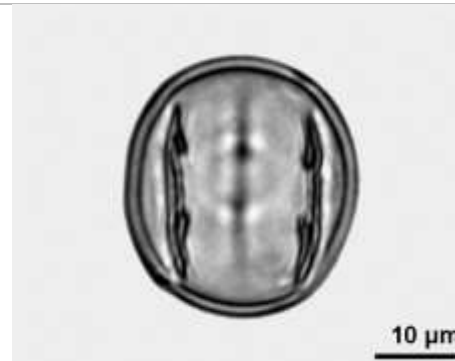
*Talinum paniculatum* (dry pollen)

**colporate**

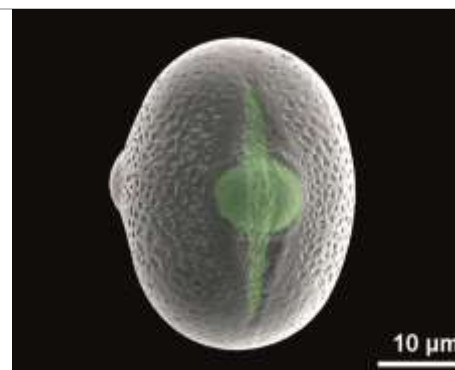
pollen grain with colpi

*Polygala chamaebuxus**Cistus creticus***colporoidate**

pollen grain with compound apertures composed of a colpus (ektoaperture) with an indistinct endoaperture

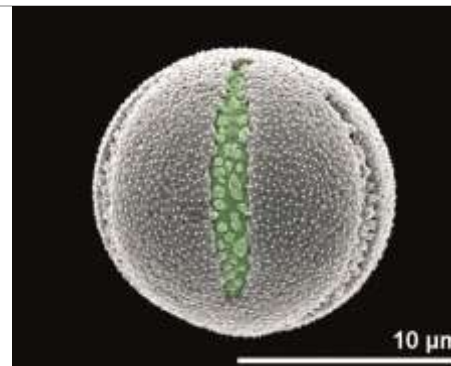
*Comment:* Is a rare character, e.g., for deciduous *Quercus* pollen.*Eucommia* sp. (fossil)**colporus** (pl. colpi)

compound aperture composed of a colpus (ektoaperture) combined with an endoaperture (porus) of variable size and shape

*Lathyrus vernus*

**colpus** (pl. colpi)

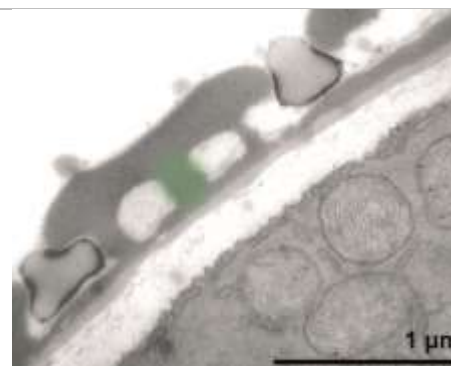
elongated aperture (length/width ratio > 2)  
situated at the equatorial region or regularly  
distributed over the pollen grain



*Crucjata laevipes*

**columella**  
(pl. columellae)

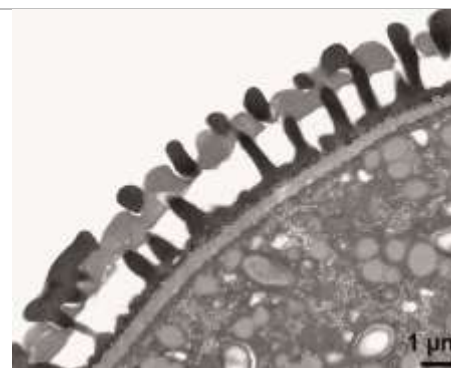
rod-like structure element, supporting a tectum



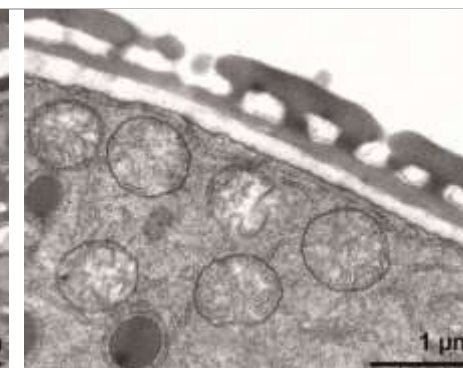
*Microrrhinum minus*

**columellate**

infratectum with columellae

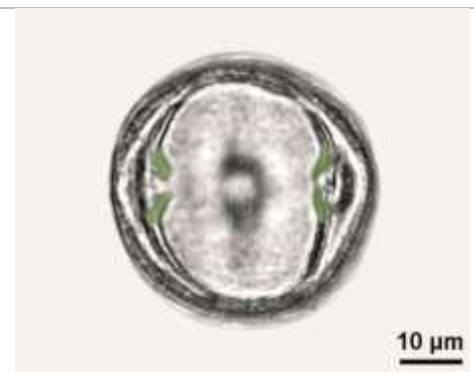


*Mentha aquatica*



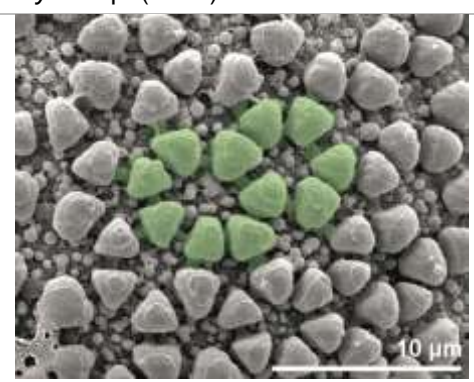
*Microrrhinum minus*

**costa** (pl. costae),  
**costate** thickening of the nexine/endexine bordering an endoaperture

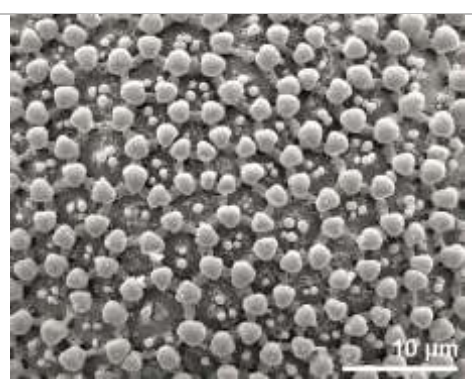


*Nyssa* sp. (fossil)

**croton pattern** special type of reticulum cristatum formed by regularly arranged sculpture elements on muri

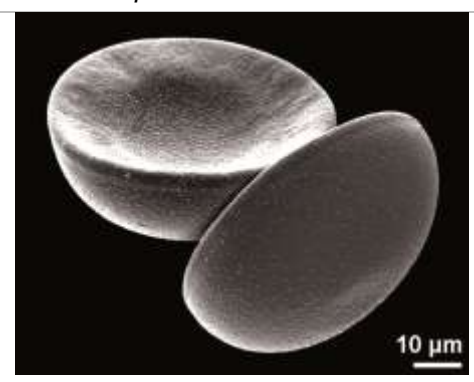


*Croton triqueter*

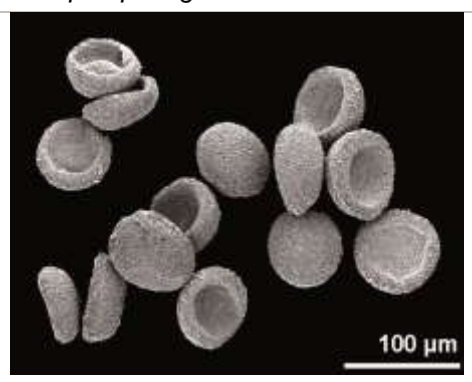


*Jatropha podagrica*

**cup-shaped** characteristic shape of pollen grains caused by infoldings as a consequence of harmomegathy



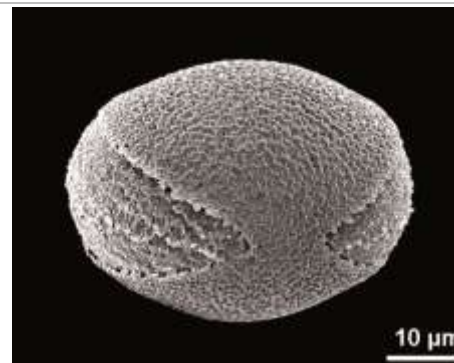
*Heliconia* sp. (dry pollen)



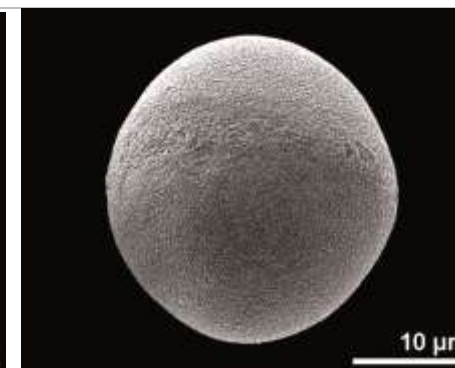
*Tsuga canadensis* (dry pollen)

**di-** prefix meaning 2 (dicolpate, dicolporate, diporate, disulcate)

**dicolpate** pollen grain with 2 colpi



*Chimonanthus praecox* (polar view)



*Pedicularis elongata* (polar view)

**dicolporate** pollen grain with 2 colpi

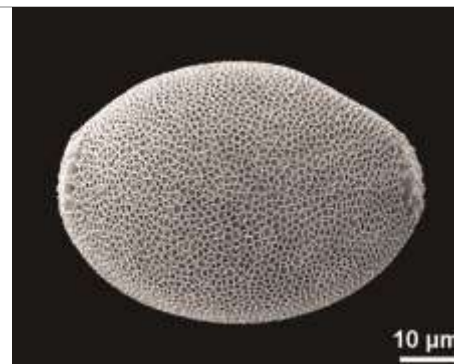


*Justicia xylosteoides*

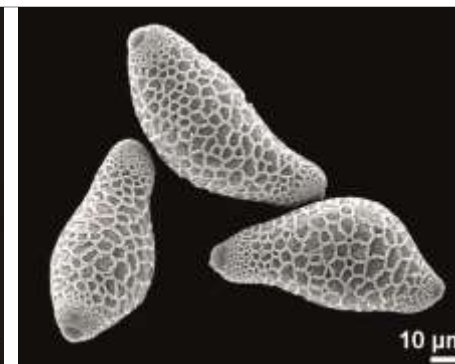


*Justicia procumbens*

**diporate** pollen grain with 2 pori



*Colchicum autumnale*

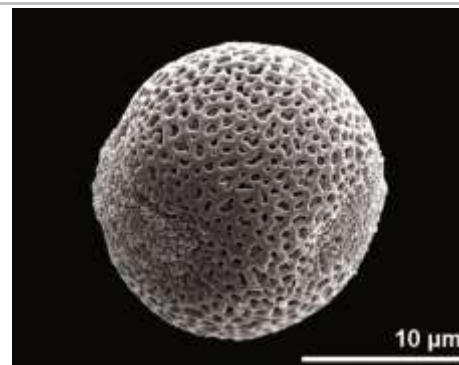


*Quesnelia augusto-coburgii*

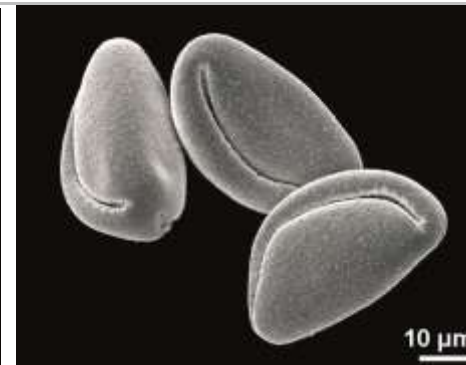
**dispersal unit** unit in which pollen is shed (monad, dyad, tetrad, polyad, massula, pollinium, pollinarium)

**disulcate**

pollen grain with 2 sulci



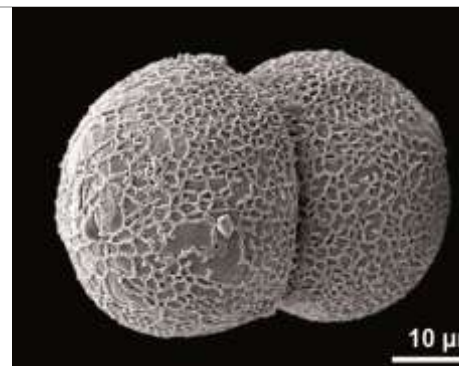
*Tofieldia calyculata*



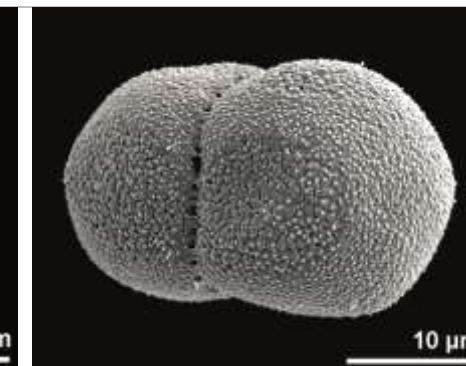
*Uvularia grandiflora* (dry pollen)

**dyad**

dispersal unit of 2 pollen grains



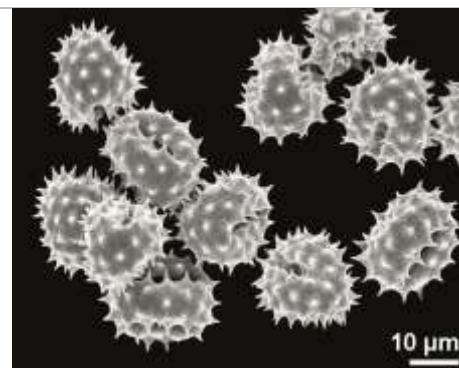
*Scheuchzeria palustris*



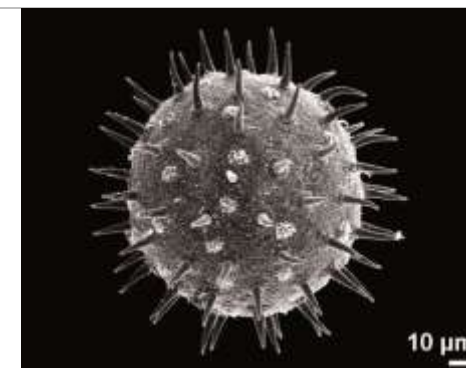
*Zeylanidium subulatum*

**echinate**

pollen wall with echini

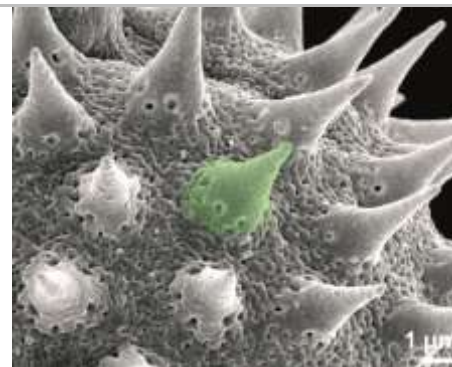


*Bellis perennis* (dry pollen)



*Hibiscus trionum*

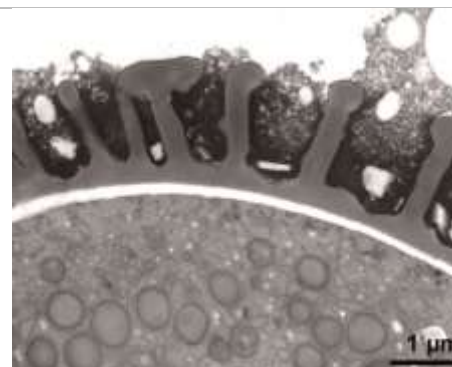
**echinus** (pl. echini) pointed ornamentation element longer and/or wider than 1  $\mu\text{m}$



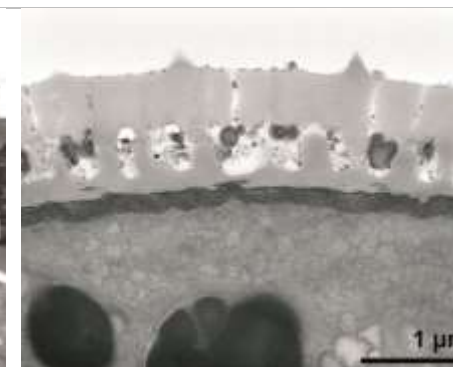
*Galinsoga ciliata*

**endexine** distinct exine layer between ektexine and intine; endexine can be compact, spongy or lamellar as well as continuous, discontinuous, absent or in aperture only

**endexine absent**

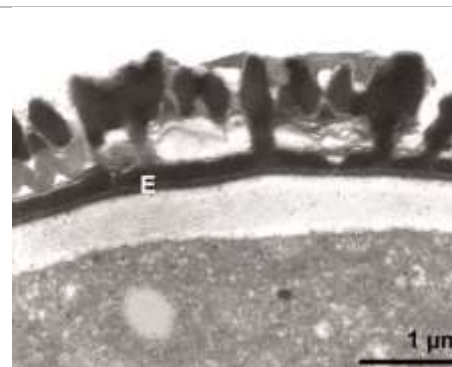


*Brassica napus*

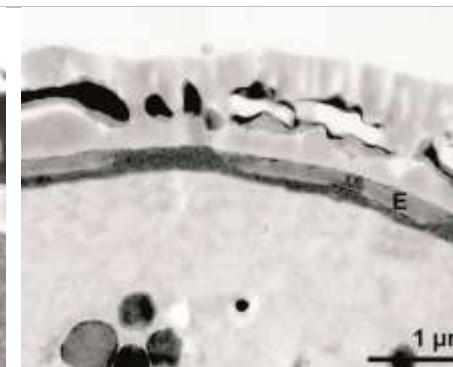


*Chenopodium album*

**endexine compact**



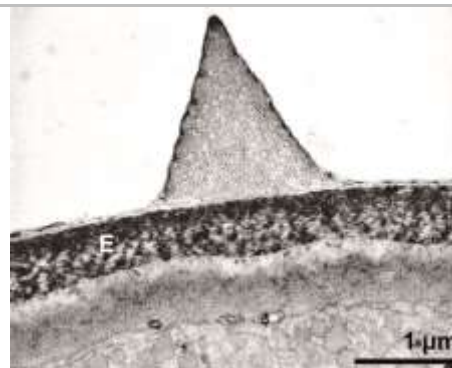
*Odontites luteus*  
(compact, continuous)



*Ranunculus trichophyllos*  
(compact, discontinuous)



**endexine spongy**

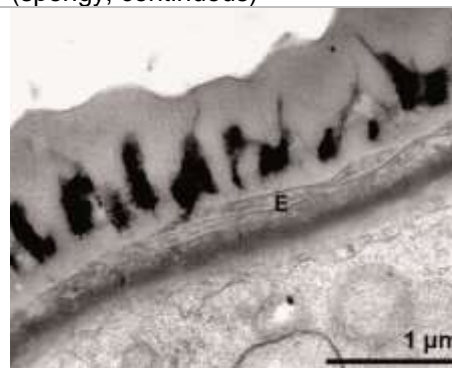


*Pistia stratiotes*  
(spongy, continuous)

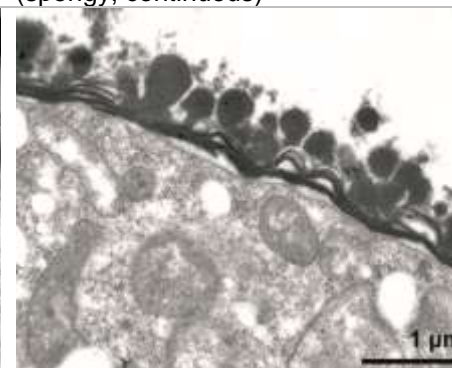


*Spathiphyllum blandum*  
(spongy, continuous)

**endexine lamellar**



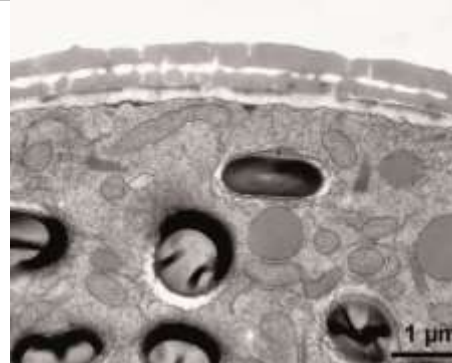
*Thalictrum flavum*  
(lamellar, continuous)



*Orobanche hederiae*  
(spongy, continuous)

**eutectate**

pollen grain with a continuous tectum



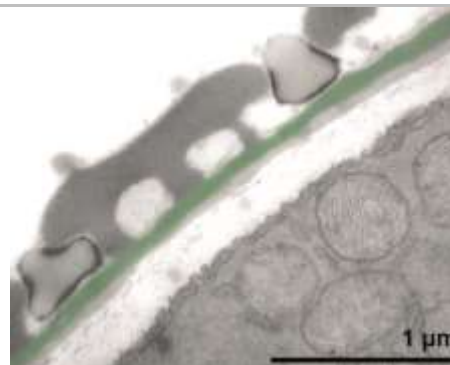
*Plantago maritima*



*Apium nodiflorum*

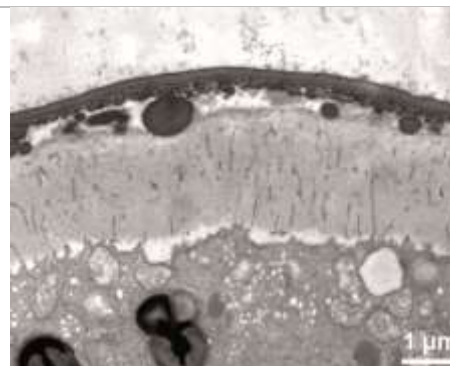
**foot layer**

inner layer of the ektexine;  
 foot layer can be continuous, discontinuous,  
 perforated or absent

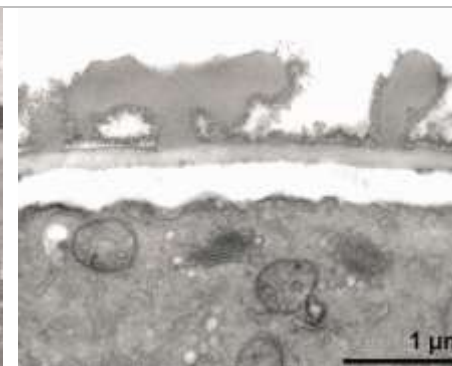


*Microrrhinum minus*

**foot layer absent**

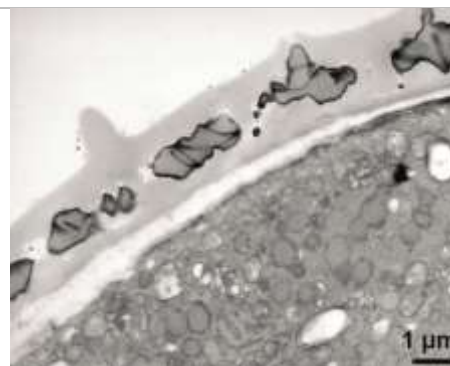


*Pachypodium succulentum*

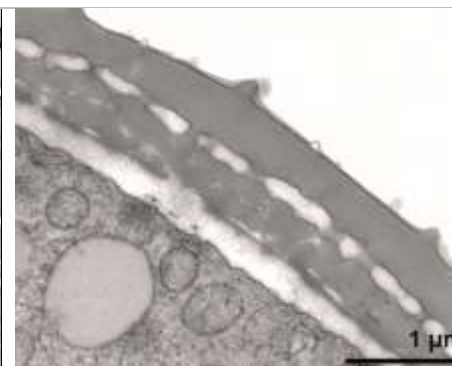


*Fraxinus excelsior*

**foot layer continuous**

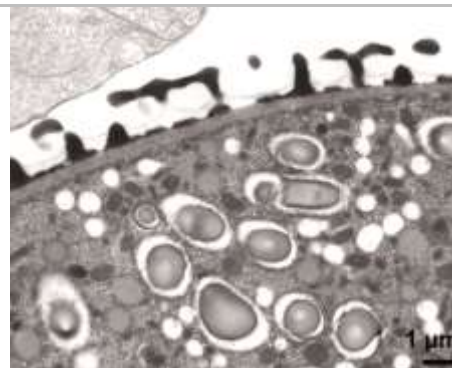


*Cereus* sp.

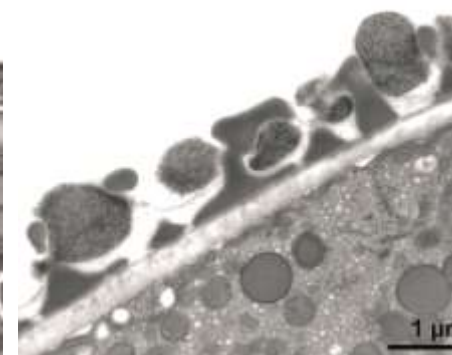


*Plantago maritima*

**foot layer  
discontinuous**

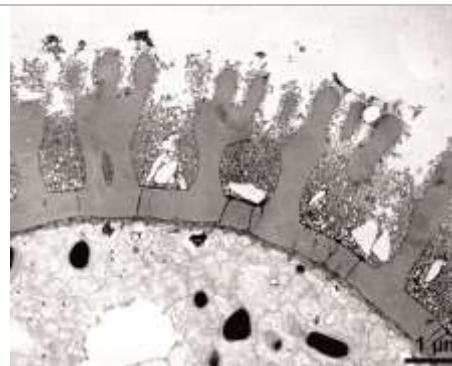


*Acinos alpinus*



*Clinopodium vulgare*

**foot layer perforated**



*Geranium robertianum*

**fossula (pl. fossulae)** irregularly shaped groove in the surface of a pollen wall



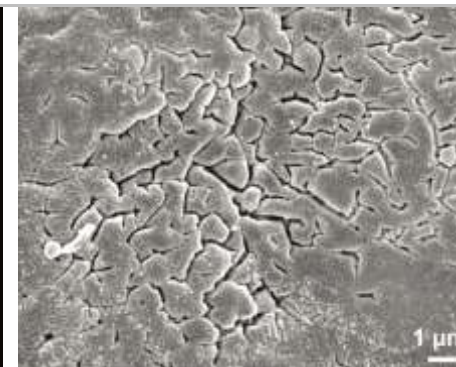
*Mendoncia albida*

**fossulate**

pollen wall with fossulae



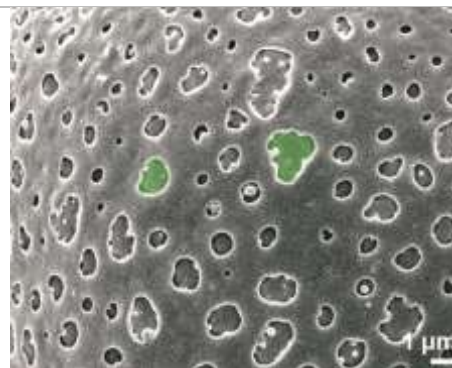
*Aristolochia manshuriensis*



*Rhododendron hirsutum*

**foveola** (pl. foveolae)

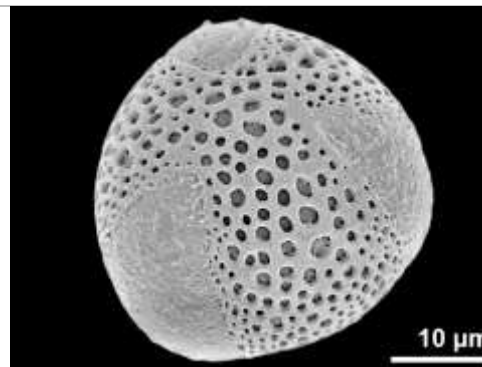
roundish lumen more than 1 μm in diameter;  
distance between two adjacent lumina larger  
than their diameter



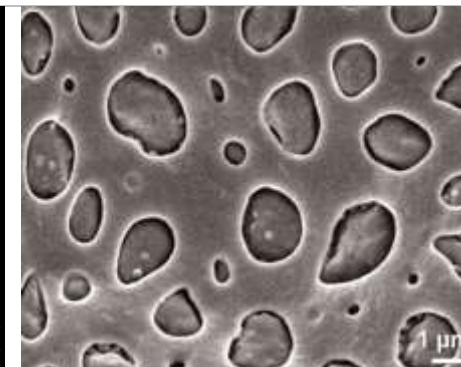
*Streptocalyx poeppigii*

**foveolate**

pollen wall with foveolae



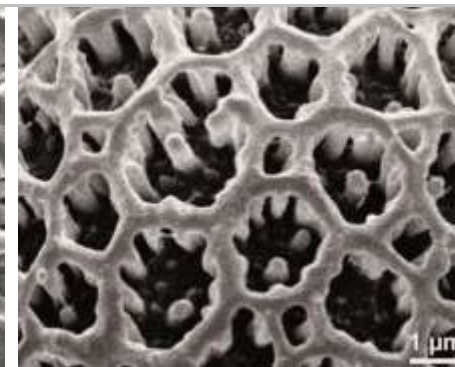
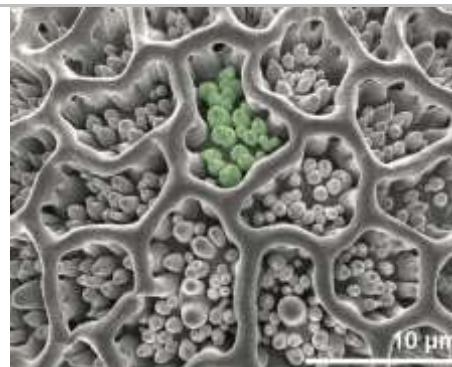
*Averrhoa bilimbi*



*Canistrum camacaense*

**free-standing columellae**

columellae in the infratectal layer not covered by a tectum in semitectate pollen grains

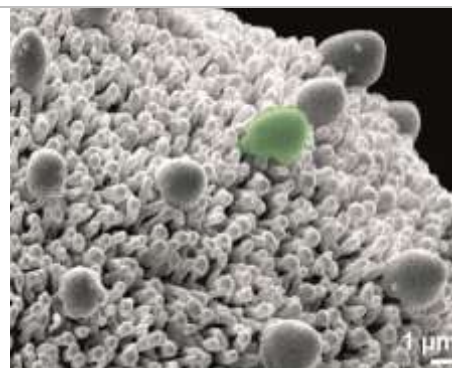


*Dipteracanthus devosianus*

*Erophila verna*

**gemma (pl. gemmae)**

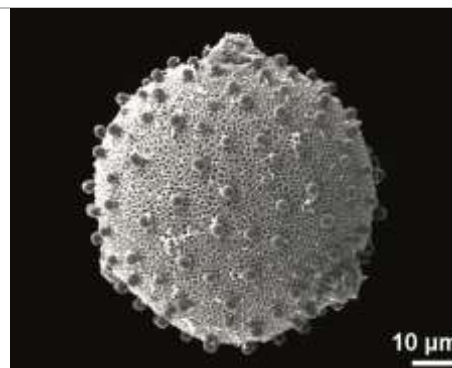
globular exine element more than 1 μm in diameter



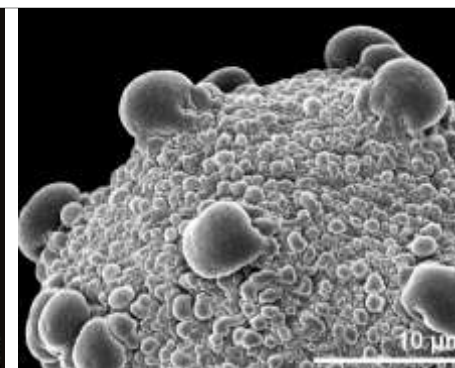
*Dionaea muscipula*

**gemmate**

pollen wall with gemmae



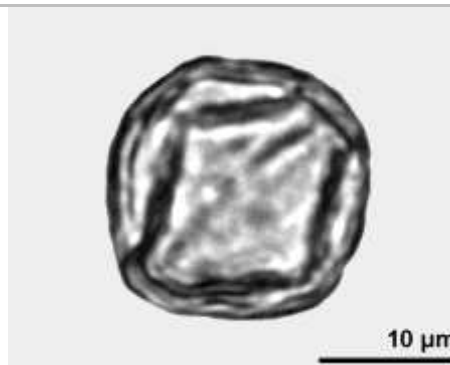
*Cephalopentandra ecirrhosa*



*Stenandrium dulce*

**geniculum**  
(pl. genicula)

bulge of a colpus in the equatorial region of a pollen grain

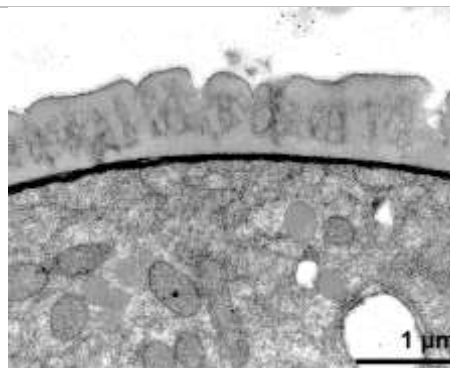


*Quercus* sp. (fossil)

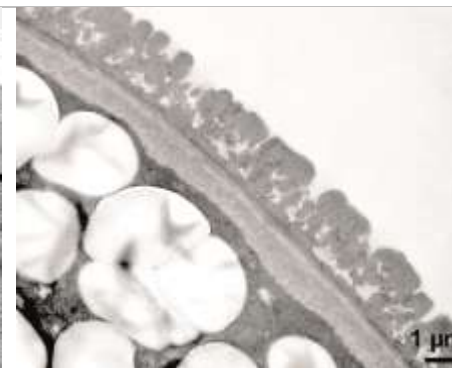
**granular**

infratectum composed of granula, clusters of granula or elements of different size and shape (never solid and rod-like)

*Comment:* Not to be confused with "granulate", which is a type of ornamentation.



*Amydrinium medium*

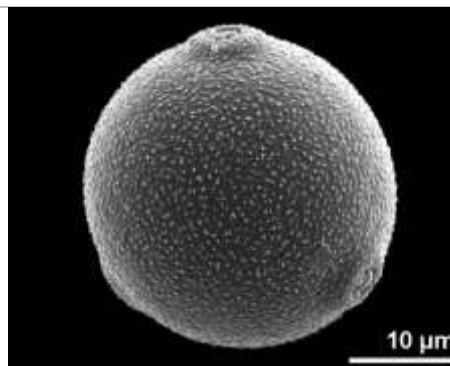


*Viola tricolor*

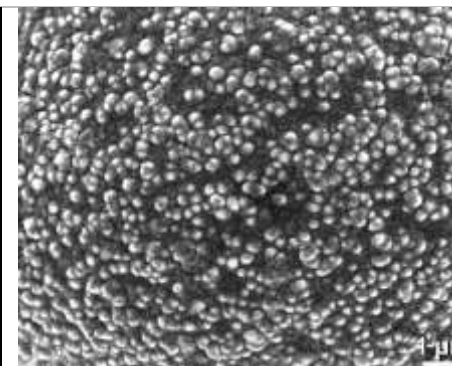
**granulate**

pollen wall with granula

*Comment:* Not to be confused with "granular", which is a feature of the pollen wall structure.

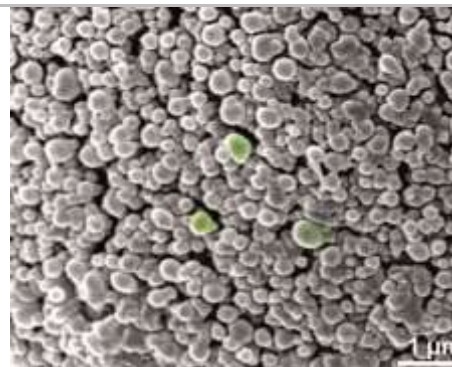


*Betula humilis*



*Humulus lupulus*

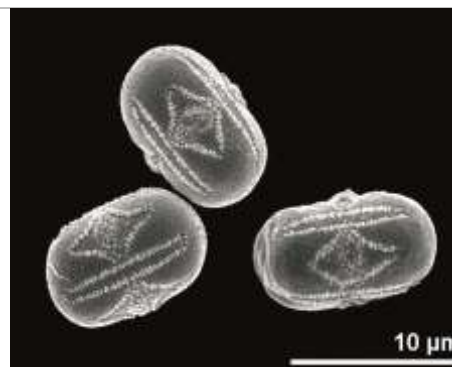
**granulum** (pl granula) structure- or sculpture element of different size and shape; smaller than 1  $\mu\text{m}$



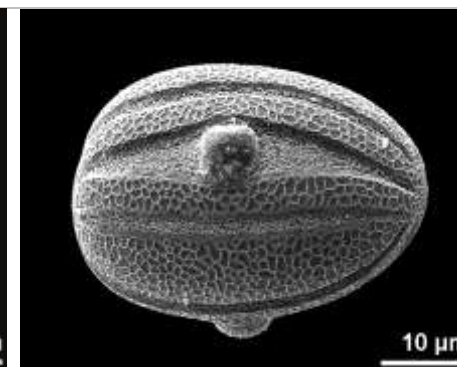
*Rhaphidophora africana*

**heteroaperturate** pollen grain with two different types of apertures; only one type presumed to function as a germination site

*Comment:* Colpori and colpi alternate, the colpi are also called pseudocolpi because they do not function as germination sites.



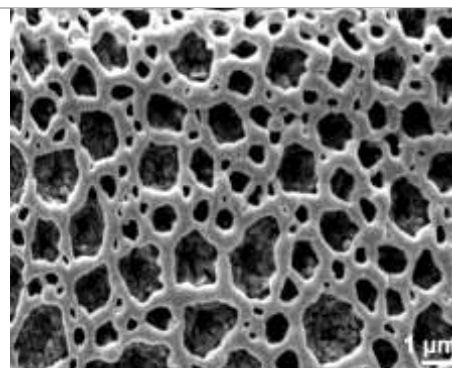
*Myosotis ramosissima*



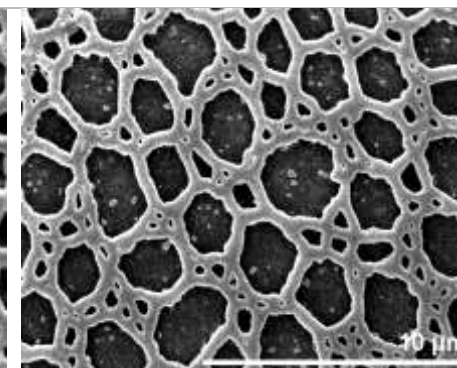
*Tetramerium nervosum*

**heterobrochate** reticulate pollen wall with lumina of different sizes

*Comment:* The term should be used when the feature is remarkably expressed.



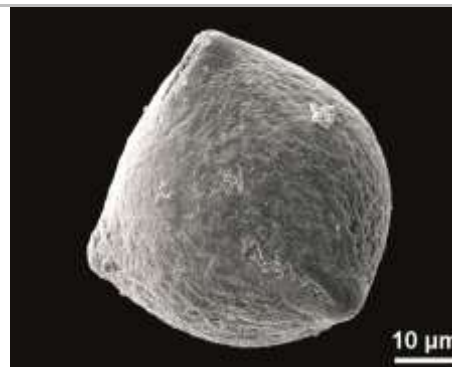
*Anthericum ramosum*



*Fritillaria meleagris*

**heteropolar**

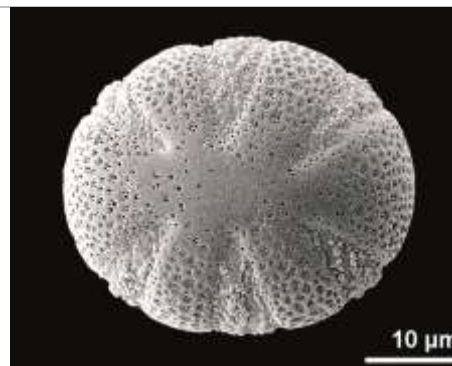
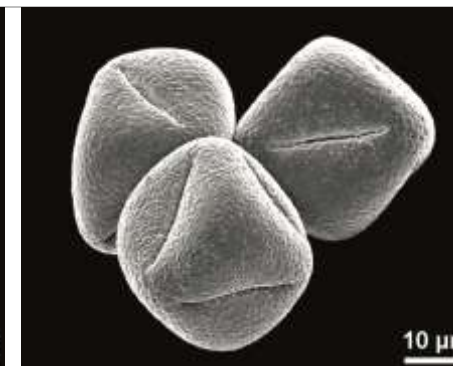
pollen grain with different proximal and distal faces

*Eleaagnus angustifolia**Onosma visianii***hexa-**

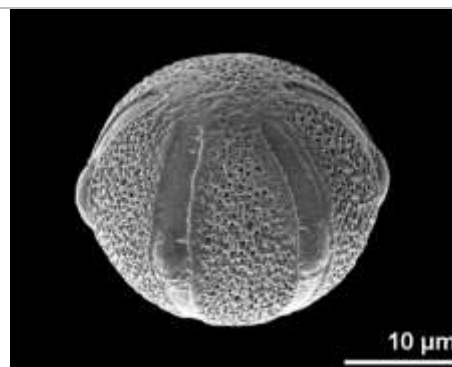
prefix meaning 6

**hexacolpate**

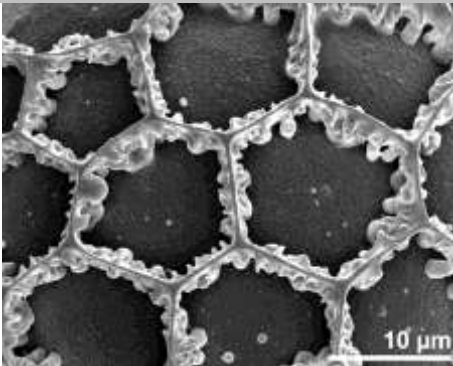
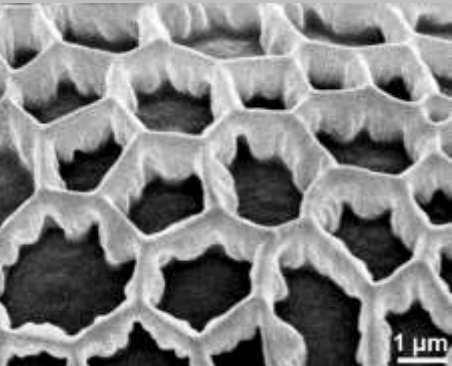

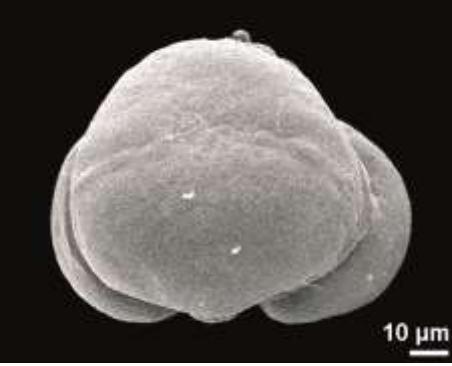
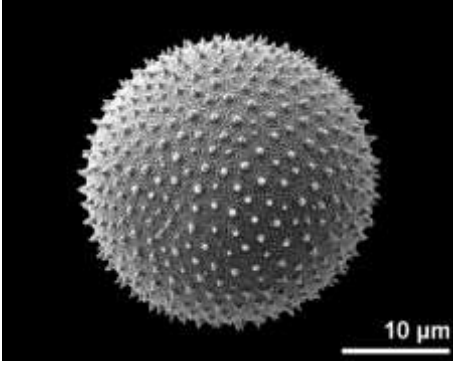
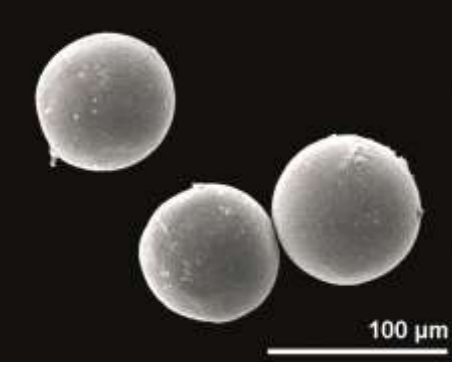
a pollen grain with 6 colpi

*Salvia austriaca**Sideritis syriacus* (dry pollen)**hexacolporate**

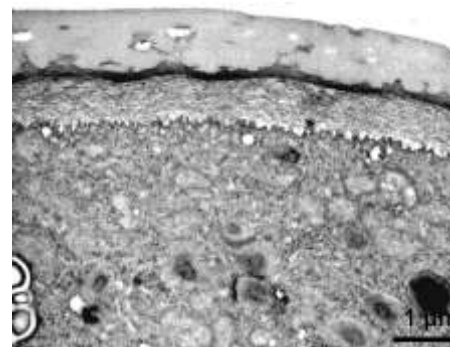
a pollen grain with 6 colpi

*Pinguicula ehlersiae**Justicia menesii*



<b>homobrochate</b>	reticulate pollen wall with lumina of uniform size  <i>Comment:</i> The term should be used when the feature is remarkably expressed.		
<b>impression mark</b>	a linear or Y-shaped mark on the proximal polar area of a pollen grain retained from the tetrad stage		
<b>inaperturate</b>	pollen grain without distinct apertures		
<b>infoldings</b>	a consequence of harmomegathy in dry pollen (e.g. aperture sunken, interapertural area sunken, irregularly infolded)		
<b>infratectum</b>	layer between tectum and foot layer or endexine (if foot layer is missing); infratectum can be alveolate, columellate, granular or absent; see: alveolate, columellate, granular		

**infratectum absent**



*Mahonia aquifolium*



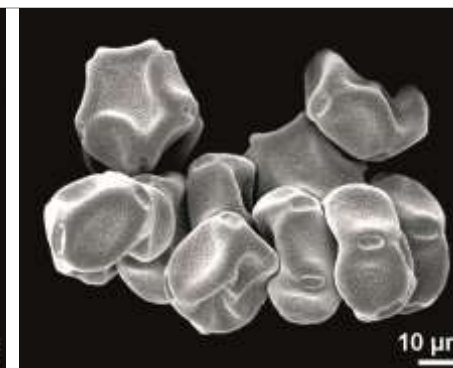
*Dieffenbachia humilis*

**interapertural area** region between apertures

**interapertural area sunken** infoldings of dry pollen as a consequence of harmomegathy

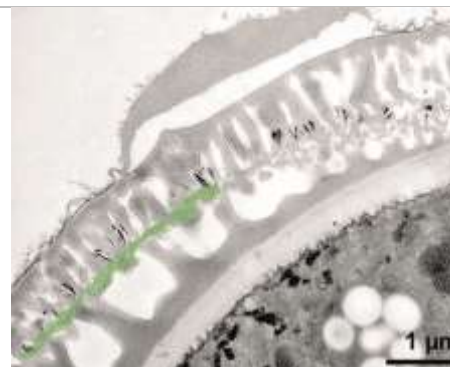


*Odontites luteus*

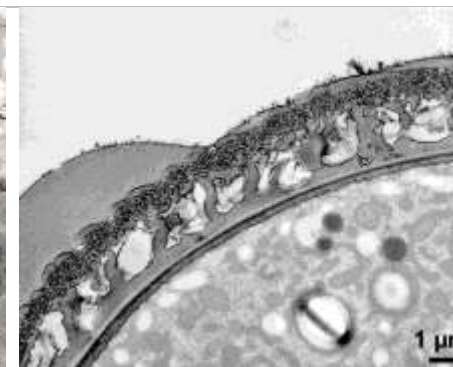


*Alnus glutinosa*

**internal tectum** layer between foot layer and tectum, separated from them by columellae



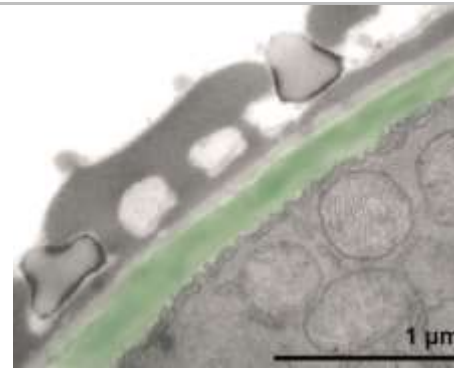
*Centaurea cyanus*



*Agrimonia eupatoria*

**intine**

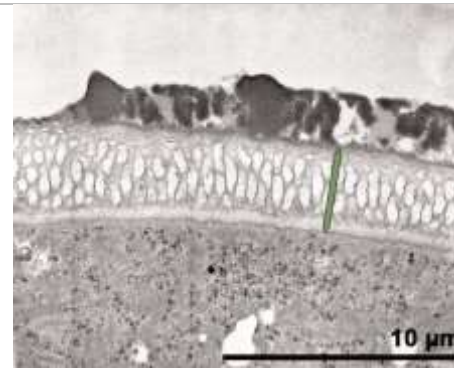
part of the pollen wall next to the cytoplasm, mainly consisting of polysaccharides; intine can be mono- or bilayered



*Microrrhinum minus*

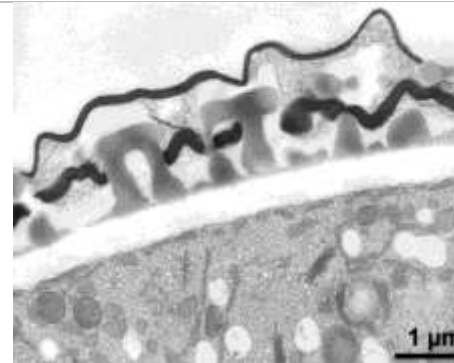
**intine bilayered**

ektintine with channels, endintine homogenous



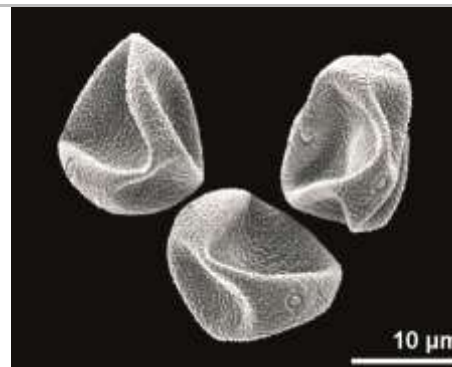
*Dieffenbachia humilis*

**intine monolayered**

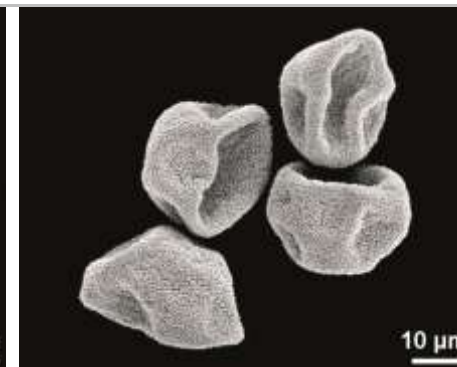


*Acinos alpinus* (electron-lucent layer)

**irregularly infolded** infoldings of dry pollen as a consequence of harmomegathy

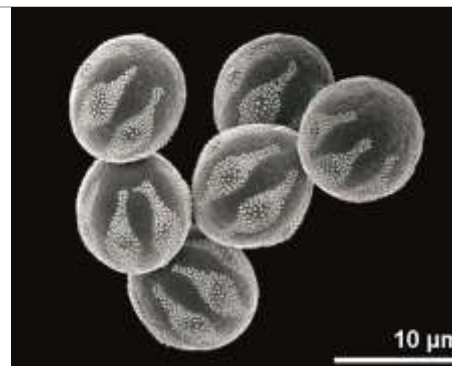


*Urtica dioica*

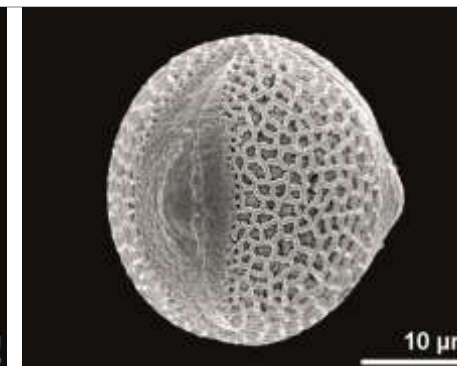


*Populus alba*

**isopolar** pollen grain with identical proximal and distal faces

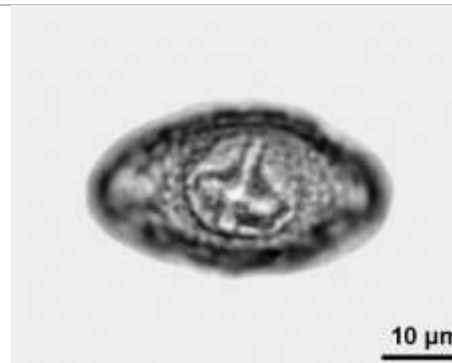


*Moltkia petraea*



*Viburnum tinus*

**lalongate** endoaperture elongated equatorially



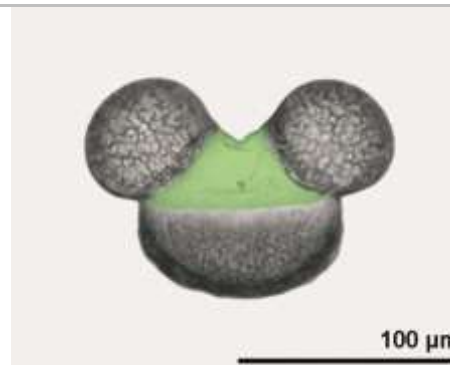
*Symplocos* (fossil)



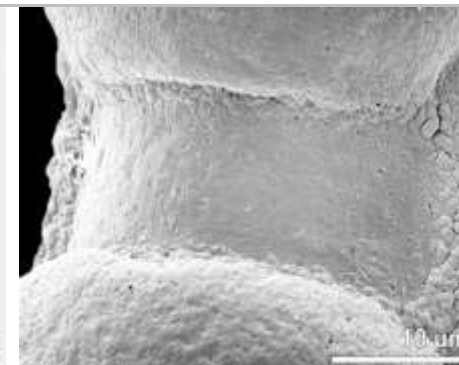
*Dictamnus albus*

**leptoma**  
(pl. leptomata)

thinning of the pollen wall at the distal pole (of a pollen grain) in conifers, presumed to function as germination area



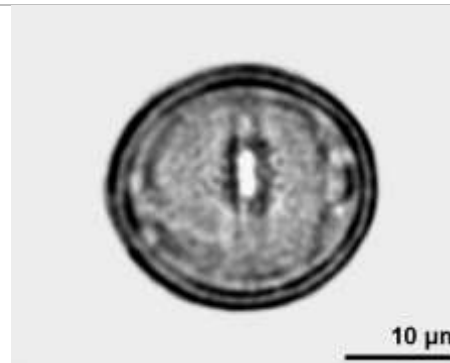
*Abies* sp. (fossil)



*Pinus strobilus*

**lolongate**

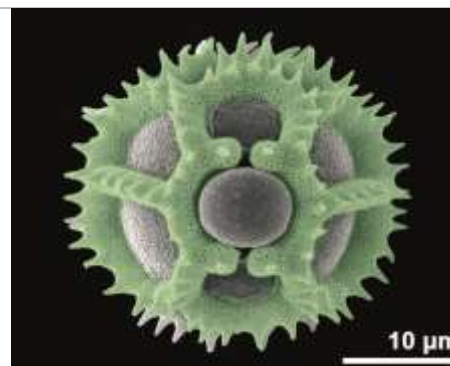
endoaperture elongated meridionally



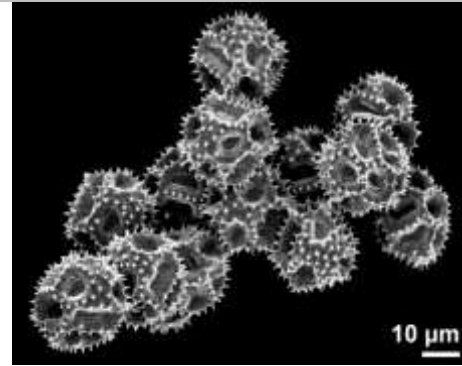
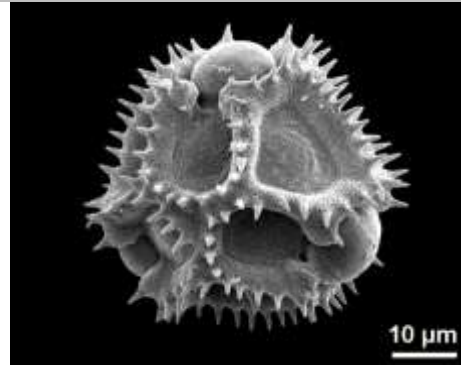
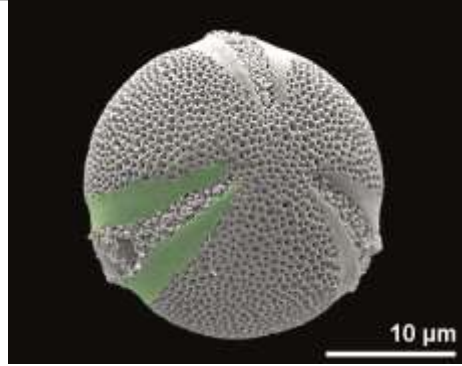
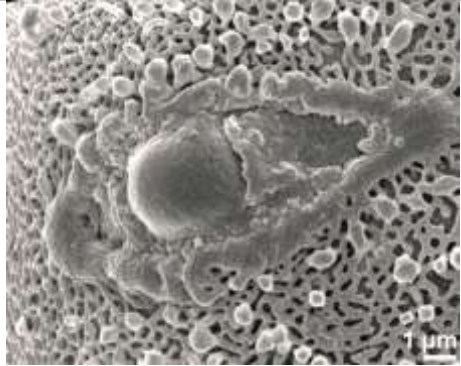
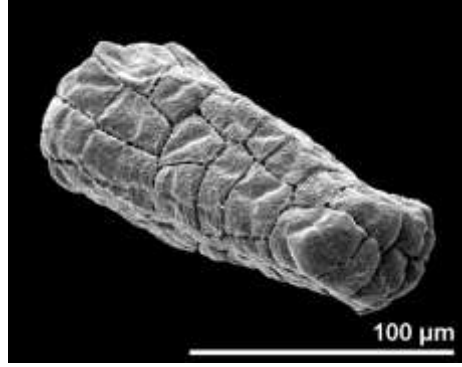
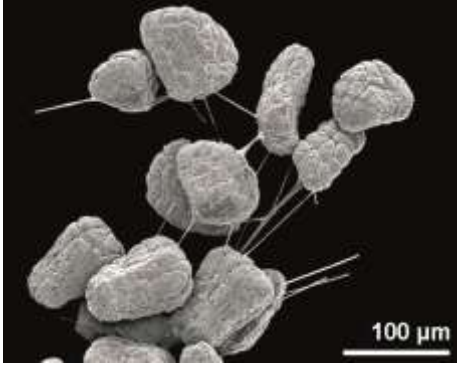
*Rumex* sp. (fossil)

**lophae** (sing. lophae)

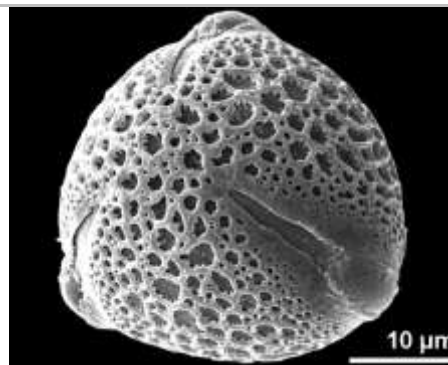
a network-like pattern of ridges (=lophae) formed by the outer exine surrounding window-like spaces or depressions (=lacunae)



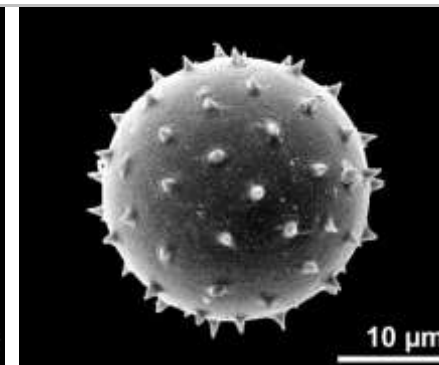
*Leontodon saxatilis*

<b>lophate</b>	pollen wall with lophae		
<b>margo</b> (pl. margines)	exine area surrounding an aperture and differentiated in ornamentation		
<b>massula</b> (pl. massulae)	dispersal unit of more than 4 pollen grains and fewer than the locular content		
<b>micro-</b>	prefix meaning small; features smaller as 1 μm: -baculate, -clavate, -echinate, -gemmate, -rugulate, -reticulate, -verrucate		

**monad** dispersal unit consisting of a single pollen grain

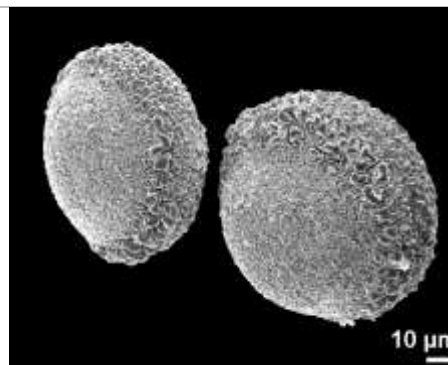


*Hedera helix*

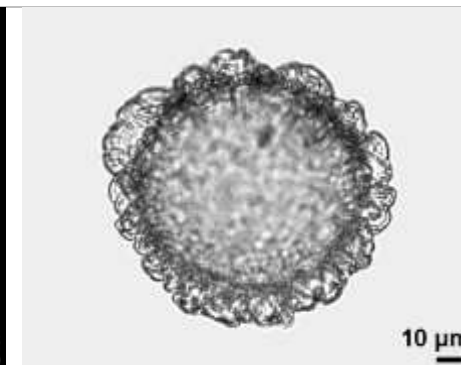


*Alocasia brisbanensis*

**monosaccate** pollen grain with a single saccus

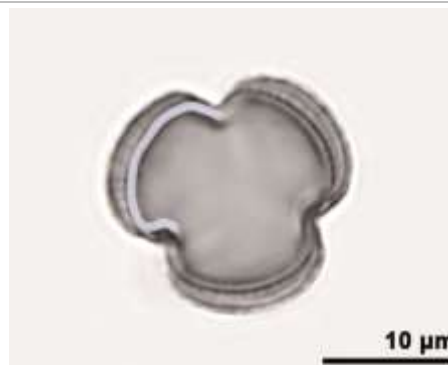


*Tsuga canadensis*

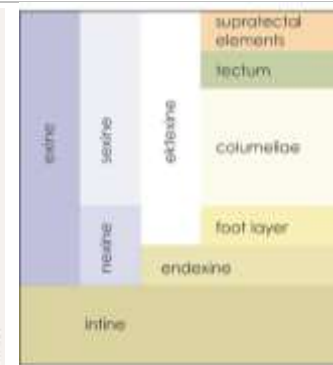


*Tsuga canadensis*

**nexine** term used for light microscopy, describing the inner, unstructured layer/part of the exine

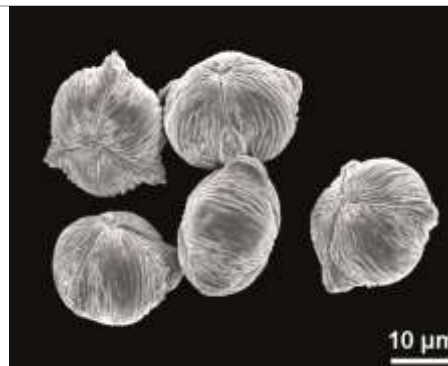


*Artemisia sp.*



**oblate**

pollen grain with a polar axis shorter than the equatorial diameter



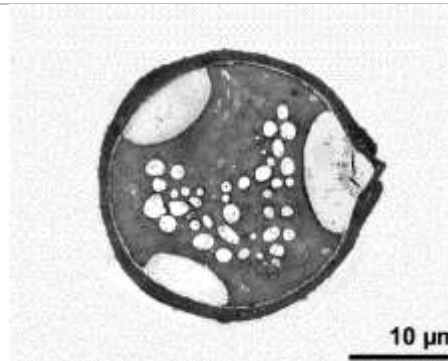
*Cuphea purpurea*



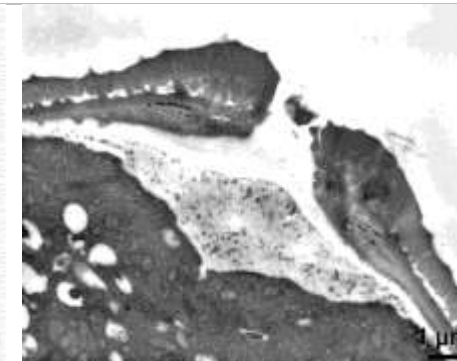
*Lachenalia aloides*

**oncus** (pl. onci)

lens-shaped body located in the apertural region



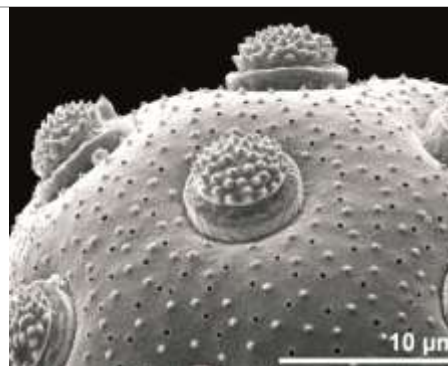
*Corylus avellana*



*Betula humilis*

**operculate**

aperture(s) with operculum (opercula)



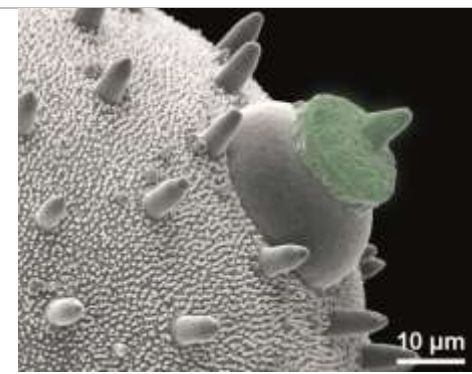
*Agrostemma githago*



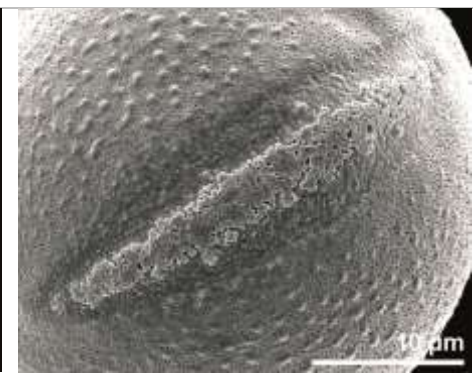
*Passiflora suberosa*



**operculum**  
(pl. opercula)      coherent exine structure covering an aperture



*Cucurbita pepo*



*Teucrium pyrenaicum*

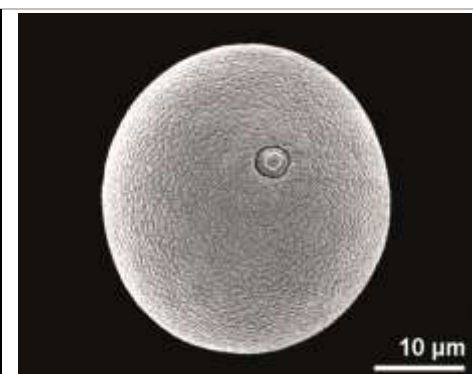
**ornamentation**      general term, applied in palynology to surface features

**outline**      general term used to describe the contour of pollen grains in polar and/or equatorial view (circular, elliptic, triangular, quadrangular, polygonal, irregular, lobate)

**outline circular**  
(polar view)

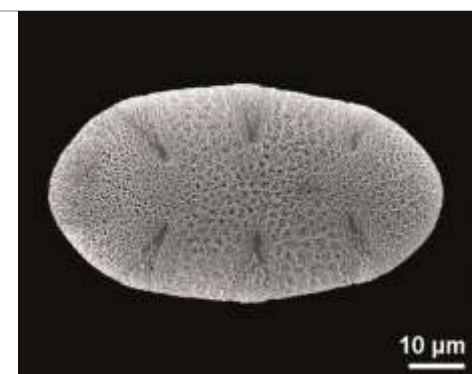


*Galium verum*

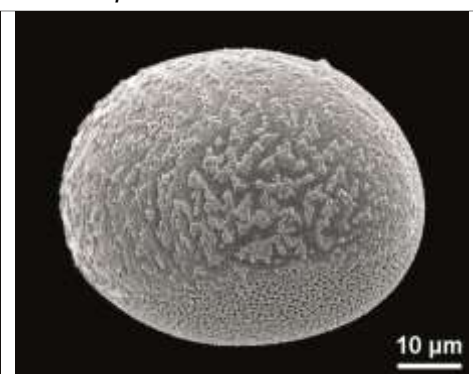


*Phleum pratense*

**outline elliptic**  
(polar view)

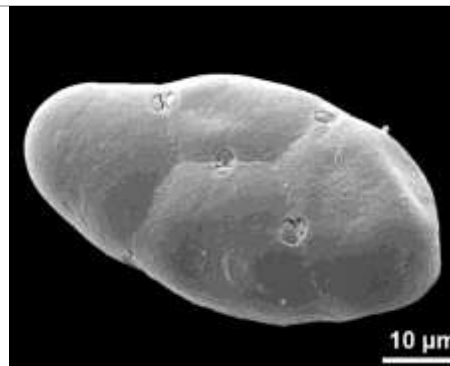


*Salvia coccinea*

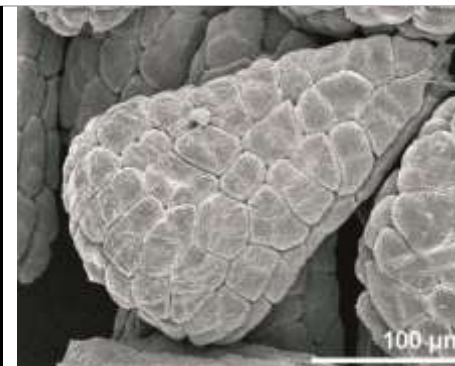


*Gagea villosa*

outline irregular

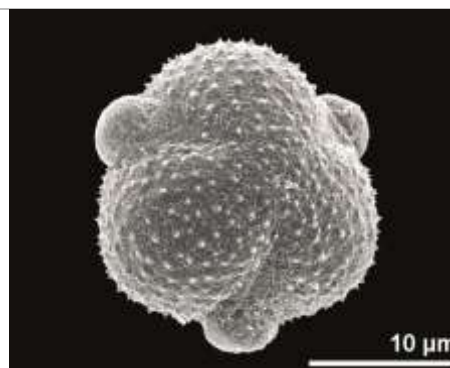


*Periploca gracilis* (tetrad)



*Anteriorchis coriophora*

outline lobate  
(polar view)

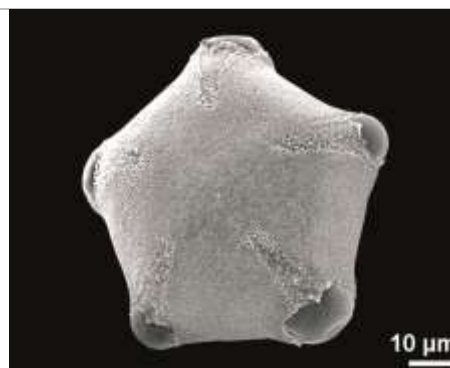


*Artemisia pontica*

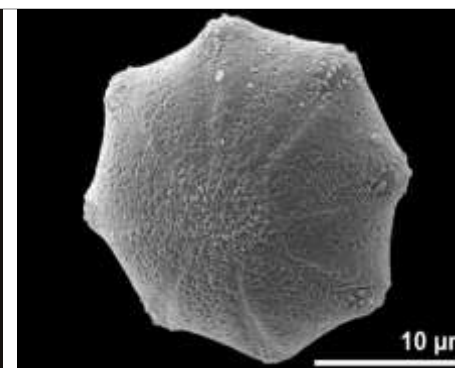


*Acer pseudoplatanus* (dry pollen)

outline polygonal  
(polar view)



*Viola arvensis*

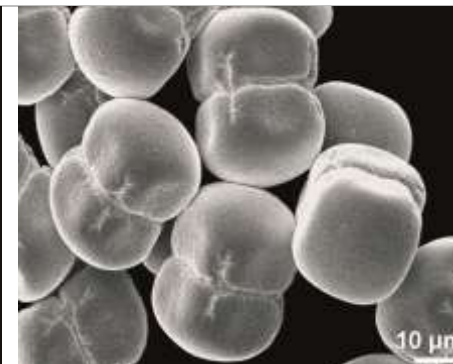


*Sarracenia alata*

**outline quadrangular  
(polar view)**

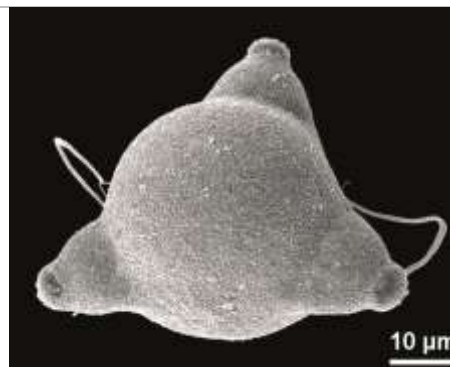


*Viola tricolor*

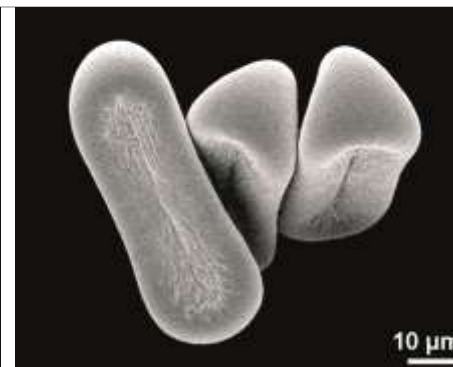


*Anchusa officinalis* (dry pollen)

**outline triangular  
(polar view)**



*Circaea lutetiana*



*Orlaya grandiflora* (dry pollen)

**panto-**

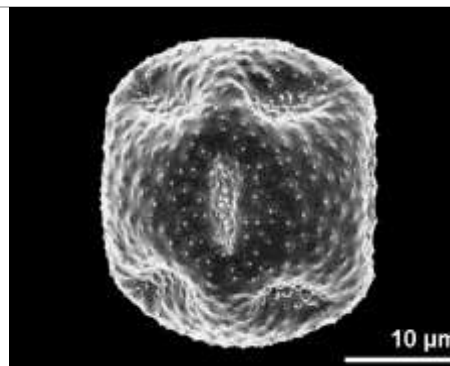
prefix meaning globally distributed

**pantoaperturate**

pollen grain with apertures distributed more or less regularly over the whole surface

**pantocolpate**

pollen grain with colpi distributed more or less regularly over the whole surface

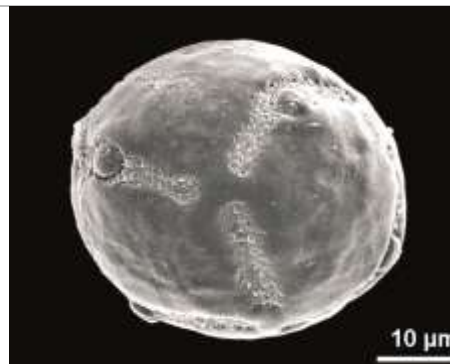


*Ranunculus lanuginosus* (dry pollen)



*Corydalis cava*

**pantocolporate**



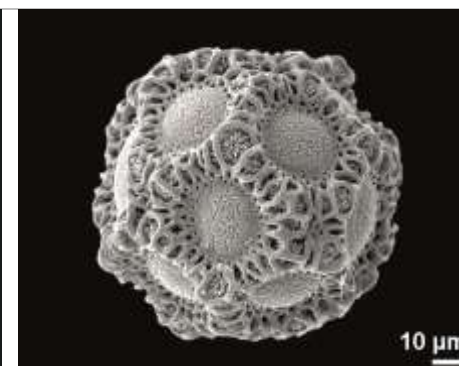
*Banisteria argentea*

**pantoporate**

pollen grain with pori distributed more or less regularly over the whole surface



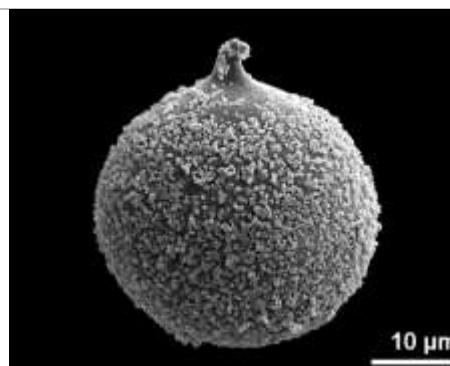
*Costus barbatus*



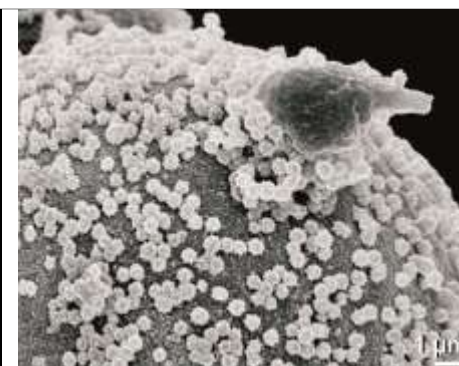
*Opuntia phaeacantha*

**papilla** (pl. papillae)

small protuberance typical for Taxodioideae-pollen (Cupressaceae)



*Cryptomeiria japonica*

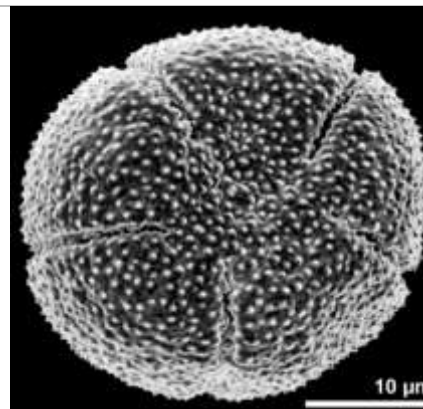


*Metasequoia glyptostroboides*

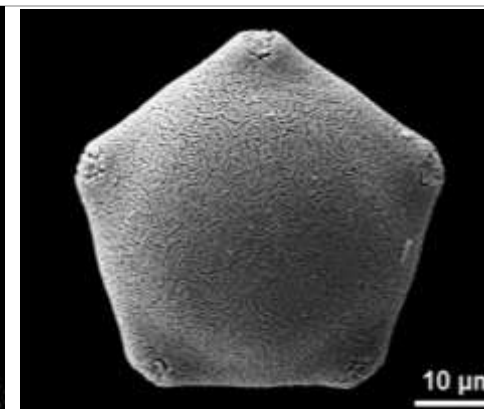
**penta-**

prefix meaning 5

**pentacolpate** a pollen grain with 5 colpi



*Eschscholzia californica*

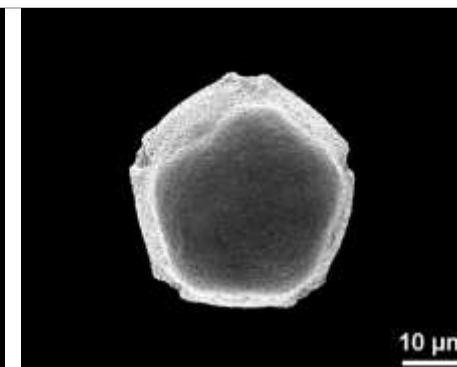


*Mendoncia albida*

**pentacolporate** a pollen grain with 5 colpi

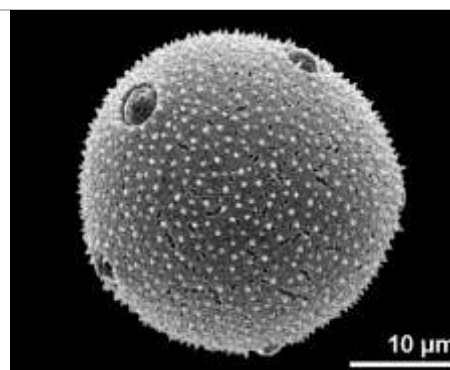


*Viola arvensis*

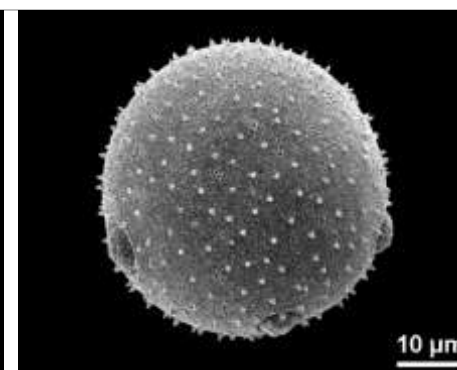


*Pulmonaria mollissima*

**pentaporate** a pollen grain with 5 pori



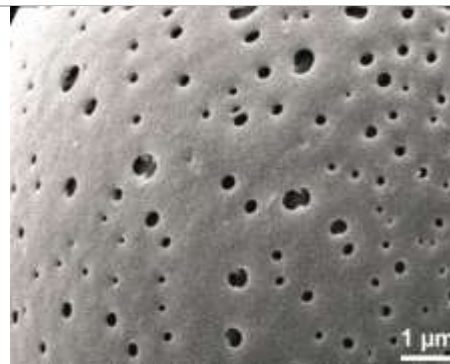
*Legousia speculum-veneris*



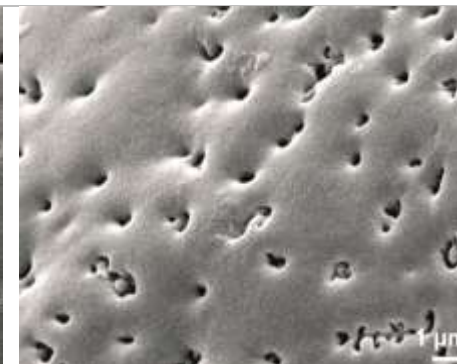
*Campanula rapunculoides*

**perforate**

pollen wall with holes less than 1µm in diameter



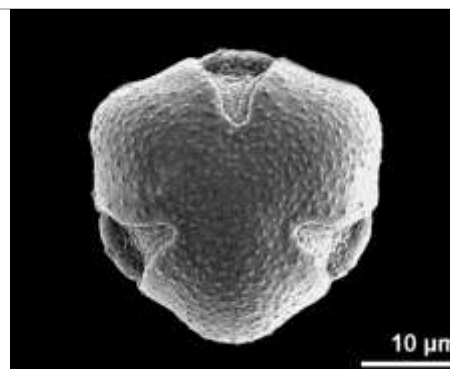
*Pulmonaria officinalis*



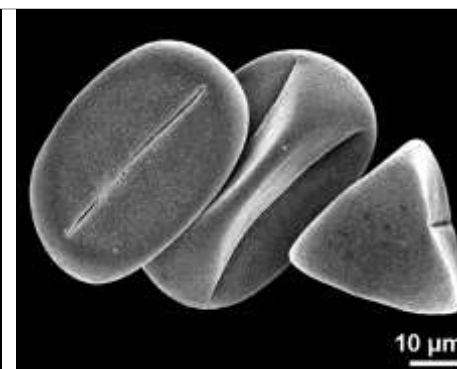
*Gonatopus angustus*

**planaperturate**

pollen grain with an angular outline, where the apertures are situated in the middle of the sides



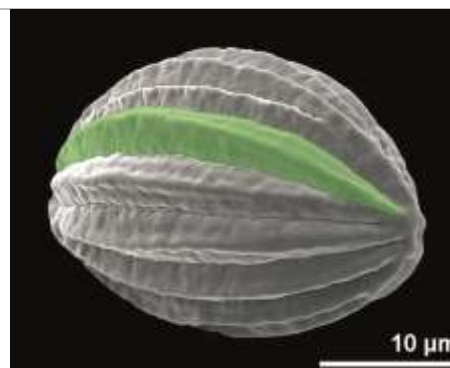
*Centaurea cyanus*



*Persicaria bistorta* (dry pollen)

**plica** (pl. plicae)

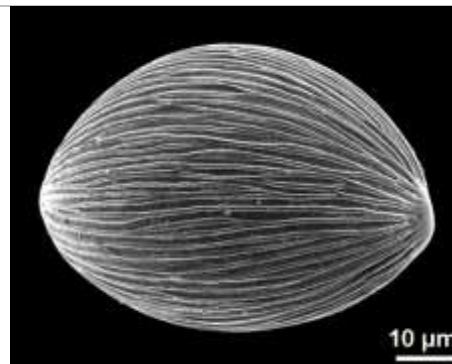
circumferential, parallel ridge-like fold



*Ephedra distachya*

**plicate**

pollen wall with plicae

*Pseudodracontium siamense**Hemigraphis primulaefolia***pluricolumellate**

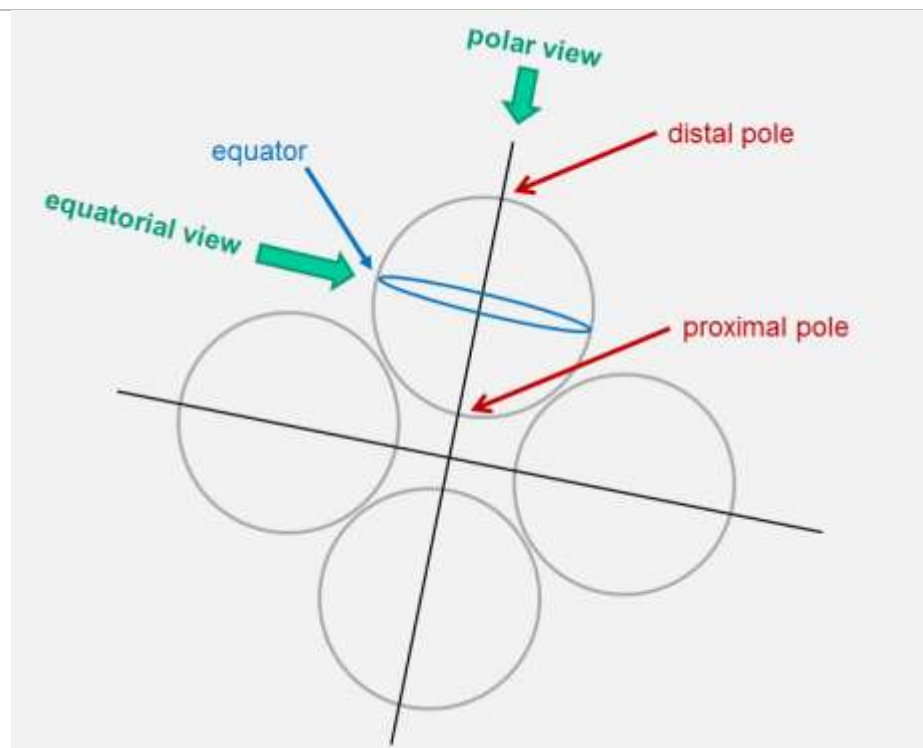
reticulate pollen wall with more than one row of columellae beneath a murus

**polar view**

view of a pollen grain in which the polar axis is directed towards the observer

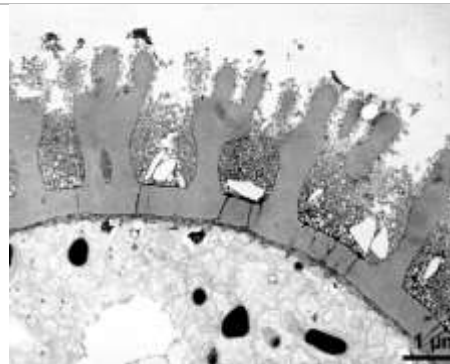
**polarity**

orientation of a pollen grain determined in tetrad stage



**pollen class** artificial grouping of pollen grains that share a single distinctive character; classes include the terms: clypeate, colpate, colporate, dyad, inaperturate, lophate, plicate, polyad, porate, saccate, spiraperturate, sulcate, synaperturate, tetrad, ulcerate

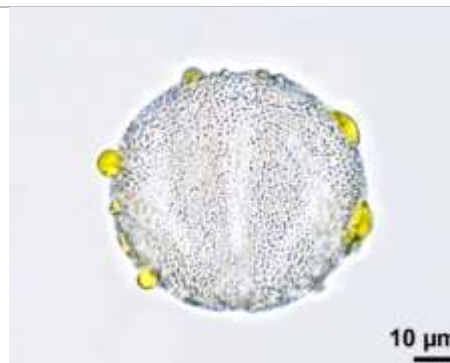
**pollen coating vesicles** pollen coating consisting of polysaccharidic vesicles, e. g. in *Geranium*



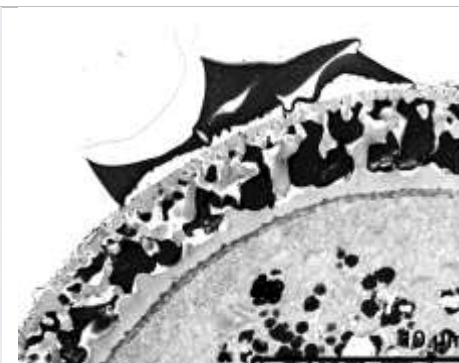
*Geranium* sp.

**pollen coatings** general term applied to organic compounds usually produced by the tapetum, located on the exine and/or in exine cavities

**pollenkitt** pollen coating consisting of sticky substances, mainly lipids



*Salvia nemorosa*

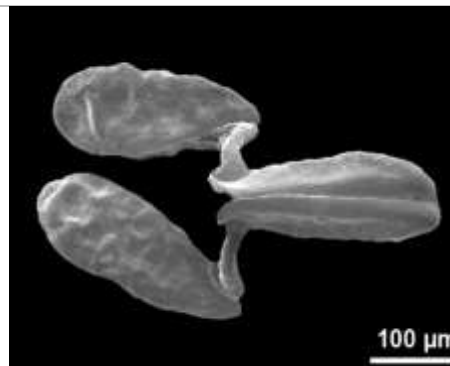


*Nigella arvensis*

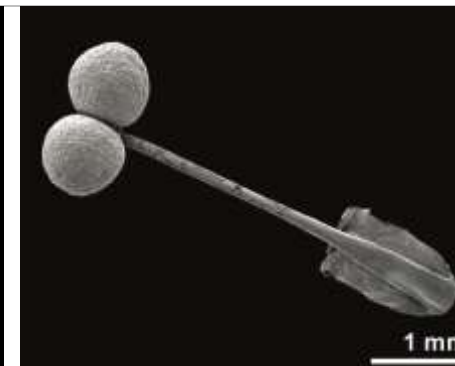


**pollinarium**  
(pl. pollinaria)

dispersal unit of pollinium (or pollinia) and a single interconnecting sterile appendage



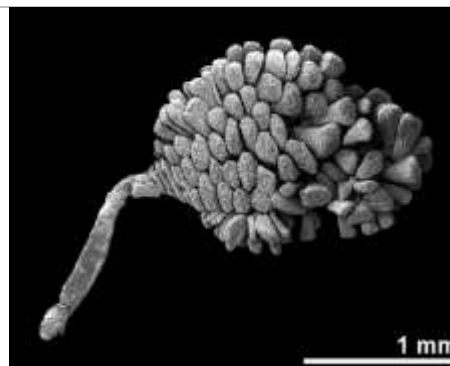
*Vincetoxicum hirundinaria*



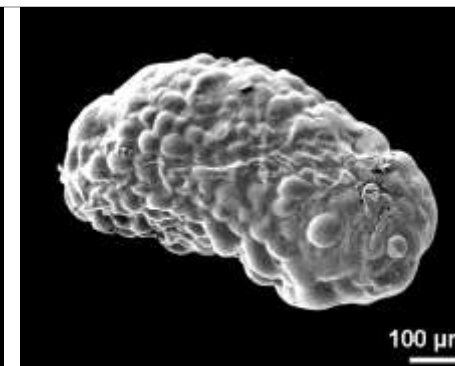
*Aerides multiflora*

**pollinium** (pl. pollinia)

dispersal unit of a more or less interconnected loculiform pollen mass



*Anteriorchis coriophora*



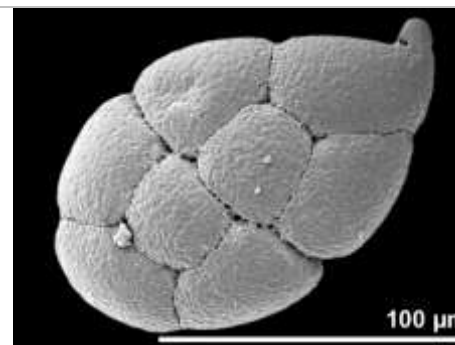
*Stephanotis floribunda*

**polyad**

dispersal unit of more than 4 united pollen grains

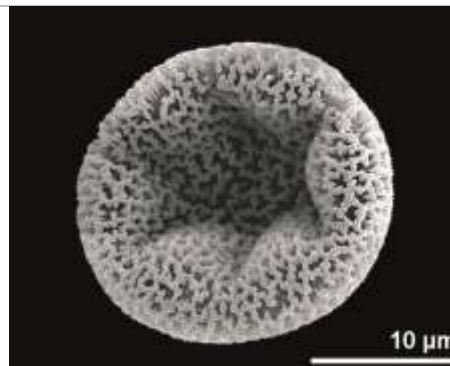


*Acacia myrtifolia*



*Calliandra emarginata*

**polychotomosulcate** pollen grain with a polychotomosulcus,



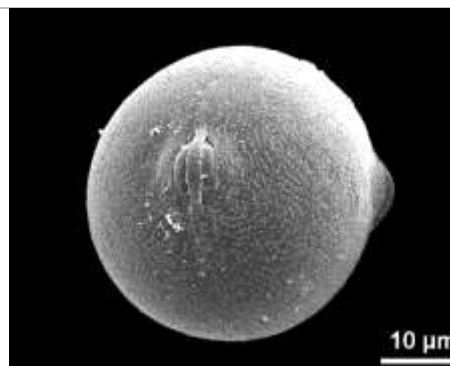
*Hedyosmum goudotianum*



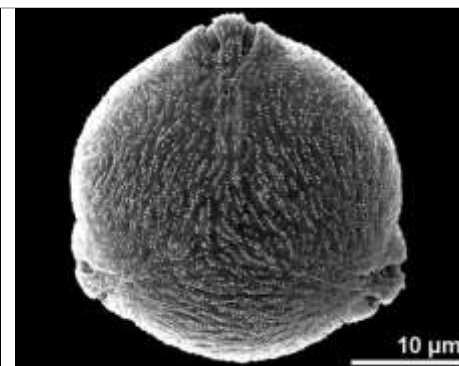
*Hedyosmum goudotianum*

**polychotomosulcus** sulcus with more than 3 arms

**pontoperculate** aperture with a pontoperculum

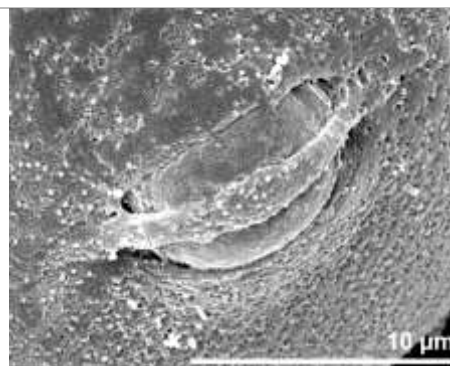


*Sanguisorba cretica*

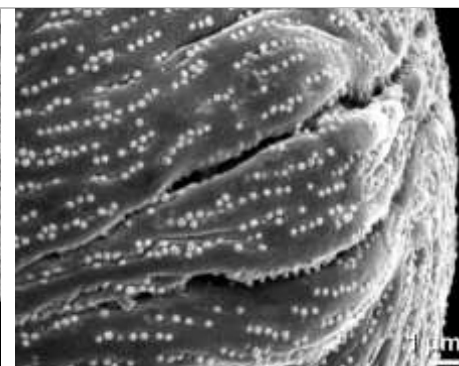


*Sanguisorba minor*

**pontoperculum** operculum covering a colpus, not completely isolated from the remainder of the exine  
(pl. pontopercula)



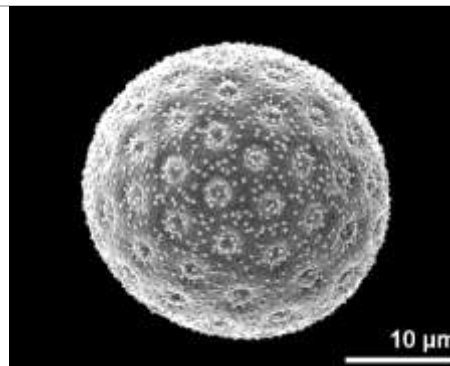
*Sanguisorba cretica*



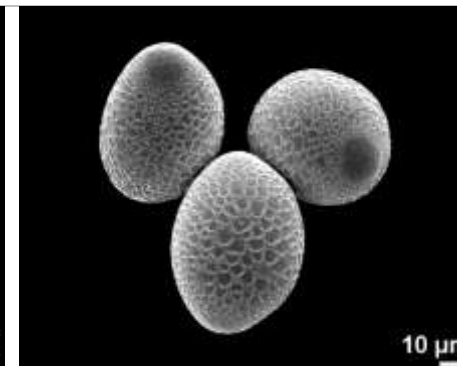
*Sanguisorba minor*

**porate**

pollen grain with pori



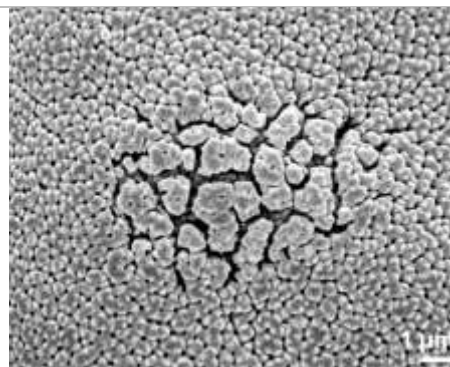
*Chenopodium glaucum*



*Aechmea caesia*

**poroid**

circular or elliptic aperture, with indistinct margin



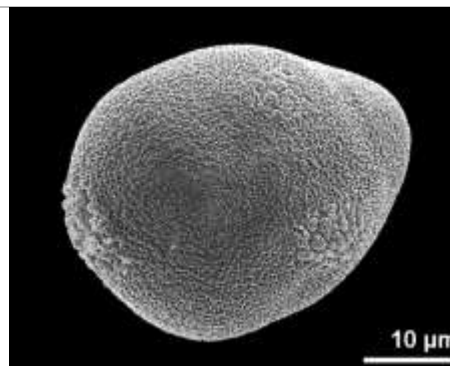
*Scirpus sylvaticus*



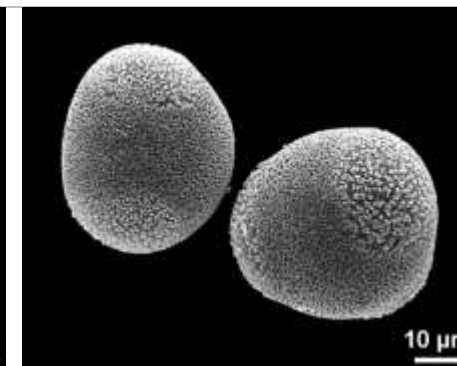
*Schoenoplectus lacustris*

**poroidate**

pollen grain with poroid aperture(s)



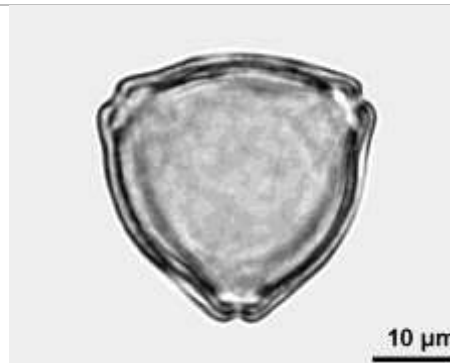
*Carex remota*



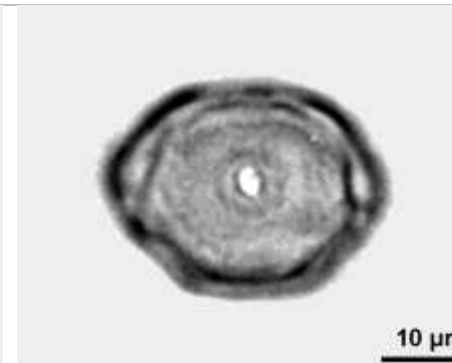
*Cercidiphyllum japonicum*

**pororate**

pollen grain with compound apertures composed of a circular ekto- (porus) and endoaperture



*Corylus* sp. (fossil, polar view)



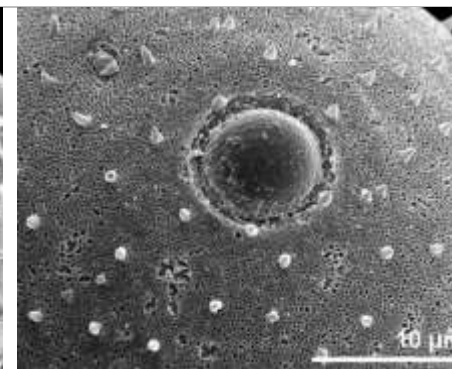
*Corylus* sp. (fossil, equatorial view)

**porus** (pl. pori)

more or less circular aperture situated at the equator or regularly spread over the pollen grain



*Aechmea azurea*



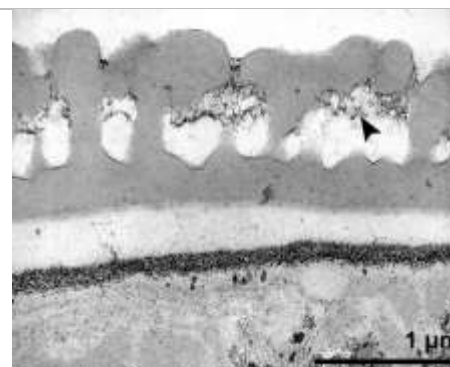
*Campanula rapunculoides*

**primexine**

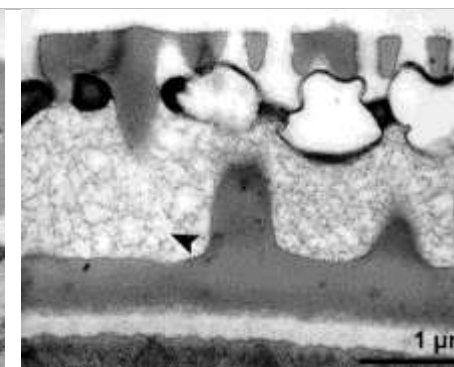
polysaccharidic layer formed during early developmental stage wherein the later exine structures are preformed

**primexine matrix**

pollen coating consisting of primexine remnants in mature pollen grains



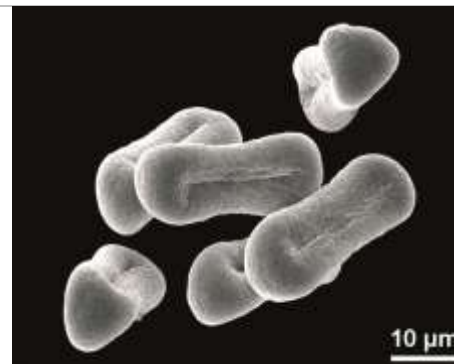
*Apium nodiflorum*



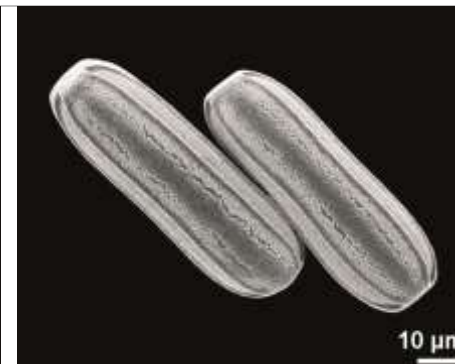
*Convolvulus tricolor*

**prolate**

pollen grain with a polar axis longer than the equatorial diameter



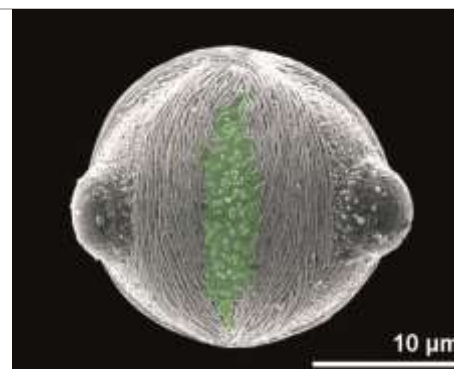
*Torilis arvensis* (dry pollen)



*Crossandra flava*

**pseudocolpus**

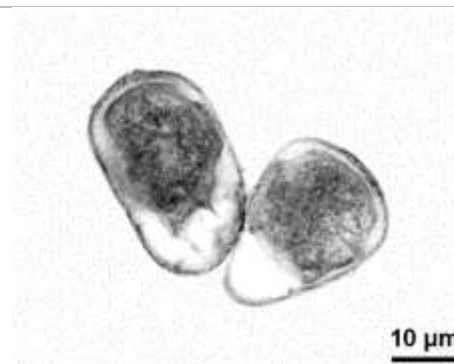
colpus in heteroaperturate pollen grains, presumably non-functional



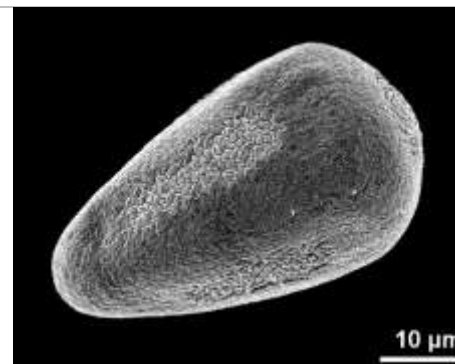
*Lythrum salicaria*

**pseudomonad**

dispersal unit of a permanent tetrad with 3 rudimentary pollen grains

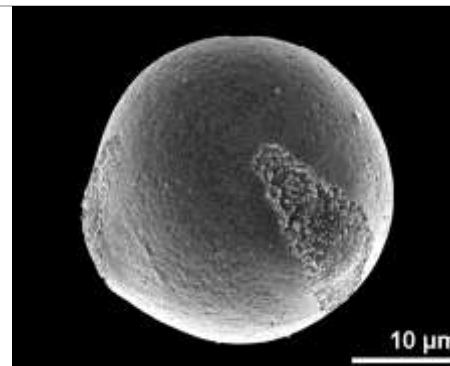


*Carex* sp.

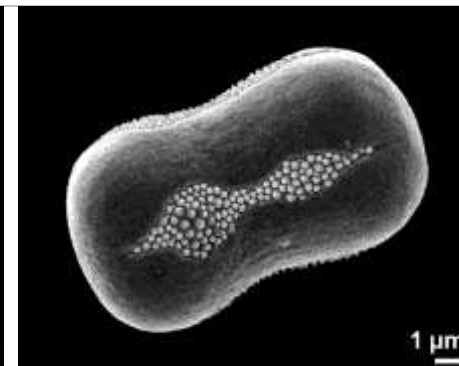


*Schoenoplectus lacustris*

**psilate** pollen wall with smooth surface

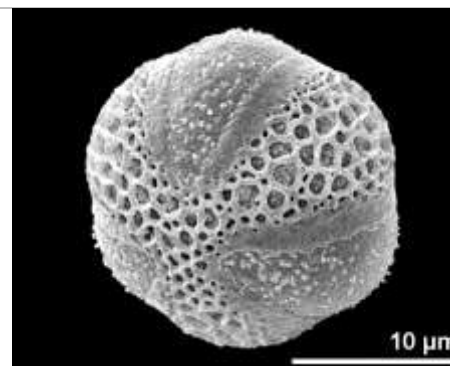


*Dorycnium germanicum*

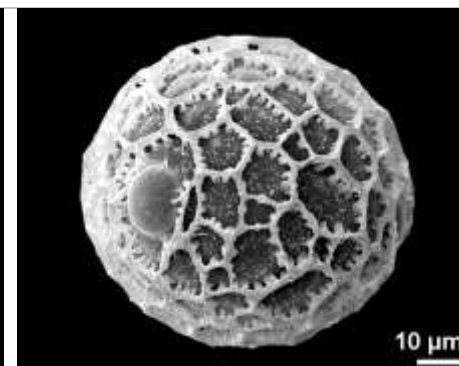


*Lithospermum officinale*

**reticulate** pollen wall with reticulum



*Salix daphnoides*



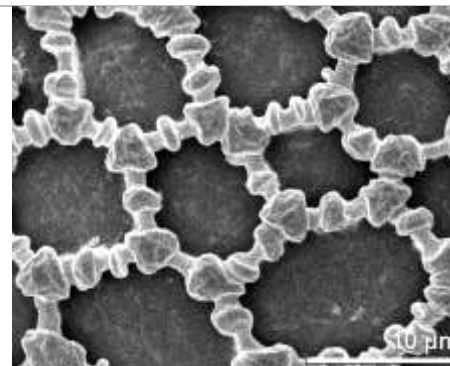
*Razisea citrina*

**reticulum** (pl. reticula) network like pattern formed by exine elements (muri), where the lumina are wider than 1 μm

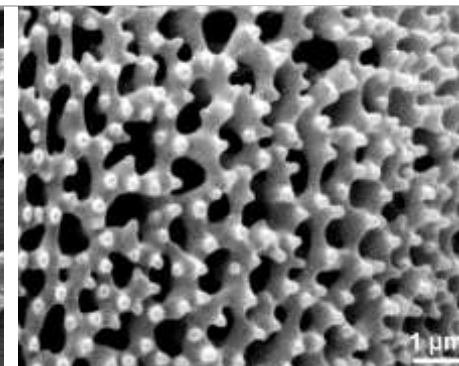


*Cardamine pratensis*

**reticulum cristatum** special type of reticulum; muri with prominent sculpture elements

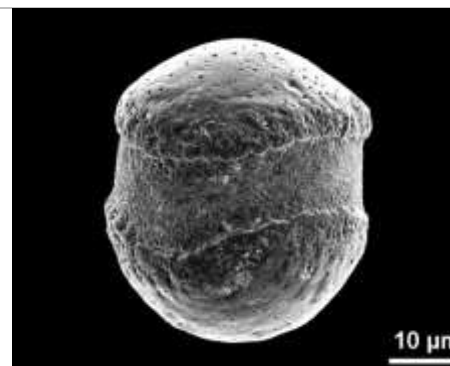


*Lilium candidum*

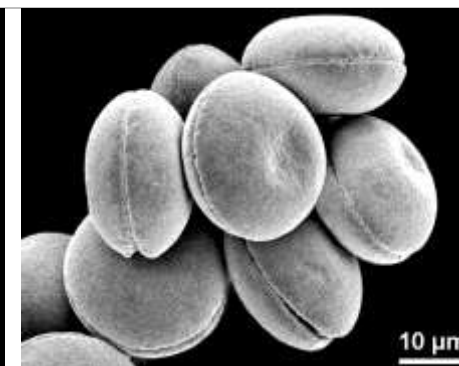


*Mercurialis perennis*

**ring-like aperture** circumferential aperture (situated more or less equatorially or, rarely, meridionally)



*Gonatopus angustus* (equatorial)



*Pedicularis rostrato-capitata* (meridional)

**rugulae** (sing. rugula) elongated exine elements longer than 1 μm; irregularly arranged



*Securigera varia*

**rugulate**

pollen wall with rugulae



*Nymphoides peltata*



*Fagus* sp. (fossil)

**saccate**

pollen grain with one or more air sacs



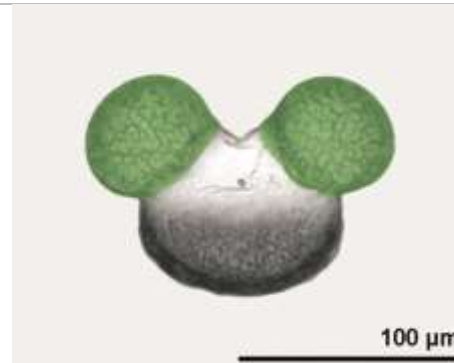
*Pinus strobus*



*Podocarpus* sp.

**saccus** (pl. sacci)

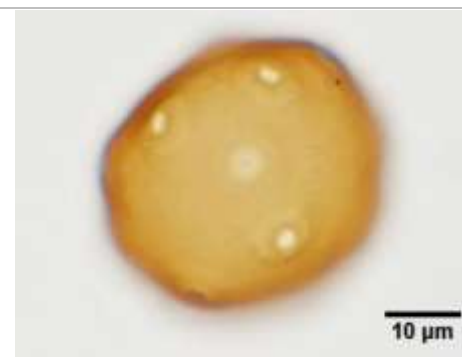
exinous expansion forming an air sac



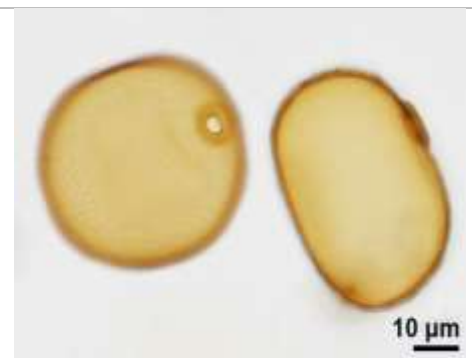
*Abies* sp. (fossil)



**scabrate** a term used for light microscopy only, describing minute sculpture elements of undefined shape and of a size close to the resolution limit of the light microscope



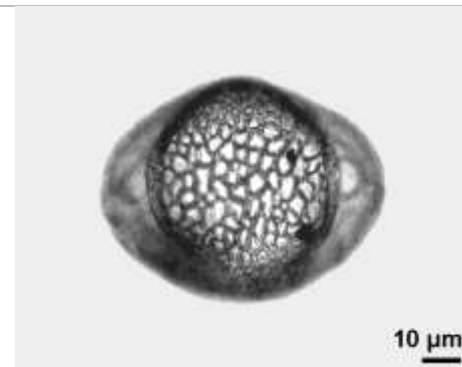
*Juglans* sp.



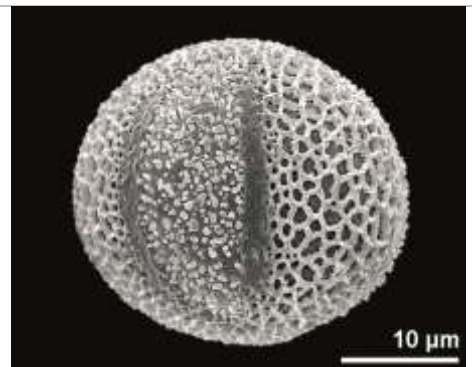
*Secale* sp.

**sculpture** elements of ornamentation on the pollen surface

**semitectate** pollen grain with a semitectum (e.g. reticulate ornamentation)

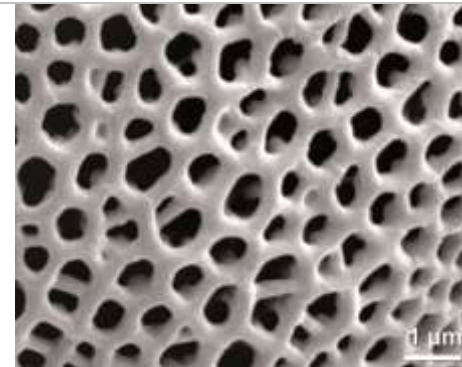


*Alangium* sp. (fossil)

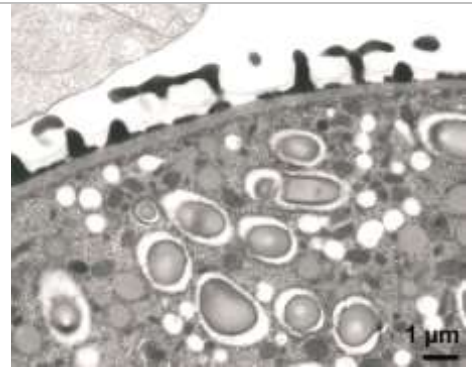


*Salix alba*

**semitectum** discontinuous tectum, covering less than 50% of pollen grain surface

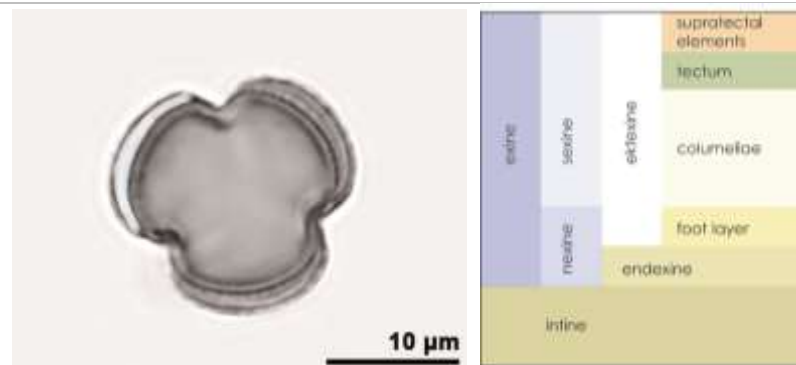


*Acinos alpinus*



*Acinos alpinus*

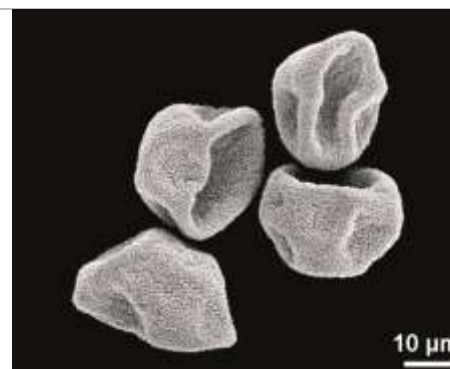
**sexine** term used for light microscopy, describing the structured/sculptured outer layer of the exine



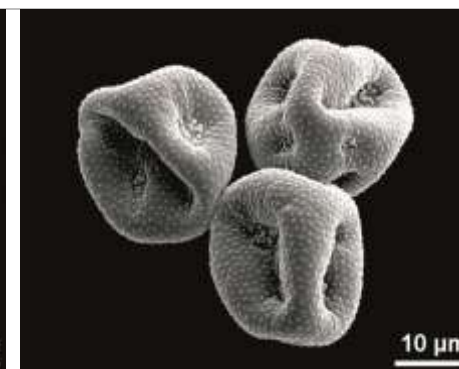
*Artemisia* sp.

**shape** a result of of the length of the polar axis in ratio to the equatorial diameter, e.g. irregular, oblate, prolate, spheroidal

**shape irregular**



*Populus alba* (dry pollen)

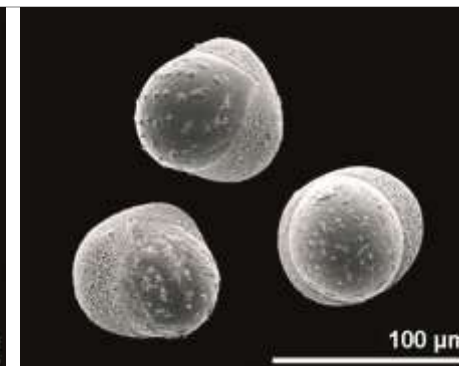


*Thalictrum minus* (dry pollen)

**shape isodiametric** equal polar and equatorial diameters, shape not spheroidal

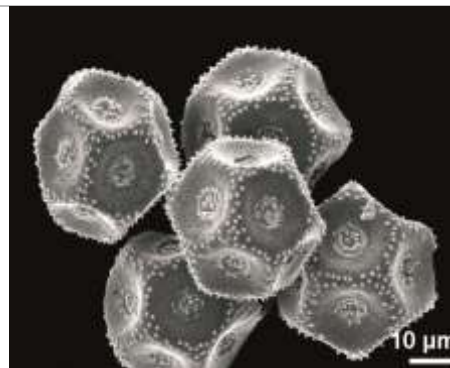


*Herniaria glabra*

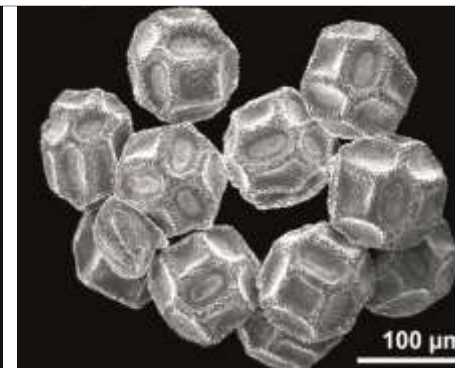


*Asphodeline lutea*

shape polygonal

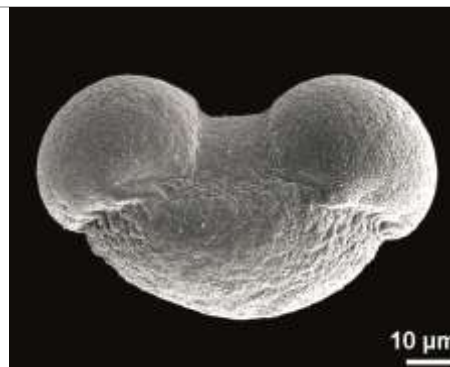


*Stellaria holostea* (dry pollen)

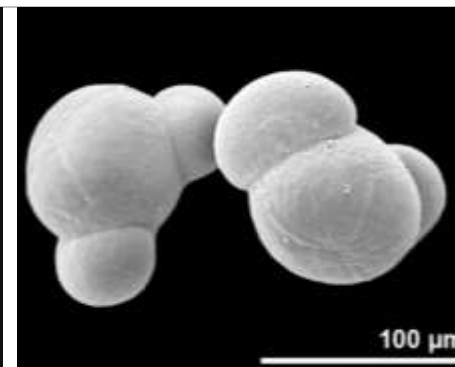


*Opuntia basilaris* (dry pollen)

shape saccate

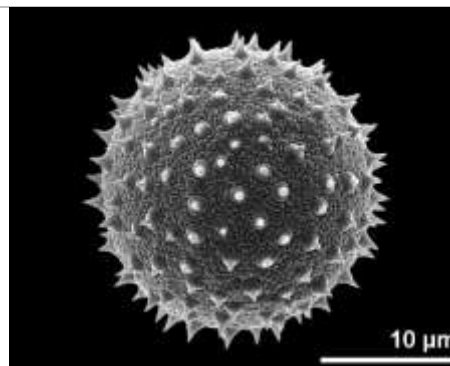


*Pinus strobus*

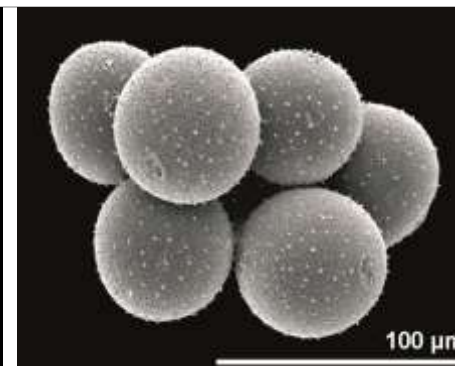


*Abies nordmanniana*


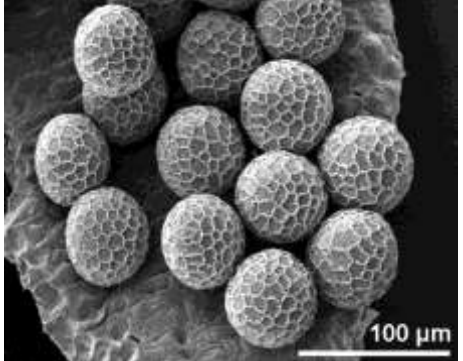
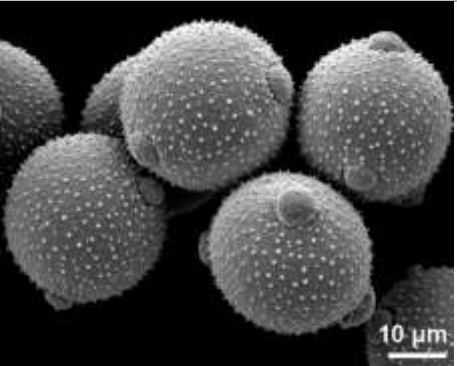

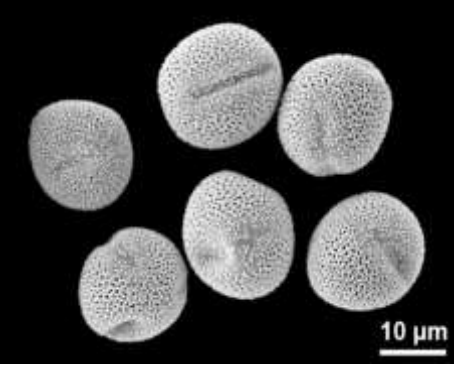
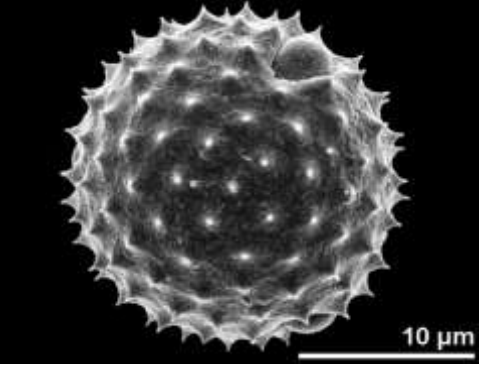
shape spheroidal



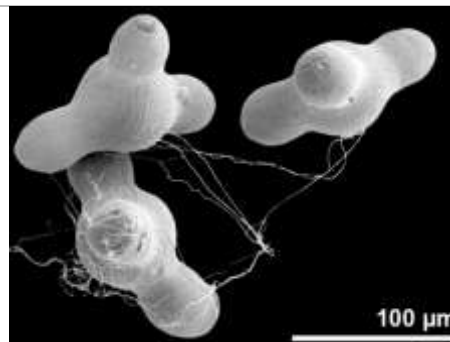
*Pinellia ternata*



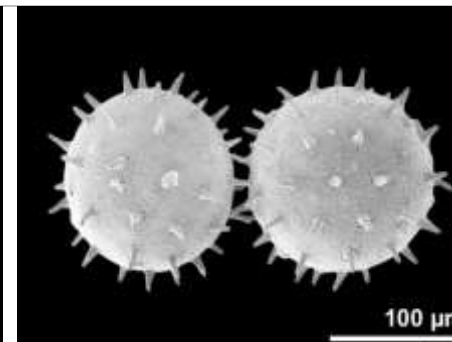
*Adansonia gregorii*

<b>size</b>	categories: very small (<10 $\mu\text{m}$ ), small (10-25 $\mu\text{m}$ ), medium (26-50 $\mu\text{m}$ ), large (51-100 $\mu\text{m}$ ), very large (>100 $\mu\text{m}$ )		
<b>size large</b>	51-100 $\mu\text{m}$		
<b>size medium</b>	25-50 $\mu\text{m}$		
<b>size small</b>	10 - 25 $\mu\text{m}$		
		<i>Anthericum ramosum</i>	<i>Ruellia brevifolia</i>
		<i>Campanula foliosa</i>	<i>Centaurium littorale</i>
		<i>Ruschia uncinata</i> (dry pollen)	<i>Ambrosia artemisiifolia</i>

size very large >100 μm

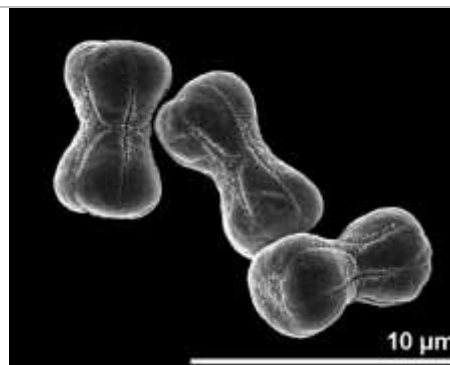


*Oenothera fruticosa*

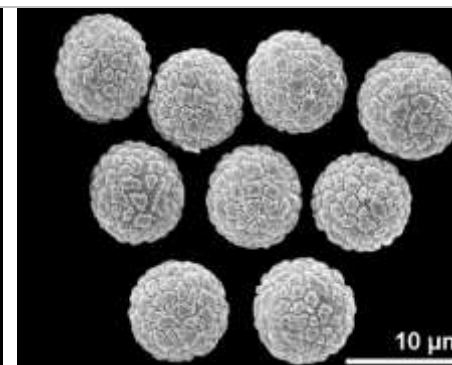


*Hibiscus syriacus*

size very small <10 μm

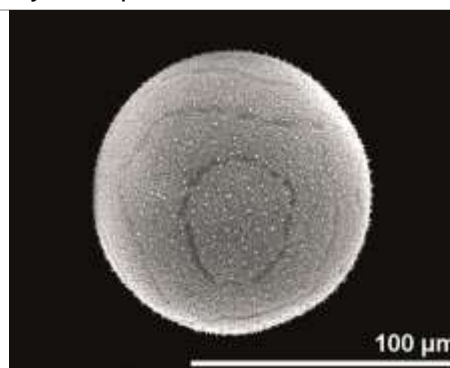


*Myosotis palustris*

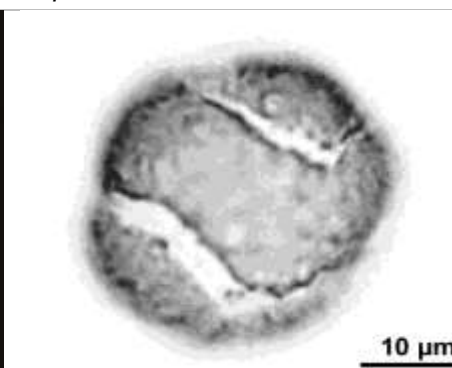


*Peperomia rubella*

spiral aperture(s)

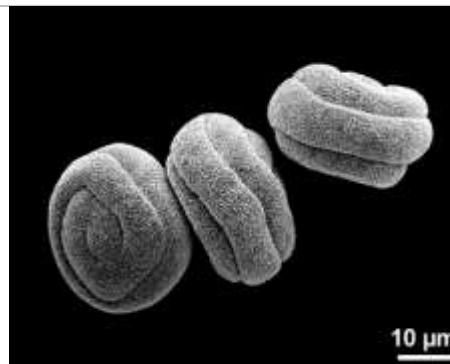


*Crocus speciosus*

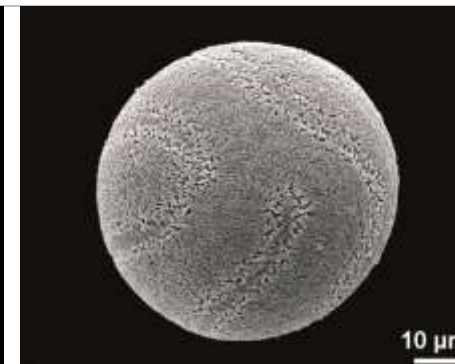


*Berberis vulgaris*

**spiraperturate** pollen grain with one or more spiral aperture(s)



*Mimulus guttatus* (dry pollen)



*Thunbergia alata*

**stephano-** prefix meaning equatorial

**stephanoaperturate** apertures situated at the equator (term usually used for more than 3 apertures)

**stephanocolpate**



*Sherardia arvensis*

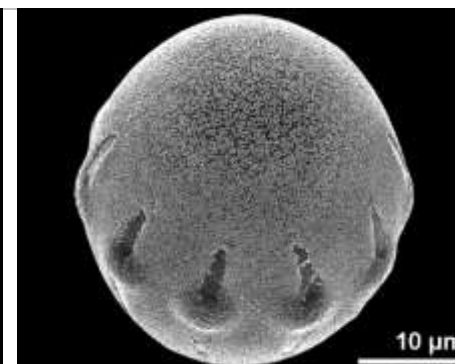


*Galium glaucum*

**stephanocolporate**

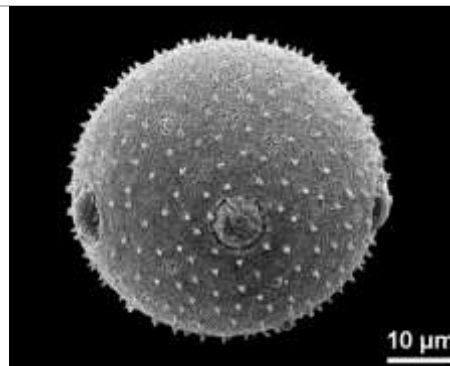


*Sangisorba officinalis*

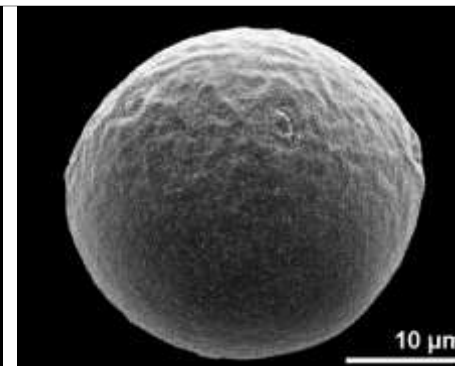


*Symphytum caucasicum*

**stephanoporate**



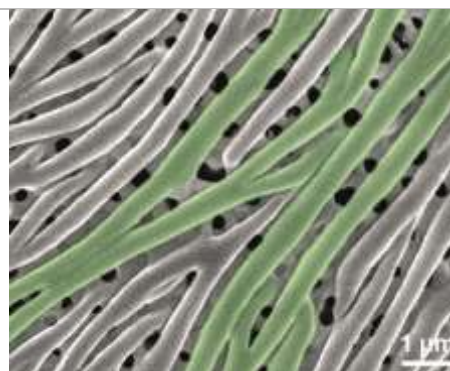
*Campanula rapunculoides*



*Ulmus minor*

**striae** (sing. stria)

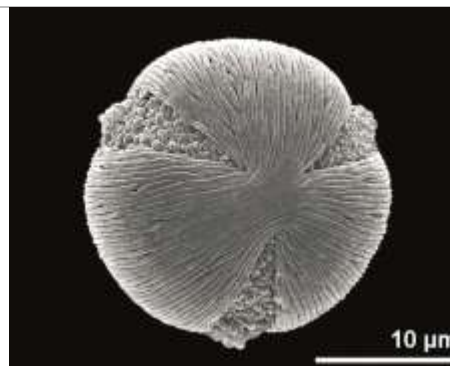
elongated exine elements separated by grooves predominantly parallel arranged



*Acer pseudoplatanus*

**striate**

pollen wall with striae



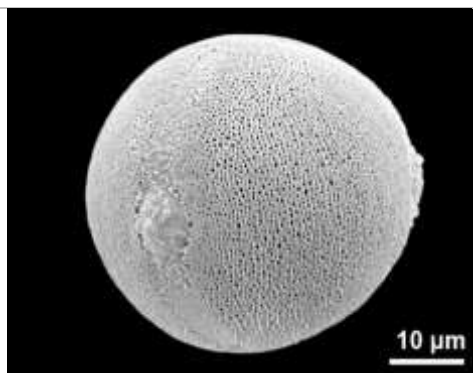
*Neoalsomitra sarcophylla*



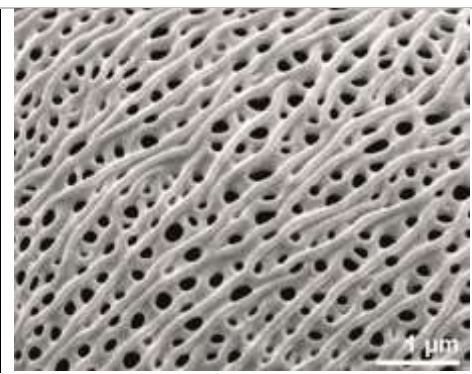
*Geum reptans*

**striato-microreticulate**

ornamentation intermediate between striate and microreticulate (lumina width < 1 μm)



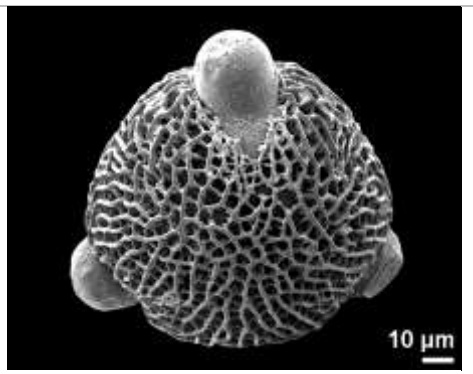
*Helianthemum vulgare*



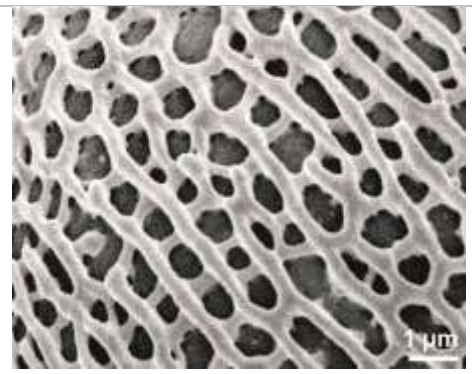
*Veronica cinerea*

**striato-reticulate**

ornamentation intermediate between striate and reticulate



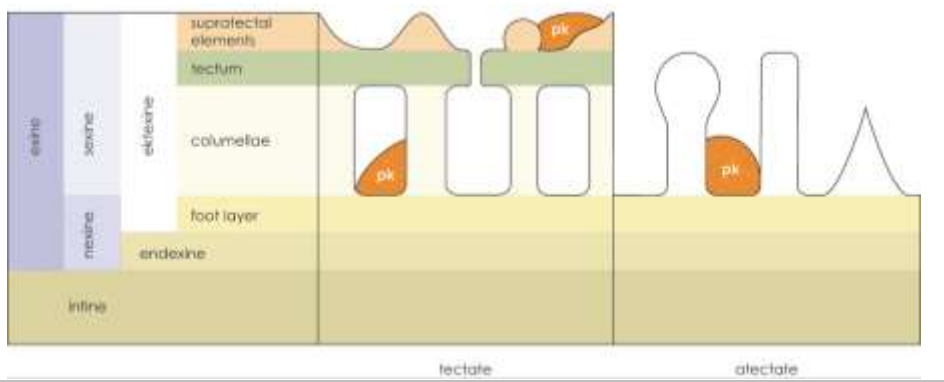
*Pelargonium ferulaceum*



*Solandra longiflora*

**structure**

internal construction of a pollen wall



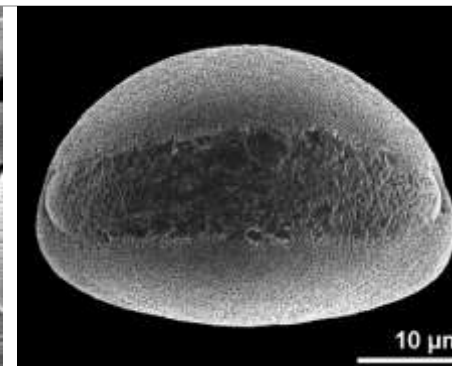


**sulcate**

pollen grain with a sulcus



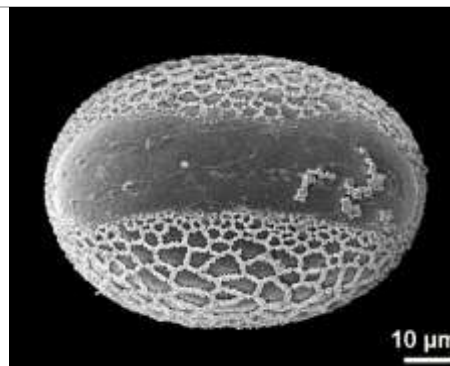
*Doryanthes palmeri* (dry pollen)



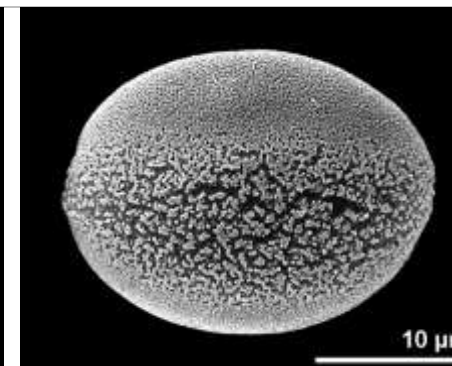
*Allium oleraceum*

**sulcus** (pl. sulci)

elongated aperture situated distally



*Lilium martagon*



*Galanthus nivalis*

**synaperturate**

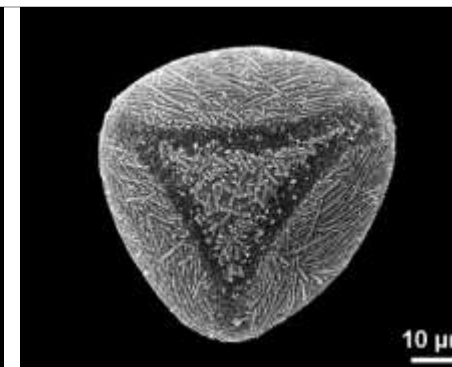
pollen grain with anastomosing apertures

**syncolpate**

pollen grain with anastomosing colpi



*Pedicularis verticillata*



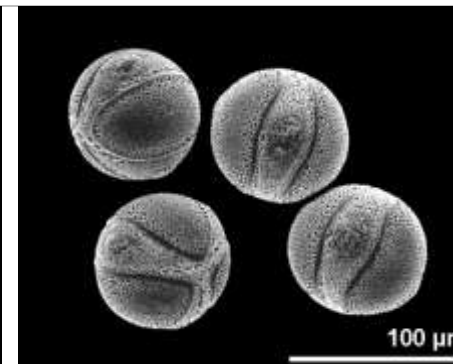
*Nymphoides peltata*

**syncolporate**

pollen grain with anastomosing colpi



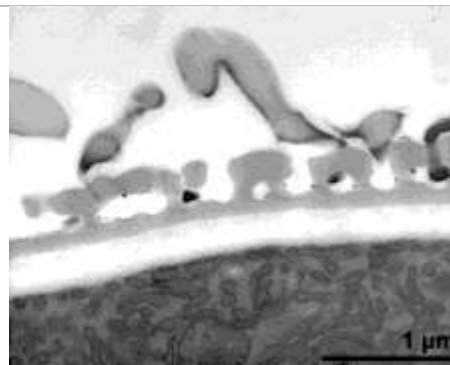
*Cuphea purpurea*



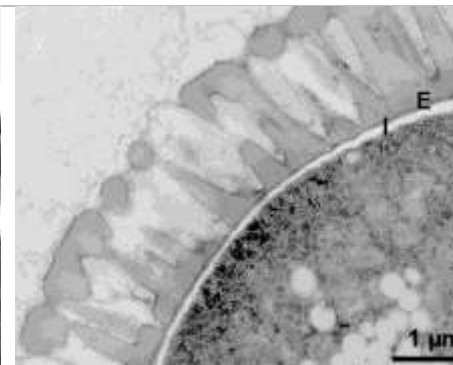
*Cassia pulcherrima*

**tectate**

pollen grain with a tectum



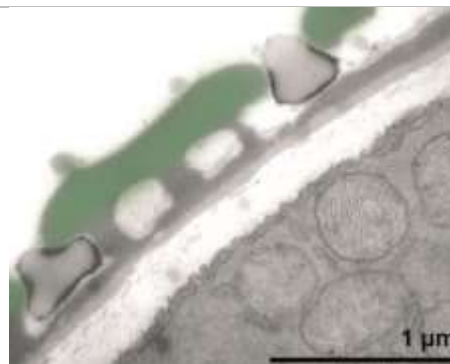
*Allium ursinum*



*Alliaria petiolata*

**tectum** (pl. tecta)

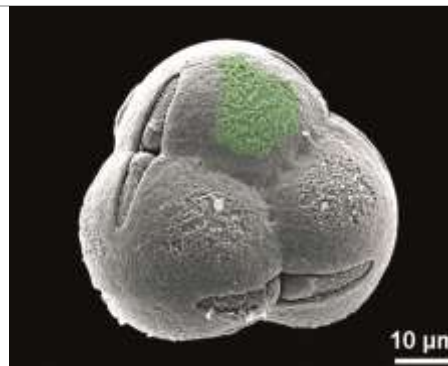
outer ektexine layer  
see: eutectate, semitectate, atectate



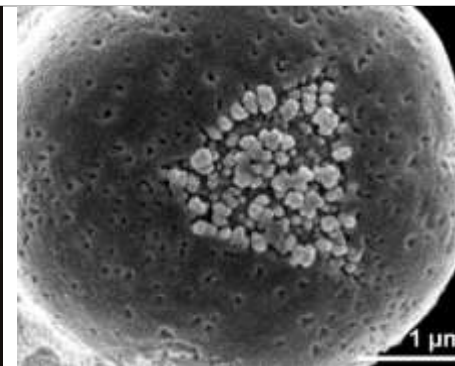
*Microrrhinum minus*

**tenuitas**  
(pl. tenuitates)

general term for a thinning of the pollen wall



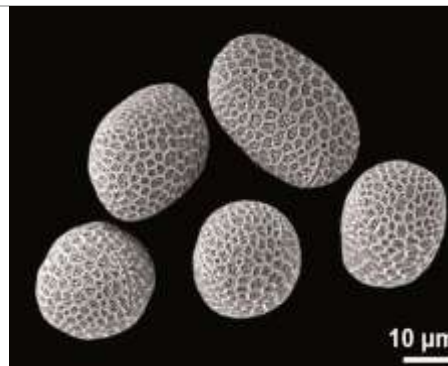
*Agapetes variegata*



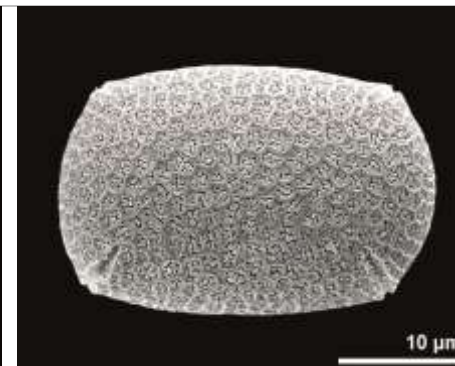
*Myosotis palustris*

**tetra-**  
**tetracolpate**

prefix meaning 4  
a pollen grain with 4 colpi



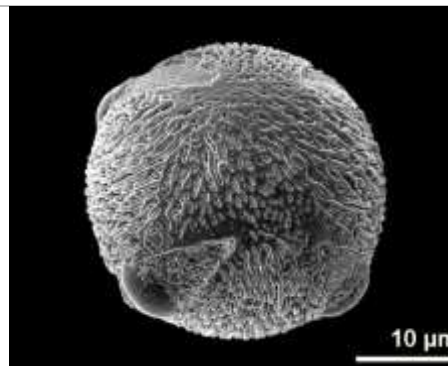
*Impatiens balfourii*



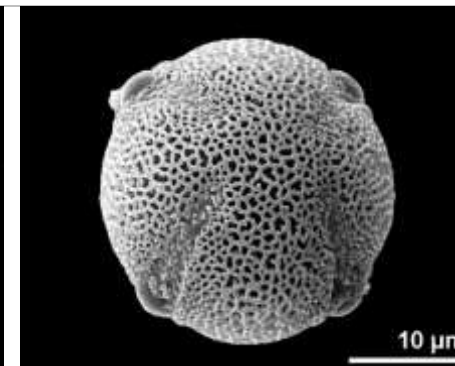
*Impatiens glandulifera*

**tetracolporate**

a pollen grain with 4 colpi



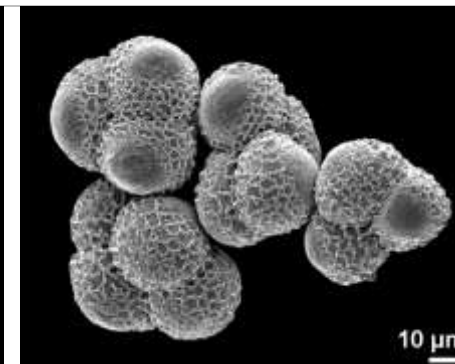
*Nicotiana tabacum*



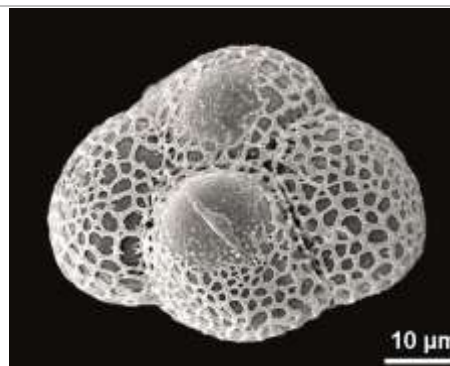
*Poncirus trifoliata*

**tetrad**

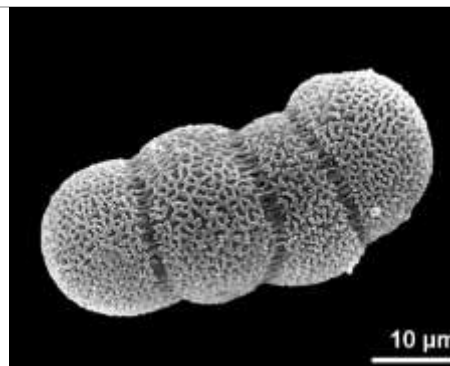
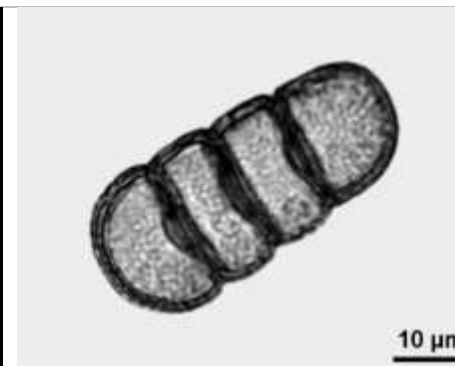
dispersal unit of 4 pollen grains

*Erica herbacea**Epipactis helleborine***tetrad decussate**

dispersal unit of 4 pollen grains arranged in two planes, with arbitrary angles

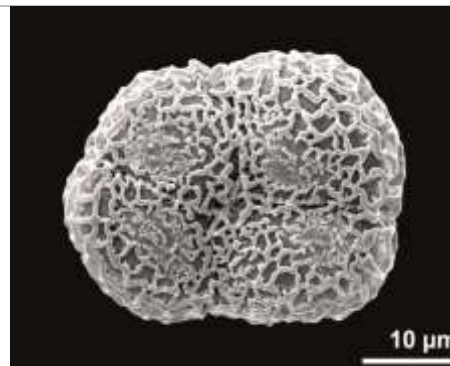
*Neottia nidus-avis**Androlepis skinneri***tetrad linear**

special case of tetrad planar

*Typha latifolia**Typha latifolia***tetrad planar**

dispersal unit of 4 pollen grains arranged in one plane (linear, T-shaped, tetragonal)

**tetrad tetragonal** special case of tetrad planar

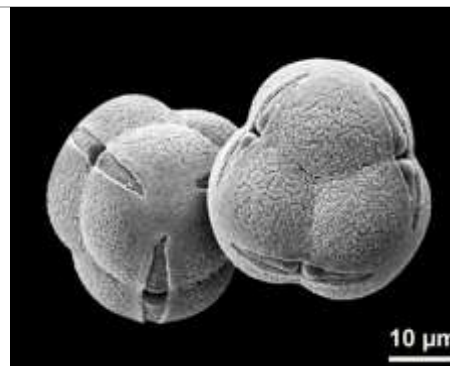


*Listera ovata*

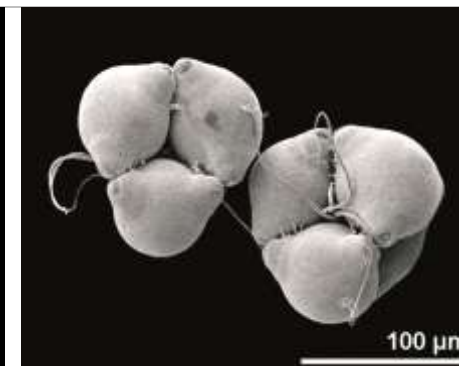


*Chlorospatha dodsonii*

**tetrad tetrahedral** dispersal unit of 4 pollen grains in which the centers of the grains define a tetrahedron

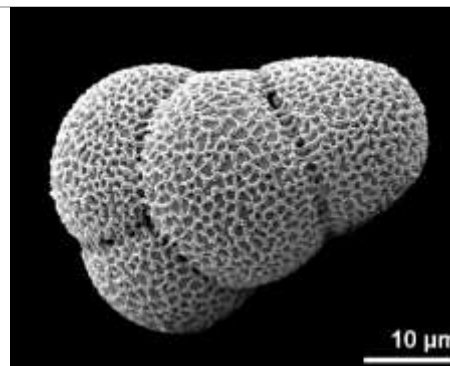


*Erica herbacea*

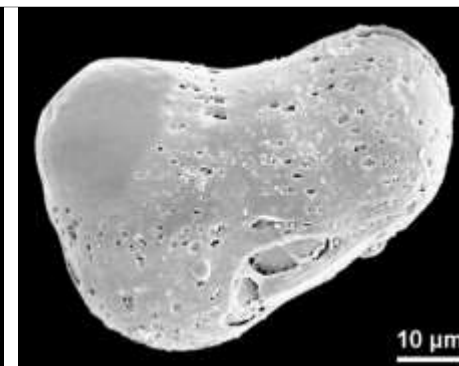


*Epilobium parviflorum*

**tetrad T-shaped** special case of tetrad planar

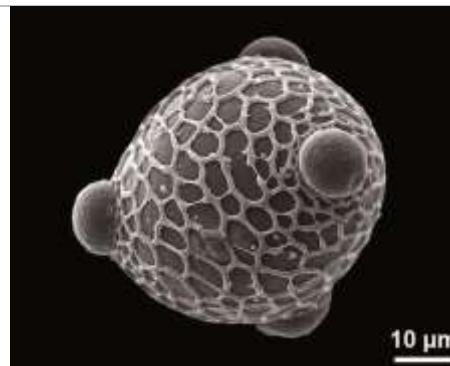


*Typha latifolia*

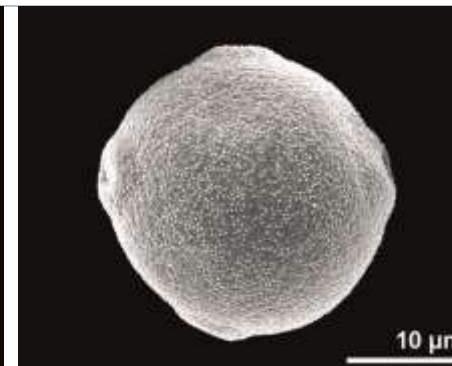


*Chlorospatha kolbii*

**tetraporate** a pollen grain with 4 pori



*Aechmea tomentosa*

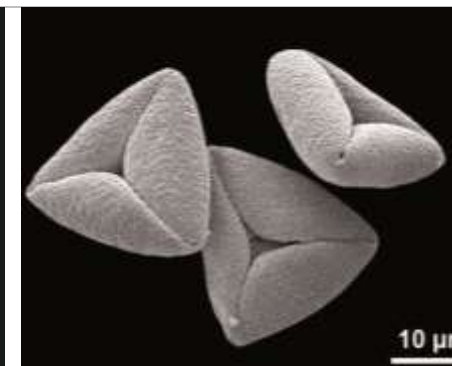


*Myriophyllum spicatum*

**trichotomosulcate** pollen grain with a trichotomosulcus

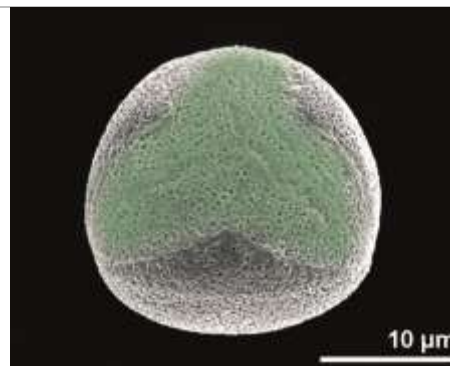


*Dianella tasmanica*



*Dianella caerulea* (dry pollen)

**trichotomosulcus** 3-radiate sulcus

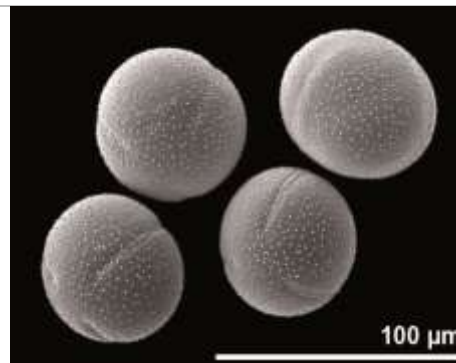


*Dianella tasmanica*

**tri-** prefix meaning 3

**tricolpate**

pollen grain with 3 colpi



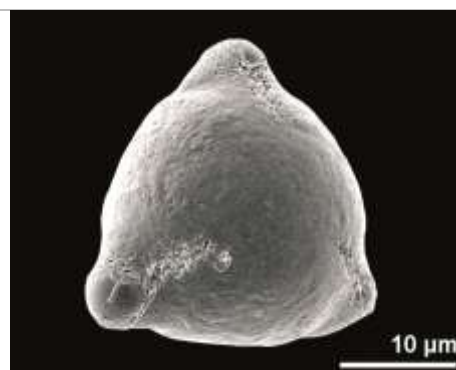
*Pilocereus strausii*



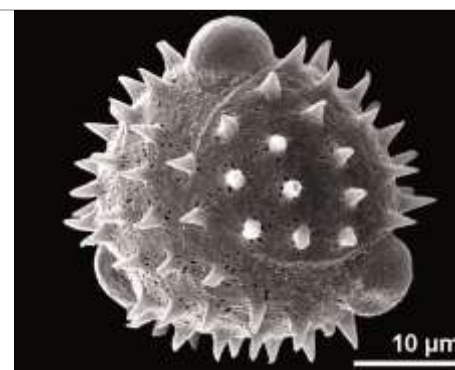
*Nelumbo nucifera*

**tricolporate**

pollen grain with 3 colpi



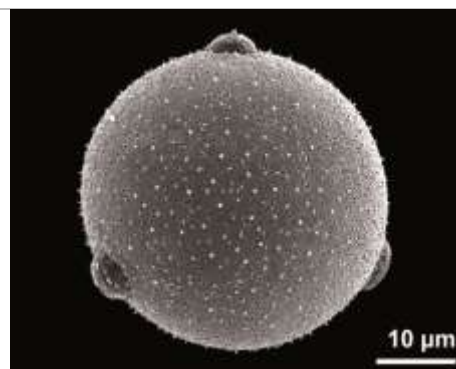
*Verbena officinalis*



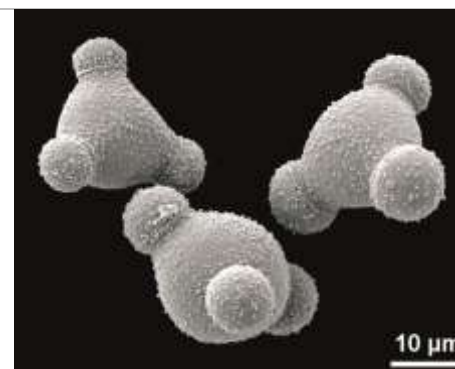
*Antennaria dioica*

**triporate**

pollen grain with 3 pori



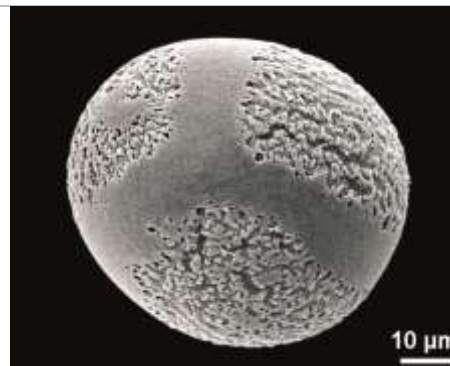
*Campanula saxatilis*



*Hakea kippistiana*

**trisulcate**

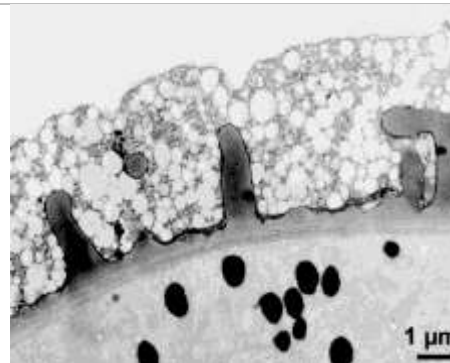
pollen grain with 3 sulci (very rare feature)



*Tulipa kaufmanniana* (equatorial view)

**tryphine**

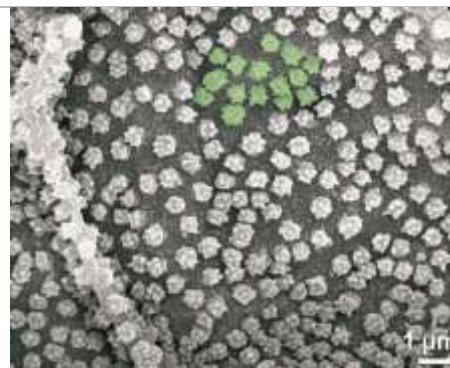
pollen coating consisting mainly of lipids mixed with membrane remnants



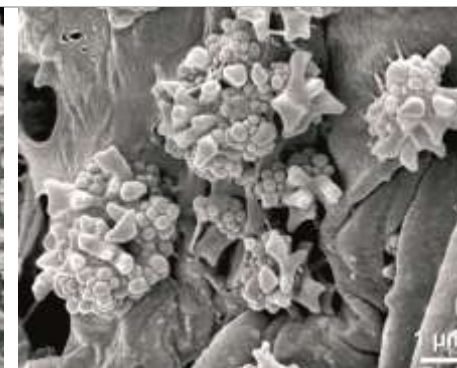
*Sinapis alba*

**Ubisch body**

sporopollenin elements produced by the tapetum



*Trisetum flavescens* (locule wall)

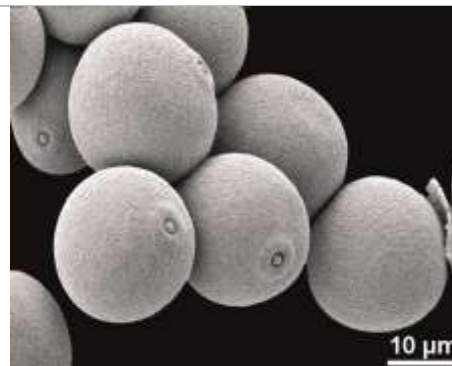


*Stellaria graminea* (locule wall)

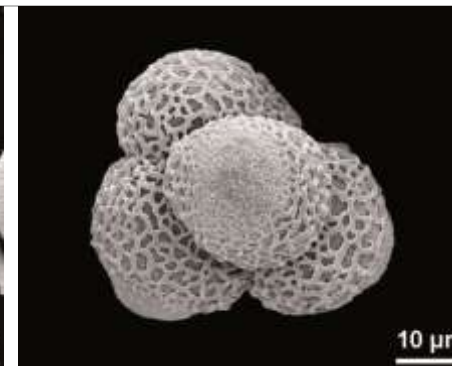


**ulcerate**

pollen grain with an ulcer



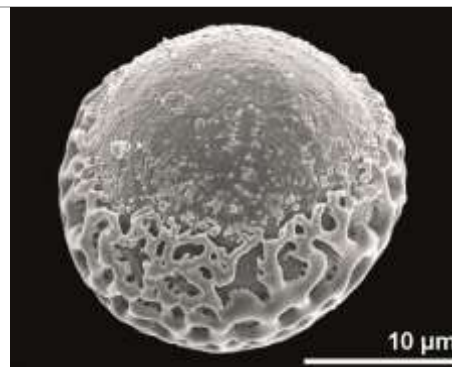
*Poa annua*



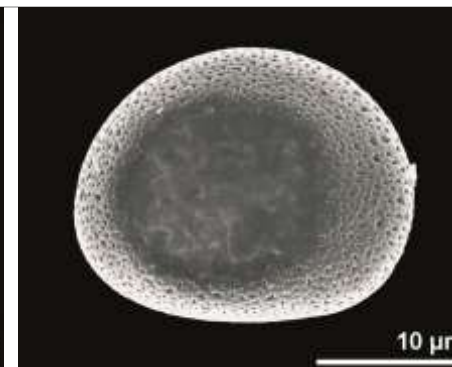
*Epipactis atrorubens* (tetrad)

**ulcus** (pl. ulci)

more or less circular aperture situated distally



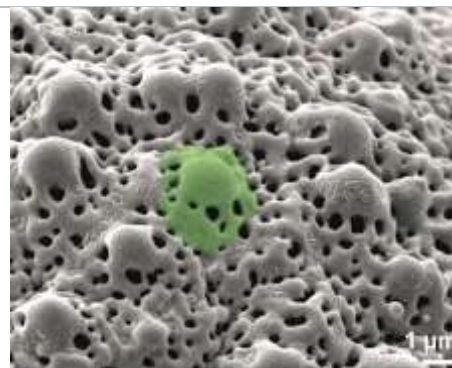
*Cephalanthera longifolia*



*Cyrtosperma beccarianum*

**verruca** (pl. verrucae)

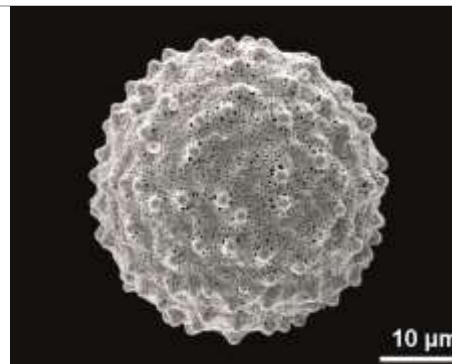
wart-like element more than 1 μm, broader than high



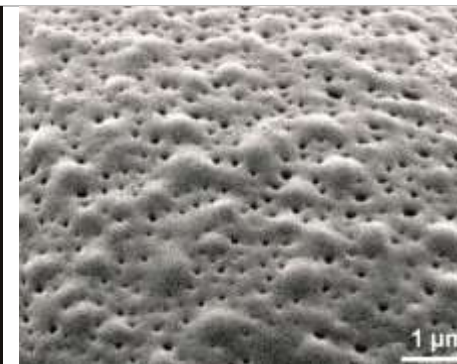
*Aristolochia salvadorens*

**verrucate**

pollen wall with verrucae



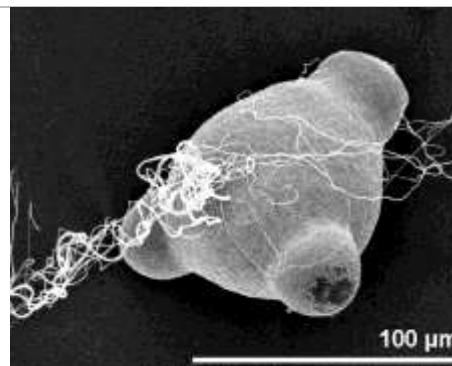
*Aristolochia tricaudata*



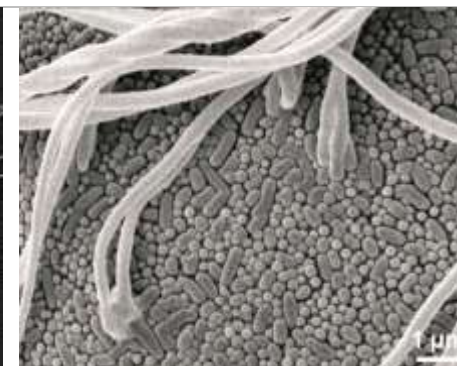
*Teucrium chamaedrys*

**viscin thread**

acetolysis resistant thread arising from the exine



*Oenothera biennis*



*Godetia purpurea*