

# Glossary of Palynological Terms

All **important terms** in palynology are listed here and explained. Terms figured in the chapters of the “Illustrated Pollen Terms” part are indicated by bold page numbers. **Non-recommended terms** are only provided with an explanatory comment. For consistency, phrases are standardized, for example, features of ornamentation are stereotypically defined as “**pollen wall with ...**”, and pollen wall features (or pollen shape and size) as “**pollen grain with ...**”.

Both the singular and the plural are given for Latin terms. The English spelling of the Latin term is added (porus, pl. pori, engl. pore) if it is preferable. Cross-references are given to terms that are **synonyms** (the preferable one is printed in bold) or that indicate the opposite condition (**antonyms**), e.g., homo- and heterobrochate. If both a Greek and a corresponding Latin form exist for a prefix, then the Greek form is used consistently: panto- (not peri-), ekto- (not ecto-), or the Greek di- (dis-), and not the Latin bi- (bis-). There are few exceptions from this rule. If the Latin form is more widely accepted, then the term is used as *nomen conservandum*, for example, bisaccate is found exclusively in the literature and not the Greek form disaccate. Sometimes two adjectival variants (-ate, -ar) are used, but in two different meanings. For example, from the noun granulum derive two adjectival forms: granular and granulate (both meaning “with granules”). These are corresponding terms used in two quite different contexts: **granular** describes a distinct type of infratectum hence a structural feature whereas **granulate** refers to an ornamentation feature—a sculpture element.

Terms not listed in the glossary belong to spores, or are considered as redundant (e.g., multiplanar tetrad), superfluous (e.g., polypligate, because plicate pollen grains are always equipped with several to many plicae), or may be a permanent source of confusion (zon-, zona-, zoni-, zono-).

- a**  
prefix meaning absent
- acalymmate** \_\_\_\_\_ 406  
dyads, tetrads, and polyads covered by an exine envelope which is discontinuous at the junctions between the monads  
*Antonym: calymmate*
- acetolysis** \_\_\_\_\_ 77, 100, 103, 123  
widely used technique for preparing pollen and spores especially for light microscopy
- actuopalynology**  
the study of pollen and spores of extant plants
- aeropalynology**  
the study of palynomorphs found in the atmosphere
- alveolate** \_\_\_\_\_ 50, 385  
infratectum with compartments of irregular size and shape
- alveolus** (lat., pl. **alveoli**) \_\_\_\_\_ 50, 385  
compartment(s) of irregular size and shape
- angulaperturate** \_\_\_\_\_ 208  
pollen grain with an angular outline where the apertures are located at the angles  
*Antonym: planaperturate*
- annulate** \_\_\_\_\_ 209  
pollen grain with an annulus or annuli
- annulus** (lat. pl. **annuli**) \_\_\_\_\_ 209  
ring like wall thickening surrounding a porus or ulcus  
*Comment: "anulus" orthographical variant of "annulus"*
- aperturate** \_\_\_\_\_ 211  
pollen grain with one or more apertures  
*Antonym: inaperturate*
- aperture** \_\_\_\_\_ 42, 73  
a region of the pollen wall that differs significantly from its surroundings in morphology and/or anatomy, presumed to function usually as germination site and to play a role in harmomegathy
- apertures sunken** \_\_\_\_\_ 57, 194  
characteristic shape of pollen grains in dry condition as a consequence of harmomegathy
- aperture membrane** \_\_\_\_\_ 42, 214  
exine layer covering an aperture; aperture membrane (colpus or porus membrane) can be psilate or ornamented
- apex** (lat., pl. **apices**)  
applied to outermost tips in the equatorial plane of pollen
- apocolpium** (lat., pl. **apocolpia**)  
see: polar area  
*Comment: "polar area" is the more general term independent of the aperture type*
- apoporium** (lat., pl. **apoporia**)  
see: polar area  
*Comment: "polar area" is the more general term independent of the aperture type*
- arcuate** \_\_\_\_\_ 407  
pollen grain with arcus
- arcus** (lat., pl. **arcus**) \_\_\_\_\_ 407  
curved wall thickening interconnecting apertures
- areola** (lat., pl. **areolae**) \_\_\_\_\_ 78, 296  
insular ornamentation element
- areolate** \_\_\_\_\_ 78, 296  
pollen wall with areolae
- atectate** \_\_\_\_\_ 47, 384  
pollen grain lacking a tectum  
*Antonym: "tectate"*
- atrium** (lat., pl. **atria**) \_\_\_\_\_ 220  
space between diverging exine layers within the aperture
- baculate** \_\_\_\_\_ 298  
pollen wall with bacula longer and/or wider than 1 µm
- baculum** (lat., pl. **bacula**) \_\_\_\_\_ 298  
rod-like, free standing element (never pointed)
- bi-**  
prefix for two
- biporate**  
see: diporate  
*Comment: "diporate" is the more common term*
- bireticate** \_\_\_\_\_ 299  
reticulate ornamentation, where the lumina of the coarse-meshed reticulum are filled by a fine-meshed reticulum
- bisaccate** \_\_\_\_\_ 50, 190  
pollen grain with two sacci  
*Comment: nomen conservandum*
- bisulcate**  
see: disulcate  
*Comment: "disulcate" is the more common term*
- boat-shaped** \_\_\_\_\_ 196  
characteristic shape of sulcate pollen grains in dry condition as a consequence of harmomegathy
- brevi-**  
prefix meaning short
- brevicolpate** \_\_\_\_\_ 221  
pollen grain with brevicolpi
- brevicolporate** \_\_\_\_\_ 222  
pollen grain with brevicolpori
- brevicolporus** (lat., pl. **brevicolpori**) \_\_\_\_\_ 222  
short colpus in a compound aperture situated equatorially
- brevicolpus** (lat., pl. **brevicolpi**) \_\_\_\_\_ 221  
short colpus situated equatorially
- bridge** \_\_\_\_\_ 223  
exine connection(s) between the margins of an aperture  
*Comment: the term is often used in a more general context, e.g., for exine connections within tetrads*
- brochus** (lat., pl. **brochi**) \_\_\_\_\_ 348  
mesh of a reticulum consisting of one lumen and the adjoining half of the muri
- calymmate** \_\_\_\_\_ 57, 405  
dyads, tetrads, and polyads covered by a continuous exine envelope  
*Antonym: acalymmate*
- cappa** (lat., pl. **cappae**) \_\_\_\_\_ 50, 385  
the thick-walled proximal face of the corpus in a saccate pollen grain

- cappula** (lat., pl. **cappulae**)  
see: leptoma  
*Comment: may be confused with "cappa" which points to the proximal side, while "cappula" refers to distal*
- caput** (lat., pl. **capita**) 302  
distal part of a clava
- cavea** (lat., pl. **caveae**) 47  
cavity between the sexine and nexine in the interapertural area
- caveate** 47  
pollen wall with caveae
- circular** 156  
see: outline  
*Comment: a general term, used in palynology describing, e.g., "outline"*
- clava** (lat., pl. **clavae**) 51, 302  
club-shaped element
- clavate** 51, 302  
pollen wall with clavae longer and/or wider than 1  $\mu\text{m}$
- clypeate** 305, 430  
pollen with exine subdivided into shields
- colpate** 42, 72, 225  
pollen grain with colpi
- colporate** 42, 233  
pollen grain with colpi
- colporoidate** 42  
used for light microscopy only, describing compound apertures composed of a colpus (ektoaperture) with an indistinct endoaperture
- colporus** (lat., pl. **colpori**) 42, 233  
compound aperture composed of a colpus (ektoaperture) combined with an endoaperture of variable size and shape
- colpus** (lat., pl. **colpi**) 42, 72, 225  
elongated aperture (length/width ratio > 2) situated at the equator or globally distributed
- columella** (lat., pl. **columellae**) 45, 50, 319, 386  
rod-like structure element, supporting a tectum
- columellate** 13, 50, 386  
infratectum with columellae
- compound aperture** 42, 222, 233, 240  
aperture with two or more components that are situated in more than one wall layer, e.g., colporus
- copropalynology** 9  
the study of palynomorphs in coprolites or feces
- corpus** (lat., pl. **corpora**) 50, 188  
body of a saccate pollen grain
- costa** (lat., pl. **costae**) 50, 347  
thickening of the nexine/endexine bordering an endoaperture
- costate** 50, 347  
pollen grain with costae
- croton pattern** 10, 307  
special type of reticulum cristatum formed by regularly arranged suprasculpture elements on muri
- cryopalynology**  
the study of palynomorphs found in ice
- cup-shaped** 42, 199  
characteristic shape of pollen grains in dry condition as a consequence of harmomegathy
- di-**  
prefix meaning two
- diaperturate** 42  
pollen grain with two apertures: disulcate, dicolpate, dicolporate, diporate
- dicolpate** 74, 225  
pollen grain with two colpi
- dicolporate** 233  
pollen grain with two colpi
- diploxyton-type** 50  
see: *Pinus* subgenus *Pinus* type
- diporate** 263  
pollen grain with two pori
- dispersal unit** 38, 76, 131  
unit in which pollen is dispersed (e.g., monad, tetrad, pollinarium)
- distal** 38  
directing away from the center of a tetrad (deduced from tetrad stage)
- disulcate** 74, 287  
pollen grain with two sulci
- dyad** 38, 134, 431  
unit of two pollen grains
- echinate** 309  
pollen wall with echini longer and/or wider than 1  $\mu\text{m}$
- echinus** (lat., pl. **echini**) 309  
pointed ornamentation element  
*Comment: the plural "echinae" is linguistically incorrect*
- ektexine** 45, 50, 380, 393  
outer layer of an exine
- ektintine** 400  
the outer layer of the intine which is adjacent to the exine
- ekto-**  
prefix meaning outer
- ektoaperture** 42, 240  
outer part of a compound aperture
- elastoviscin** 416  
highly elastic, not acetolysis resistant substance in Orchidaceae, which interconnects the subunits (monads, tetrads, or massulae) of a pollinium and builds up the caudicles
- elliptic** 158  
see: outline  
*Comment: a general term, used in palynology describing, e.g., "outline"*
- endexine** 13, 45, 50, 80, 117, 394  
distinct exine layer between ektexine and intine; endexine can be compact, spongy or lamellar as well as continuous, discontinuous, absent, or in aperture only  
*Comment: the endexine can be monolayered or bilayered; characteristic for the endexine is the increasing thickness close to the aperture*

- endintine** \_\_\_\_\_ **400**  
inner layer of the intine which is adjacent to the cytoplasm
- endo-**  
prefix meaning inner
- endoaperture** \_\_\_\_\_ **42, 98, 240**  
inner part of a compound aperture
- endoplica**  
fold of the inner exine layer
- equator** \_\_\_\_\_ **38**  
imaginary line encircling a pollen grain between the proximal and distal poles
- equatorial** \_\_\_\_\_ **38**  
preposition indicating a region on the pollen surface
- equatorial diameter** \_\_\_\_\_ **39, 168**  
diameter of a pollen grain at the equator
- equatorial plane** \_\_\_\_\_ **38**  
imaginary plane at the equator, perpendicular to the polar axis
- equatorial view** \_\_\_\_\_ **39**  
view of a pollen grain where the equator is directed towards the observer
- eu-**  
prefix meaning true
- eurypalynous** \_\_\_\_\_ **13**  
plant taxa characterized by a significant variation in pollen morphology  
*Antonym: stenopalynous*
- eutectate** \_\_\_\_\_ **45, 381**  
pollen grain with a predominantly continuous tectum  
*Antonym: semitectate*
- exine** \_\_\_\_\_ **6, 45**  
outer layer of the pollen wall, usually resistant to acetolysis
- fenestrate**  
see: lophate  
*Comment: as there is no corresponding substantive to "fenestrate", we prefer the terms "lophate" and "lophae"*
- Fischer's law/rule** \_\_\_\_\_ **42**  
refers to the most frequent aperture arrangement where a pair of apertures occur at six points in a tetrad
- foot layer** \_\_\_\_\_ **45, 50, 393**  
inner layer of an ectexine that can be continuous, discontinuous, perforated or absent
- forensic palynology** \_\_\_\_\_ **9, 16**  
the study of palynomorphs found in crime related samples
- fossula (pl. fossulae)** \_\_\_\_\_ **78, 315**  
irregular shaped groove
- fossulate** \_\_\_\_\_ **78, 315**  
pollen wall with fossulae
- foveola (pl. foveolae)** \_\_\_\_\_ **317**  
roundish lumen more than 1  $\mu\text{m}$  in diameter; distance between two adjacent lumina larger than their diameter
- foveolate** \_\_\_\_\_ **317**  
pollen wall with foveolae
- free-standing columellae** \_\_\_\_\_ **45, 319**  
columellae not covered by a tectum in semitectate pollen grains
- frustrate**  
special mental condition of palynologists discussing terminology of pollen; see *PalDat* ([www.paldat.org](http://www.paldat.org))
- Garside's law/rule** \_\_\_\_\_ **42**  
refers to the unusual arrangement of apertures where a group of three apertures occur at four points in a tetrad
- gemma (lat., pl. gemmae)** \_\_\_\_\_ **321**  
globular ornamentation element
- gemmate** \_\_\_\_\_ **321**  
pollen wall with gemmae larger than 1  $\mu\text{m}$  in diameter
- generative cell** \_\_\_\_\_ **24**  
progenitor cell of the sperm cells
- geniculum (pl. genicula)** \_\_\_\_\_ **42**  
colpus buckled in the equatorial region
- granular** \_\_\_\_\_ **50, 389, 439**  
infratectum composed of granula, cluster 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*
- granulate** \_\_\_\_\_ **54, 323, 439**  
pollen wall with granula  
*Comment: not to be confused with "granular", which is a feature of the pollen wall structure*
- granulum (lat., pl. granula)** \_\_\_\_\_ **323, 439**  
sculpture element of different/indefinable shape, equal or smaller than 0,1  $\mu\text{m}$  in diameter (hard to outline)  
*Comment: only applicable if sculpture element cannot be defined more precisely by improved microscopic resolution*
- haploxyton-type** \_\_\_\_\_ **50**  
see: *Pinus* subgenus *Strobus* type
- harmomegathy** \_\_\_\_\_ **43, 57, 194**  
mechanism permitting changes in shape and size of the pollen grain due to varying hydration status
- hetero-**  
prefix meaning different
- heteroaperturate** \_\_\_\_\_ **42, 242, 273**  
pollen grain with different types of apertures; only one type presumed to function as germination site; see: pseudocolpus
- heterobrochate** \_\_\_\_\_ **324**  
reticulate pollen wall with lumina of different sizes  
*Antonym: homobrochate*
- heterocolpate**  
see: heteroaperturate  
*Comment: unfortunately the term "heterocolpate" is commonly incorrectly used for pollen grains with alternating colpi and colpi, but "heterocolpate" means two different types of colpi; therefore we prefer the more general term "heteroaperturate"*

- heteropolar** \_\_\_\_\_ 39, 178  
pollen grain with different proximal and distal faces  
*Antonym: isopolar*
- hexa-** \_\_\_\_\_ 50  
prefix meaning six
- hexaaperturate** \_\_\_\_\_ 42, 165, 230, 238  
pollen grain with 6 apertures: hexacolpate, hexacolporate, hexaporate
- homo-**  
prefix meaning equal
- homobrochate** \_\_\_\_\_ 326  
reticulate pollen wall with lumina of uniform size  
*Antonym: heterobrochate*
- iatropalynology** \_\_\_\_\_ 9  
the study of palynomorphs causing allergies
- impression mark** \_\_\_\_\_ 68  
a linear or Y-shaped mark on the proximal polar area of a pollen grain retained from the tetrad stage
- in-**  
prefix meaning absent
- inaperturate** \_\_\_\_\_ 42, 244  
pollen grain without distinct apertures  
*Antonym: aperturate*
- infoldings** \_\_\_\_\_ 57, 73, 194  
consequence of harmomegathy in dry condition, e.g., boat-shaped, cup-shaped, irregularly infolded
- infra-**  
prefix meaning beneath
- infratectum** \_\_\_\_\_ 45, 50, 385  
layer between tectum and foot layer or endexine (if foot layer is absent); infratectum can be alveolate, columellate, granular or absent
- intectate**  
see: atectate  
*Comment: "atectate" is the more common term*
- inter-**  
prefix for in between
- interapertural area** \_\_\_\_\_ 47, 57, 160, 201  
region between apertures
- interapertural area sunken** \_\_\_\_\_ 201  
characteristic shape of pollen grains in dry condition as a consequence of harmomegathy
- intercolpium**  
see: interapertural area  
*Comment: "interapertural area" is the more general term independent from the aperture type*
- internal tectum** \_\_\_\_\_ 391  
additional more or less continuous layer within the infratectum
- interporium**  
see: interapertural area  
*Comment: "interapertural area" is the more general term independently from the aperture type*
- interstitium**  
see: infratectum  
*Comment: "infratectum" is the more common term*
- intine** \_\_\_\_\_ 6, 45, 117, 400  
part of the pollen wall next to the cytoplasm, mainly consisting of polysaccharides; the intine can be monolayered or bilayered; see also "ektintine" and "endintine"  
*Comment: characteristic for a monolayered intine is the increasing thickness in the aperture region and that it becomes bilayered (ektintine and endintine)*
- intra-**  
prefix for within
- irregular** \_\_\_\_\_ 203  
*Comment: a general term, used in palynology describing, e.g., "outline", "shape"*
- iso-**  
prefix meaning identical
- isodiametric** \_\_\_\_\_ 39, 171  
pollen grain with a polar axis equal to the equatorial diameter  
*Comment: a general term, used in palynology describing, e.g., "shape"*
- isopolar** \_\_\_\_\_ 39, 176  
pollen grain with identical proximal and distal faces  
*Antonym: heteropolar*
- lacuna (lat., pl. lacunae)** \_\_\_\_\_ 328  
depressed area surrounded by ridges (lophae) in lophate pollen grains
- laesura (lat., pl. laesurae)** \_\_\_\_\_ 43  
a single arm of a tetrad mark
- lalongate** \_\_\_\_\_ 240  
endoaperture elongated equatorially
- leptoma (gr., pl. leptomata)** \_\_\_\_\_ 50, 247  
thinning of the pollen wall on the distal face in conifers, presumed to function as germination area
- LO-analysis** \_\_\_\_\_ 7  
light microscopic method for analyzing pollen surfaces
- lobate** \_\_\_\_\_ 160  
outline in polar view of a pollen grain with bulged interapertural areas (mainly in dry pollen grains)
- lolongate** \_\_\_\_\_ 240  
endoaperture elongated meridionally
- LO-pattern**  
ornamentation identified by LO-analysis
- lophae (lat., sing. lophae)** \_\_\_\_\_ 328  
massive exine ridges
- lophate** \_\_\_\_\_ 328  
pollen wall with coarse meshed pattern formed by lophae and lacunae
- lumen (lat., pl. lumina)** \_\_\_\_\_ 299, 317, 324, 326, 348  
space enclosed by muri in reticulate pollen grains
- margo (lat., pl. margines)** \_\_\_\_\_ 248  
exine area with different ornamentation bordering a colpus/colporus/sulcus
- massula (lat., pl. massulae)** \_\_\_\_\_ 76, 147  
unit of more than 4 pollen grains but less than the locular content of a theca  
*Comment: in angiosperms only used for Orchidaceae with sectile "pollinia"*

- megaspore**  
the larger spore in vascular plants
- melissopalynology** \_\_\_\_\_ 9, 16  
the study of palynomorphs found in honey
- melittopalynology**  
see: melissopalynology  
*Comment: the term "melittopalynology" is the Greek variant of the Latin "melissopalynology"*
- meridian**  
imaginary line on the pollen surface connecting proximal and distal poles
- meridional**  
preposition indicating a direction on the pollen surface
- meso-**  
prefix meaning middle
- mesocolpium** (lat., pl. **mesocolpia**) \_\_\_\_\_ 94  
see: interapertural area  
*Comment: "interapertural area" is the more general term independent of the aperture type*
- micro-** \_\_\_\_\_ 331  
prefix for small; features between 1-0,5 µm: microbaculate, microclavate, microechinate, microgemmate, microrugulate, microreticulate, microverrucate; not used in combination with striate and foveolate
- microspore** \_\_\_\_\_ 24  
the smaller spore of heterosporous vascular plants
- microspore mother cell** \_\_\_\_\_ 24  
see: pollen mother cell
- monad** \_\_\_\_\_ 38, 132  
unit consisting of a single pollen grain
- mono-**  
prefix meaning one
- monocolpate**  
see: sulcate  
*Comment: superfluous term; as far as known, there is no example of a pollen grain with a single colpus (situated equatorially); in all pollen grains with a single elongated aperture the latter is situated distally (sulcus)*
- monoporate**  
see: ulcerate  
*Comment: superfluous term; as far as known, there is no example of a pollen grain with a single porus (situated equatorially); in all pollen grains with a single porus the latter is situated distally (ulcus)*
- monosaccate** \_\_\_\_\_ 189  
pollen grain with a single saccus
- monosulcate**  
see: sulcate  
*Comment: superfluous term, because "sulcate" implies a single elongated aperture (sulcus)*
- muri** (lat. sing. **murus**) \_\_\_\_\_ 348  
ornamentation elements forming the meshes in a reticulum
- nano-** \_\_\_\_\_ 336  
prefix for very small, features between 0.5 - 0.1 µm: nanobaculate, nanoclavate, nanoechinate, nanogemmate, nanorugulate, nanoreticulate, nanoverrucate; not used in combination with striate and foveolate
- nexine** \_\_\_\_\_ 47, 404  
term used for light microscopy, describing the inner, unstructured layer of the exine
- nodulum** (lat., pl. **nodula**) \_\_\_\_\_ 50  
small body located on the nexine of the central sacculus area
- Normapollis** \_\_\_\_\_ 11  
group of Cretaceous and lower Paleogene pollen, usually triaperturate, with a complex pore apparatus
- oblate** \_\_\_\_\_ 39, 168  
pollen grain with a polar axis shorter than the equatorial diameter  
*Antonym: prolate*
- oblique view**  
view of a pollen grain neither in polar nor in equatorial view
- omniaperturate**  
see: inaperturate  
*Comment: the term refers to the functional aspect only, therefore we prefer "inaperturate"*
- oncus** (lat., pl. **onci**) \_\_\_\_\_ 220  
lens-shaped body located beneath the aperture, not resistant to acetolysis
- operculate** \_\_\_\_\_ 251  
aperture with an operculum
- operculum** (lat., pl. **opercula**) \_\_\_\_\_ 42, 251  
distinctly delimited exine structure covering an aperture
- orbicule**  
see: Ubisch body  
*Comment: "orbicule" implies a globular element; therefore, we recommend the term "Ubisch body", as these are polymorphic*
- ornamentation** \_\_\_\_\_ 51, 295  
applied in palynology to surface features
- outline** \_\_\_\_\_ 156, 158, 160, 163, 166, 167  
describes the contour of pollen grains in polar and/or equatorial view, e.g., circular, elliptic, triangular, quadrangular, polygonal, irregular, lobate  
see also: amb
- P/E-ratio** \_\_\_\_\_ 39, 168, 171, 173  
refers to the length of the polar axis between the two poles compared to the equatorial diameter
- paleo(palaeo-)palynology** \_\_\_\_\_ 6, 11, 89, 119  
the study of fossil palynomorphs
- palynogram**  
diagram summarizing the main morphological features of a palynomorph
- palynology** \_\_\_\_\_ 4  
the study of palynomorphs
- palynomorph** \_\_\_\_\_ 4, 6, 118  
general term for all biological entities found in palynological samples, e.g., pollen, spores, cysts, diatoms
- panto-**  
prefix for global
- pantoaperturate** \_\_\_\_\_ 42, 255, 256, 257  
pollen grain with apertures distributed more or less regularly over the surface: pantocolpate, pantocolporate, pantoporate

- pantocolpate** \_\_\_\_\_ 255  
see: pantoaperturate
- pantoporate** \_\_\_\_\_ 256, 257  
see: pantoaperturate
- pantocolporate** \_\_\_\_\_ 256  
see: pantoaperturate
- papilla** (lat., pl. **papillae**) \_\_\_\_\_ 16, 259  
small protuberance typical for Taxodioidae pollen located distally
- pedium**  
see: foot layer  
*Comment: outdated term*
- penta-**  
prefix meaning five
- pentaaperturate** \_\_\_\_\_ 229, 238, 267  
pollen grain with 5 apertures: pentacolpate, pentacolporate, pentaporate
- pentacolpate** \_\_\_\_\_ 229  
see: pentaaperturate
- pentacolporate** \_\_\_\_\_ 238  
see: pentaaperturate
- pentaporate** \_\_\_\_\_ 267  
see: pentaaperturate
- perforate** \_\_\_\_\_ 342  
pollen wall with holes less than 1  $\mu\text{m}$  in diameter
- peri-**  
see: panto-
- pharmacopalynology**  
the study of palynomorphs in drugs
- pilate**  
see: clavate
- pilum** (pl. *pila*)  
see: clava  
*Comment: the term "pilum" does not refer to the palynological feature; "pilum" means "dart" or "javelin"*
- Pinus subgenus *Strobis* type** \_\_\_\_\_ 16, 50  
bisaccate pollen grain with hemispherical sacci  
*Synonym: haploxylon type*
- Pinus subgenus *Pinus* type** \_\_\_\_\_ 16, 50  
bisaccate pollen grain with balloon-like sacci  
*Synonym: diploxylon-type*
- planaperturate** \_\_\_\_\_ 70, 260  
pollen grain with an angular outline, where the apertures are situated between the angles  
*Antonym: angulaperturate*
- plicae** (lat., sing. *plica*) \_\_\_\_\_ 344  
coarse parallel ridges
- plicate** \_\_\_\_\_ 51, 344  
pollen wall with plicae
- pluricolumellate**  
reticulate pollen wall with more than one row of columellae beneath the muri
- polar area**  
region at and around the pole(s)
- polar axis** \_\_\_\_\_ 38  
imaginary line between the proximal and the distal pole of a pollen grain
- polar view**  
view of a pollen grain in which the pole is directed towards the observer
- polarity** \_\_\_\_\_ 38  
orientation of the proximal and distal pole of a pollen grain resulting from tetrad stage
- pole** \_\_\_\_\_ 38  
outermost proximal and/or distal point of a pollen grain
- pollen** \_\_\_\_\_ 24  
see: pollen grain
- pollen analysis**  
study of assemblages of dispersed palynomorphs  
*Comment: does not mean the morphological description of a pollen grain*  
see: palynogram
- pollen class** \_\_\_\_\_ 10, 429  
artificial grouping of pollen grains that share one or more distinctive characters
- pollen coating** \_\_\_\_\_ 24, 54, 57, 411, 414, 415  
general term applied to organic compounds usually produced by the tapetum, located on the exine and/or in exine cavities; see also: pollenkitt, tryphine, primexine matrix
- pollen coating vesicles**  
tapetum derived vesicles covering the perforated footlayer in mature pollen grains in, e.g., *Geranium* and *Pelargonium*
- pollen grain** (engl., pl. **pollen grains or pollen**) \_\_\_\_\_ 4, 24  
the male gametophyte of seed plants; source and carrier for the male gametes (spermatozoids or sperm cells)
- pollen mother cell** \_\_\_\_\_ 24  
diploid cell forming a tetrad of four haploid microspores by meiosis
- pollen tube** \_\_\_\_\_ 6, 16, 24, 44  
tube produced by the vegetative cell as part of the fertilization process (transports the male gametes)
- pollen type** \_\_\_\_\_ 6, 9, 57, 61  
term categorizing pollen grains; often used in connection with a distinct taxon
- pollen unit** \_\_\_\_\_ 10, 24, 38, 76, 131  
morphological unit of mature pollen grains (e.g., monad, tetrad)
- pollen wall** \_\_\_\_\_ 6, 24, 45, 50, 105, 379  
layer(s) enclosing the cytoplasm of a pollen grain
- pollenkitt** \_\_\_\_\_ 24, 47, 54, 411  
pollen coating consisting of sticky substances, mainly lipids
- pollinarium** (lat., pl. **pollinaria**) \_\_\_\_\_ 150  
dispersal unit of pollinium (or pollinia) plus secretions and/or tissues that aid in the removal of the structure from the flower
- pollination** \_\_\_\_\_ 4, 6, 13, 54, 57  
transfer of pollen from the male to the female reproductive organs in seed plants
- pollinium** (lat., pl. **pollinia**) \_\_\_\_\_ 76, 148  
unit of a more or less interconnected loculiform pollen mass

*Comment: loculi may be subdivided by septae, thus resulting in more than 2 "pollinia"*

- poly-**  
prefix for many
- polyad** \_\_\_\_\_ 10, 38, 57, 72, 76, 145  
unit of more than 4 pollen grains (multiple of 4)
- polychotomosulcate** \_\_\_\_\_ 289  
pollen grain with a polychotomosulcus
- polychotomosulcus** \_\_\_\_\_ 289  
sulcus with more than three arms
- polygonal** \_\_\_\_\_ 10, 167, 171, 182  
*Comment: a general term, used in palynology describing, e.g., "outline" and "shape"*
- polyPLICATE**  
see: plicate  
*Comment: a "plicate" pollen grain has always more than one plica, therefore the term "polyPLICATE" is superfluous*
- pontoperculate** \_\_\_\_\_ 262  
aperture with a pontoperculum
- pontoperculum** (lat., pl. **pontopercula**) \_\_\_\_\_ 262  
elongated operculum linked to the ends of the aperture
- porate** \_\_\_\_\_ 10, 42, 263, 264, 266, 267, 268, 269  
pollen grain with pori
- poroid** \_\_\_\_\_ 42, 73, 272  
indistinct circular or elliptic aperture
- poroidate** \_\_\_\_\_ 73, 272  
pollen grain with poroids
- pororate** \_\_\_\_\_ 42  
pollen grain with compound apertures composed of a circular "ektoporus" and "endoporus"
- porus** (lat., pl. **pori**; engl. **pore**, engl., pl. **pores**) \_\_\_\_\_ 10, 42, 263, 264, 266, 267, 268, 269  
more or less circular aperture; pori located at the equator or regularly spread over the pollen grain
- prae-**  
prefix for before
- pre(prae)-pollen** \_\_\_\_\_ 43  
microspores of certain extinct basal seed plants occurring from the Late Devonian until the Cretaceous, characterized by proximal and sometimes additional distal apertures, and presumed proximal germination
- primexine** \_\_\_\_\_ 24, 403  
polysaccharidic layer formed during early developmental stage wherein the later exine structures are preformed
- primexine matrix** \_\_\_\_\_ 414  
pollen coatings consisting of primexine remnants in mature pollen grains
- prolate** \_\_\_\_\_ 39, 173  
pollen grain with a polar axis longer than the equatorial diameter  
*Antonym: oblate*
- proximal** \_\_\_\_\_ 38  
pollen face/pole/side directing towards the center of the tetrad (deduced from tetrad stage)  
*Antonym: distal*
- pseudocolpus** \_\_\_\_\_ 43, 273  
colpus in a heteroaperturate pollen grain, presumed not to function as germination site
- pseudomonad** \_\_\_\_\_ 135  
unit of a permanent tetrad with 3 rudimentary pollen grains
- psilate** \_\_\_\_\_ 42, 54, 77, 346  
pollen wall with smooth surface
- punctate**  
see: perforate  
*Comment: "punctum" does not describe the three-dimensional character of a perforation*
- quadrangular** \_\_\_\_\_ 166  
*Comment: a general term, used in palynology describing, e.g., "outline"*
- reticulate** \_\_\_\_\_ 51, 348  
pollen wall with reticulum
- reticulum** (lat. pl. **reticula**) \_\_\_\_\_ 51, 348  
network like pattern consisting of muri and lumina
- reticulum cristatum** \_\_\_\_\_ 76, 355  
special type of reticulum; muri with prominent supra-sculpture
- retipilate** \_\_\_\_\_ 76  
reticulum formed by rows of pila instead of muri  
*Comment: To the best of our knowledge there is no example of a reticulum formed by rows of pila instead of muri. Earlier observations were based on light microscopy. SEM-investigations reveal that the given example of Cuscuta and Callitriche do not fit the definition.*
- ring-like aperture** \_\_\_\_\_ 16, 73, 74, 75, 274  
circumferential aperture (situated more or less equatorially or, rarely, meridionally)
- rugulae** (lat., sing. **rugula**) \_\_\_\_\_ 358  
elongated ornamentation elements irregularly arranged
- rugulate** \_\_\_\_\_ 358  
pollen wall with rugulae
- saccate** \_\_\_\_\_ 188, 189, 190, 193  
pollen grain with one or more air sacs
- saccus** (lat., pl. **sacci**) \_\_\_\_\_ 188, 189, 190, 193  
exinous expansion forming an air sac
- scabrate** \_\_\_\_\_ 16, 50  
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
- sculpture** \_\_\_\_\_ 45, 51  
ornamentation elements on the pollen surface, e.g., echini, bacula, clavae, verrucae
- semi-**  
prefix for half
- semitectate** \_\_\_\_\_ 319, 380, 382  
pollen grain with a discontinuous tectum
- sexine** \_\_\_\_\_ 47, 404  
term used for light microscopy, describing the structured/sculptured outer layer of the exine
- shape** \_\_\_\_\_ 10, 16, 38, 155, 181  
3-dimensional form of a pollen grain in relation to the P/E-ratio

- size** \_\_\_\_\_ 9, 57  
*Comment: we recommend the size categories, very small (<10 μm), small (10–25 μm), medium (26–50 μm), large (51–100 μm), and very large (>100 μm)*
- sperm cell** \_\_\_\_\_ 6, 24  
 male gamete
- spheroidal** \_\_\_\_\_ 171, 181  
*Comment: a general term, used in palynology describing, e.g., “shape”*
- spine**  
 see: echinus  
*Comment: the terms “spine”, “spinulate”, “spinus”, “spinous”, and “spinose” are linguistically inconsequent*
- spinose**  
 see: echinate  
 see: spine
- spiral aperture** \_\_\_\_\_ 277  
 elongated, coiled aperture
- spiraperturate** \_\_\_\_\_ 10, 277, 433  
 pollen grain with one or more spiral aperture(s)
- spore** \_\_\_\_\_ 4, 6, 11, 12, 44  
 general term for a reproductive unit (sexual, asexual) in plants and fungi
- sporoderm** \_\_\_\_\_ 45  
 general term for the pollen/spore wall
- sporopollenin** \_\_\_\_\_ 6, 7, 24, 45, 47, 49, 54, 56, 421  
 main component of the exine, consisting of acetolysis-resistant biopolymers
- stenopalynous** \_\_\_\_\_ 13  
 plant taxa characterized by only slight variation in pollen morphology  
*Antonym: eurypalynous*
- stephano-**  
 prefix meaning equatorially situated
- stephanoaperturate** \_\_\_\_\_ 42, 75, 279, 231, 238, 268  
 apertures situated at the equator (term usually used for 6 or more apertures); see also: stephanocolpate, stephanocolporate, stephanoporate
- stephanocolpate** \_\_\_\_\_ 231  
 see: stephanoaperturate
- stephanocolporate** \_\_\_\_\_ 238, 239  
 see: stephanoaperturate
- stephanoporate** \_\_\_\_\_ 268  
 see: stephanoaperturate
- striae (lat., sing. stria)** \_\_\_\_\_ 78, 361  
 elongated ornamentation elements separated by grooves parallelly arranged  
*Comment: the term “striae” is used inconsistently in the literature; we use the term for the elevated elements and not for the grooves*
- striate** \_\_\_\_\_ 78, 361, 332  
 pollen wall with striae
- striato-microreticulate** \_\_\_\_\_ 332, 333, 383  
 see: micro-
- striato-reticulate** \_\_\_\_\_ 78, 366  
 ornamentation intermediate between striate and reticulate
- structure** \_\_\_\_\_ 45  
 the stratification of a pollen wall
- sub-**  
 prefix for less than
- sulcate** \_\_\_\_\_ 10, 13, 70, 74, 281, 287, 288, 433  
 pollen grain with a sulcus (sulci)
- sulcus (lat., pl. sulci)** \_\_\_\_\_ 10, 13, 70, 74, 281, 287, 288, 433  
 elongated aperture located distally
- supra-**  
 prefix for above
- suprasculpture** \_\_\_\_\_ 61, 76, 92, 370  
 secondary sculpture elements positioned on the primary sculpture of the pollen surface
- supratectal element** \_\_\_\_\_ 47, 50, 374  
 sculpture element positioned on top of the tectum  
*Comment: can only be defined in cross section of a pollen wall, see also “suprasculpture”*
- syn-**  
 prefix for together
- synaperturate** \_\_\_\_\_ 10, 69, 290, 291  
 pollen grain with anastomosing apertures: syncolpate, syncolporate
- syncolpate** \_\_\_\_\_ 69, 290  
 pollen grain with anastomosing colpi
- syncolporate** \_\_\_\_\_ 69, 290, 291  
 pollen grain with anastomosing colpi
- tapetum** \_\_\_\_\_ 24, 49, 52, 421  
 specialized layer of cells lining the locule and participating in the nourishment of pollen grains, wall formation, and synthesis of pollen coatings
- tectate** \_\_\_\_\_ 45, 47, 51, 380  
 pollen grain with a tectum  
*Antonym: atectate*
- tectum (lat., pl. tecta)** \_\_\_\_\_ 45, 47, 51, 380  
 outer more or less continuous ektexine layer; tectum condition can be eutectate or semitectate
- tenuitas (lat., pl. tenuitates)** \_\_\_\_\_ 50, 68, 70, 73, 408  
 general term for a thinning of the pollen wall
- tetra-**  
 prefix meaning four
- tetraaperturate** \_\_\_\_\_ 229, 237, 266  
 pollen grain with 4 apertures: tetracolpate, tetracolporate, tetraporate
- tetracolpate** \_\_\_\_\_ 229  
 see: tetraaperturate
- tetracolporate** \_\_\_\_\_ 237  
 see: tetraaperturate
- tetraporate** \_\_\_\_\_ 266  
 see: tetraaperturate
- tetrad** \_\_\_\_\_ 137, 138, 142, 143  
 unit of 4 pollen grains
- tetrad decussate** \_\_\_\_\_ 142  
 unit of 4 pollen grains arranged in 2 pairs in 2 different plains  
*Comment: these tetrads are a consequence of successive cytokinesis; without systematic relevance*

- tetrad linear** \_\_\_\_\_ 143  
special case of tetrad planar
- tetrad mark** \_\_\_\_\_ 43  
mark on the proximal face of a spore retained from the postmeiotic stage functioning as germination area (linear = monolete, y-shaped = trilete)
- tetrad planar** \_\_\_\_\_ 26, 137, 143  
unit of 4 pollen grains arranged in one plane; can be: tetragonal, T-shaped, linear  
*Comment: these tetrads are a consequence of successive cytokinesis; without systematic relevance*
- tetrad stage** \_\_\_\_\_ 24, 38, 99  
step in pollen development
- tetrad tetrahedral** \_\_\_\_\_ 24, 138  
unit of 4 pollen grains in which the centers of the grains define a tetrahedron
- tetrad T-shaped** \_\_\_\_\_ 143, 144  
special case of tetrad planar
- tetrad tetragonal** \_\_\_\_\_ 143, 144  
special case of tetrad planar
- treme** \_\_\_\_\_ 6, 12  
suffix for a germination site (aperture, laesura); for kata-, ana-, zono-, and pantotreme
- tri-**  
prefix meaning three
- triangular** \_\_\_\_\_ 42, 68, 163  
*Comment: a general term, used in palynology describing, e.g., "outline"*
- triaperturate** \_\_\_\_\_ 226, 234, 264  
pollen grain with 3 apertures: tricolpate, tricolporate, triporate
- trichotomosulcate** \_\_\_\_\_ 70, 288  
pollen grain with a trichotomosulcus
- trichotomosulcus** \_\_\_\_\_ 70, 288  
3-radiate sulcus
- tricolpate** \_\_\_\_\_ 226  
pollen grain with 3 colpi
- tricolporate** \_\_\_\_\_ 234  
pollen grain with 3 colpi
- trilete** \_\_\_\_\_ 44  
see: laesura and tetrad mark
- triporate** \_\_\_\_\_ 264  
pollen grain with 3 pori
- trisaccate** \_\_\_\_\_ 188, 193  
pollen grain with three sacci
- tryphine** \_\_\_\_\_ 24, 415  
pollen coating consisting mainly of lipids mixed with membrane remnants
- Ubisch body** (engl., pl. **Ubisch bodies**) \_\_\_\_\_ 24, 52, 94, 421  
polymorphic sporopollenin-element produced by the tapetum  
*Comment: the "Ubisch body" is named after Gerta von Ubisch, who described these bodies for the first time*
- ulcerate** \_\_\_\_\_ 10, 74, 292, 434  
pollen grain with an ulcer
- ulcus** (lat., pl. **ulci**)  
more or less circular aperture located distally
- vegetative cell** \_\_\_\_\_ 24  
the larger of the two cells formed after first pollen mitosis
- vegetative nucleus** \_\_\_\_\_ 24  
the nucleus of the vegetative cell
- verruca** (lat., pl. **verrucae**) \_\_\_\_\_ 78, 375  
wart-like element broader than high
- verrucate** \_\_\_\_\_ 78, 375  
pollen wall with verrucae
- vesiculate**  
see: saccate  
*Comment: "saccate" is the more common term*
- vestibulum** (lat., pl. **vestibula**)  
see: atrium  
*Comment: "atrium" is the more common term*
- viscin thread** \_\_\_\_\_ 24, 94, 428  
acetolysis resistant thread arising from the exine
- zona-** \_\_\_\_\_ 75, 439  
prefix for ring-like  
*Comment: we prefer the term "ring-like"*
- zono-** \_\_\_\_\_ 12, 75, 439  
prefix for equatorially located features  
*Comment: we prefer the term "stephano-"*
- zonaaperturate**  
see: ring-like aperture
- zonoaperturate**  
see: stephanoaperturate
- Zwischenkörper** \_\_\_\_\_ 6  
see: oncus  
*Comment: "oncus" is the more common term*

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