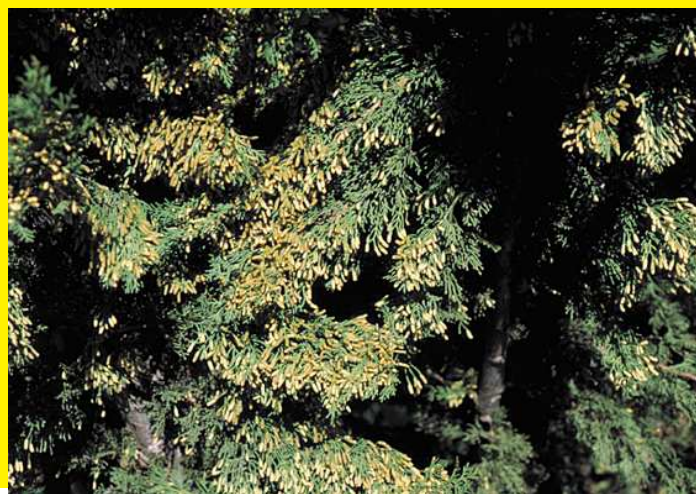


Airborne pollen morphology

FAM. Cupressaceae

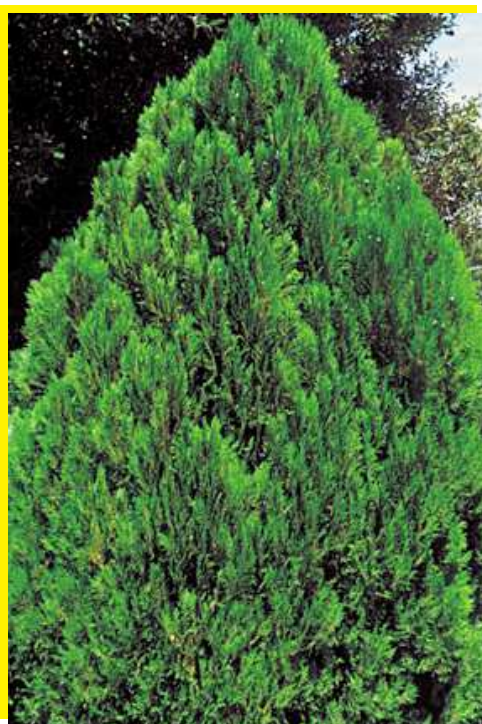


Male cones

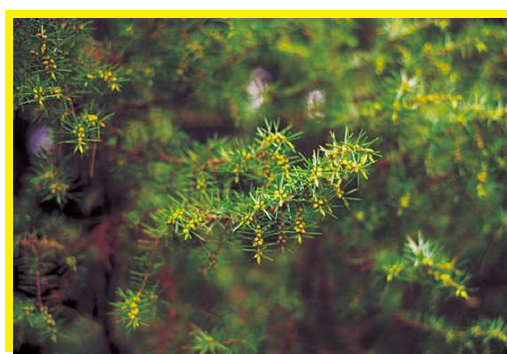
Cupressus sempervirens L.
(Cupressaceae), cypress

Hedge of *C. arizonica*





Thuja occidentalis
(Cupressaceae) white cedar



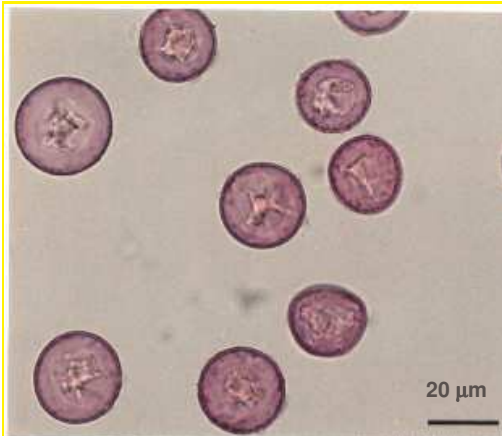
Juniperus communis
(Cupressaceae) juniper

The Cupressaceae family trees have 5 genus characterized by different pollination period but similar and indiscernible pollen morphology so the aerobiological monitoring can registered pollen named Cupressaceae from December to June continuously. Essentially in the Mediterranean regions the *Cupressus* genus is many widespread with *C. sempervirens* and *C. arizonica* species used as ornamental plants and as forestall species. Only the *Juniperus* genus growth as spontaneous brush.

Grains inaperturate (or monoporate), apolar, \pm spheroidal, rather small to rather large (22-40 μm).

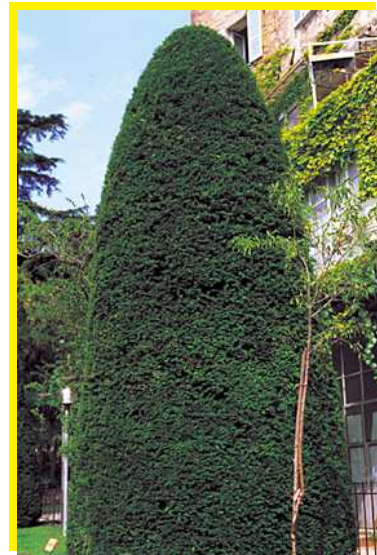
Exine rather thin, surface unevenly granular, otherwise smooth.

Intine thick, the thickness varying by 3-10 μm to correspond with the shape of the stellate content.



Fam. TAXACEAE

Pollination between is January and April

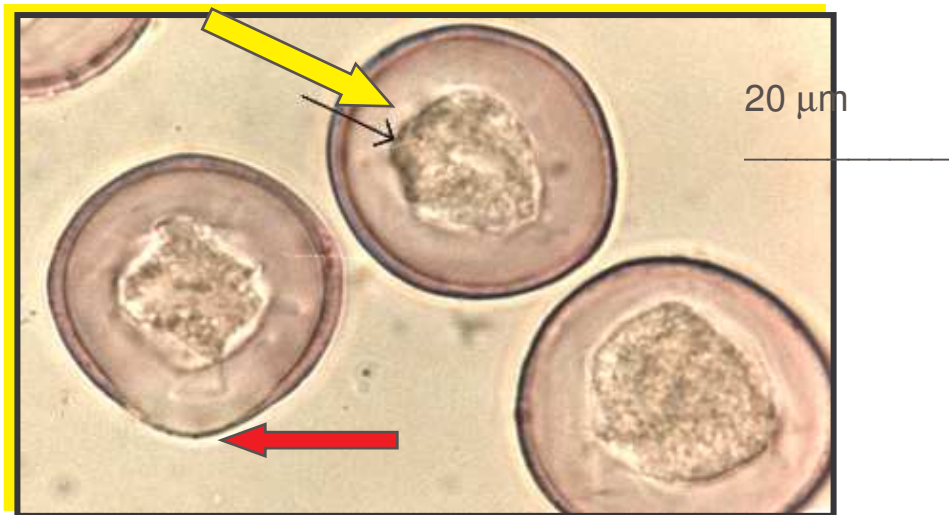


Taxus baccata L., yew

Grains inaperturate (or monoporate), apolar, \pm spheroidal, small or rather small (20-28 μm).

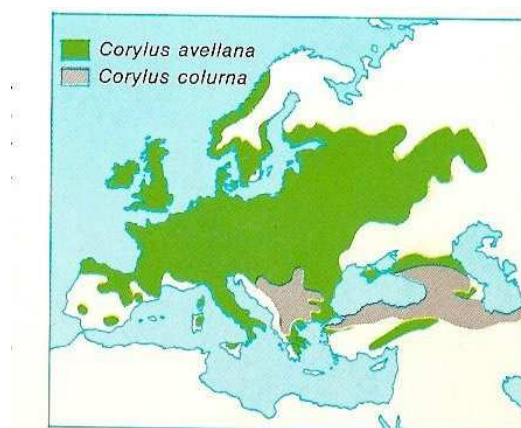
Exine often bursting and extruding intine and contents; usually with a thin area on one side (red arrow), otherwise rather thin; surface evenly granular.

Intine thick, the thickness varying by 3-5 μm to correspond with the shape of the irregularly stellate content (yellow arrow); greatest thickness 8 μm



FAM. Corylaceae

Corylus : brush tall 5-7 m, commonly widespread in all Europe and in the Mediterranean zones where growing to 1200m of altitude. Cultivate as fruiting plant in many regions. The pollination occurred in the Winter and the inflorescences are unisexual. In the pictures the male inflorescences, as catkins, leaving pollen before of the leaves emission.

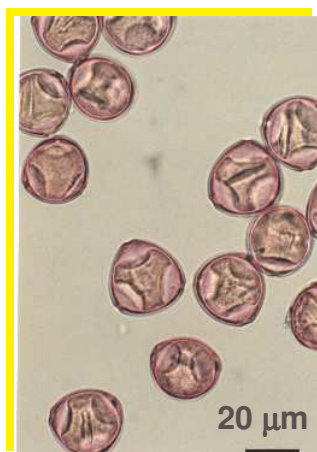


Corylus avellana L. (hazel)

Trizonoporate, isopolar, suboblate, grains diameter of 19-28 μm .

Exine becoming gradually thickened toward the *porus* margin but its not protruding. The grains in the polar vision seem sub-triangular shaped.

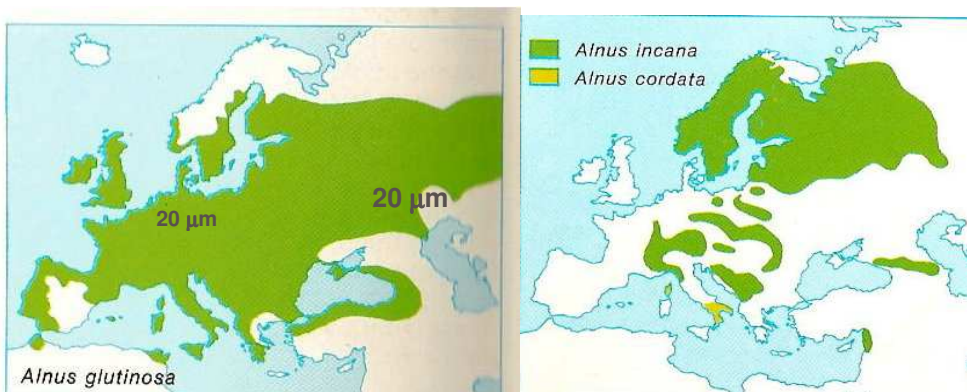
Exine scabrate-microechinate, Intine: rather thin, swelling beneath the pores to form onci larges and convexes (arrow).



FAM. Betulaceae composed by two genus *Alnus* and *Betula*

Alnus

Genus of trees commonly in all Nord Europe. Used essentially as ornamental plant in any case the is appreciate as wood. The pollination occurred in the Winter and the inflorescences are unisexual. In the pictures the male inflorescences, as catkins, leaving pollen before of the leaves emission.



Pollen morphology of *Alnus* (alder)

Tetra-pentazonoporate, isopolar, oblate or sub-oblate, diameter of 22-34 µm.

Exine micro-echinate and thickened towards the porus margin creating aspides not much pronounced (yellow arrow), the intine swelling beneath the pores to form shallow onci.

Grains with arcs or bands of nexinous (arci) thickening joining adjacent pori (white arrow).



20 µm

20 µm

Betula Growing in the cold climate, commonly widespread in North-Europe. Growing also, in the Mediterranean area but at higher altitude.



The inflorescences are unisexual. In the pictures the male inflorescences, as catkins.

The pollination occurred in the spring and the pollen is very allergenic.

Pollen of *Betula* (birch)

Trizonoporate, isopolar, suboblate, grains diameter of, 18-28 μm . Grains with protruding, vestibulate pores. Vestibulum wider than long, with slanting sides. Exine micro-echinate and thickened towards the porus margin creating evident aspides. The intine swelling beneath the pores to form shallow onci.



Fam. Platanaceae

Large trees

Leaves deciduous; medium-sized, or large; alternate (sometimes to sub-opposite on vigorously growing shoots); spiral; flat; petiolate (the petiole base enclosing the axillary bud); sheathing; simple.

Lamina palmatifid; palmately veined (nearly always); cross-venulate.

Leaves stipulate. Stipules concrescent (around the stem); ochreate; scaly; caducous.

Lamina margins dentate; flat.

Plants monoecious (the unisexual clusters in separate inflorescences). Female flowers with staminodes (commonly, 3–4), or without staminodes. Flowers aggregated in 'inflorescences'; in heads.

Inflorescences consisting of pendulous strings of up to 12 dense, globose, sessile or pedunculate heads of flowers, each inflorescence exclusively either male or female. Pollination anemophilous.

Toward end of XVII century from North America *P. occidentalis* arrived in Europe where was crossed with european *P. orientalis*.



A well known ibrid was produced: ***Platanus acerifolia* (Aiton) Willd.**

Used for parks and row of trees It is resistant to pollution. Low allergenity



Pollen tricolpate, isopolar, suboblate or oblate, small pollens 18 – 25 micron
Colpi with rounded apex; colpal membrana granulate .Microreticulate exine with lumina In
polar view grain is subtriangular with three longitudinal sulci. In equatorial view wide sulci
with colpal membrana with small granulation
Microreticulate exine with lumina

FAGACEAE

The family Fagaceae, or beech family, is characterized by alternate leaves with pinnate venation, flowers in the form of catkins, and fruit in the form of nuts, one to seven in a scale or spiny husk that may or may not enclose the nut. The best-known group of this family is the oaks, genus *Quercus*, the fruit of which is called an acorn. The husk of the acorn in most oaks only forms a cup in which the nut sits.

Trees and shrubs; leaves evergreen, or deciduous; medium-sized; alternate; spiral, or distichous to four-ranked (rarely); 'herbaceous', or leathery; petiolate; non-sheathing; gland-dotted, or not gland-dotted; simple.

Lamina dissected, or entire; when dissected, pinnatifid; pinnately veined; cross-venulate.

Leaves stipulate. Stipules caducous. Lamina margins entire, or serrate, or dentate.

Vegetative buds scaly. Leaves without a persistent basal meristem.

Plants monoecious. Pollination anemophilous (usually), or entomophilous (e.g. *Castanea*).

Flowers solitary, or aggregated in 'inflorescences'; when solitary, axillary; when aggregated, in catkins (usually, at least the males), or in heads, or in glomerules.

Inflorescences when flowers aggregated, axillary;

with male flowers usually in more or less reduced dichasia aggregated into aments or distributed along a branching axis, the females in 1–7(–15)-flowered clusters at the bases of these or in separate few-flowered inflorescences; with involucre bracts.

Flowers bracteate; minute.

Pollen grains aperturate; 3 aperturate; colpate, or colporate.

Fruit non-fleshy; indehiscent (subtended by the accrescent involucre, which sometimes encloses it before opening like a pericarp); a nut (with stony or leathery pericarp), or a samara (rarely); usually 1 seeded (by abortion).

catkins ♂ short (in flower head). Stigma 6, cupule closed shortly spiny

FAGUS

catkins ♂ linear, erects (straights). Stigma 6, cupule closed long spiny

CASTANEA

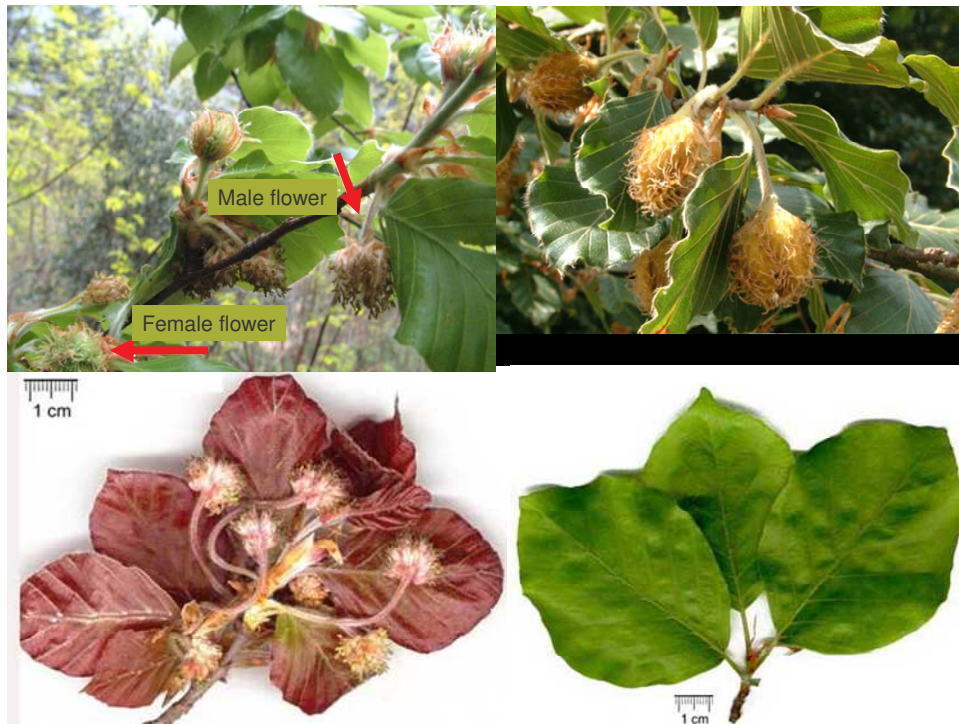
catkins ♂ linear hanging. stigma 3 (rr. 4-5), open cupule with imbricate squama

QUERCUS

***Fagus sylvatica* L. Family: Fagaceae**

Fagus has wide distribution area from Spain to Black Sea, from Sicily to Norway. It is the most important tree of broad leaved mountain wood.

It lives in pure wood or in association with *Abies*, *Pinus*, *Fraxinus*, *Taxus*, *Acer*, *Ulmus*, *Sorbus*, *Prunus*, *Carpinus*, from sea level to 1400-1800 m altitude.



Pollen isopolar, suboblate up to spheroidal, tricolporate. Medium Pollen size: 40-45 micron
In polar view circular with three pores few prominent
In equatorial view pores are circular, covered by a smooth membrane
Three colpi short and sharp. Polar area rather wide. Exine, rather thin, thickens near poles, is rugulate
Low allergenicity

