

5_Nutrition course

Order Coniferous (Conifers)

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2025-2026

- **Gymnosperms**
- **- Order Coniferales (conifers)**
- **1), Pinaceae family/**
- **2), Family Taxaceae/**
- **3), Cupressaceae family/**
- **4-Family Araucariaceae (Araucariaceae)**
- **Family Taxodiaceae (Taxodiaceae) is an ancient botanical family of coniferous trees that, according to modern phylogenetic classifications, is now part of the family Cupressaceae (Cupressaceae).**

Order of Coniferales

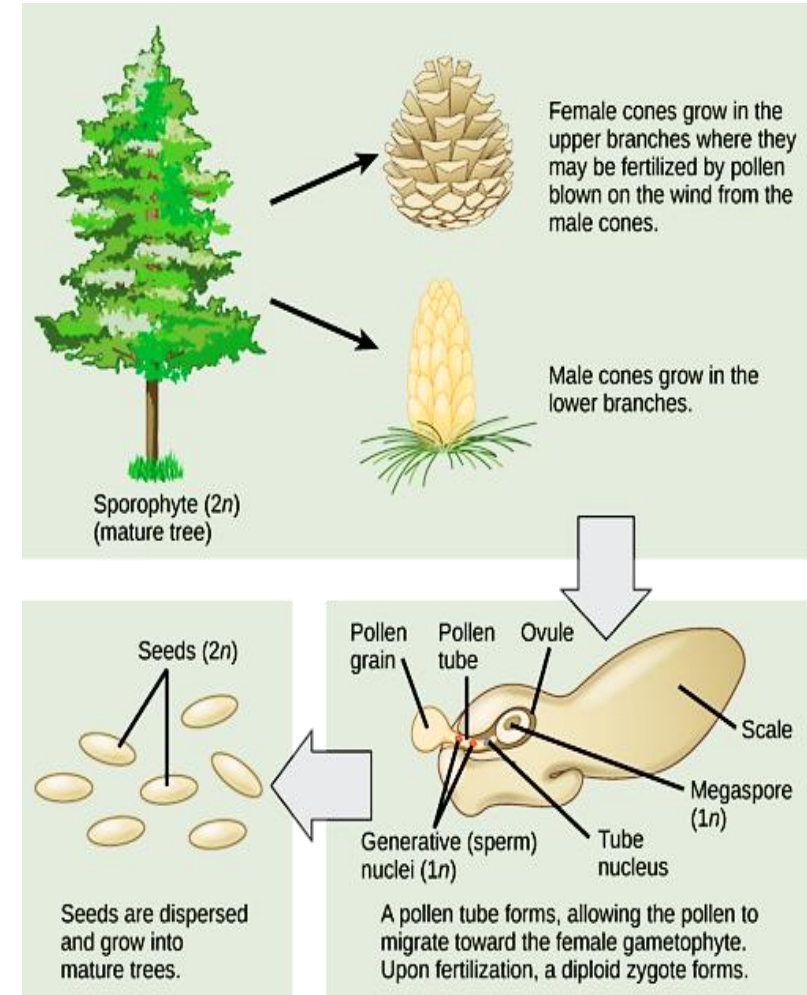
- Coniferales (or Pinales in some classifications) are the largest and most widespread order of Gymnosperms, a group of plants characterized by "naked" ovules (and therefore seeds), i.e. not enclosed in an ovary (fruit).

General characteristics of coniferous trees

- *Vegetative apparatus: These are mainly trees and shrubs, often large, with evergreen leaves in the shape of needles or scales. They dominate the vast boreal forests (plaine) of North America and Eurasia.*
- *Reproductive organs:*
- *They are monoecious (bearing distinct male and female cones on the same individual (tree))*
- *or dioecious (separate male and female individuals). The reproductive organs are grouped into cones (strobiles). [one female tree and one male tree]*

Conifer Reproductive Cycle

- The reproductive cycle of conifers takes place in several stages:
- pollen production by male cones,
- the transport of pollen by the wind to the female cones,
- the fertilization of the ovules by pollen,
- the development of the seed that contains the embryo,
- the dispersal of these seeds by the wind (or animals)
- Germination and birth of a new tree.
- The process of pollination and fertilization can be slow and take more than a year in some species.



Female cone



Male cone

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- Male cones: Composed of stamens carrying pollen sacs containing pollen grains (male gametophytes).
- Female cones: Composed of ovuliferous scales (which originate in the axils of the bracts) on which the "naked" ovules are located.
- Fertilization: Pollination is anemophilic (by the wind). Fertilization is independent of water, unlike that of ferns or mosses. The pollen grain germinates and forms a pollen tube that carries the male gametes to the oosphere (female gamete) located in the archegonium, within the ovum.
- Seed: After fertilization, the egg develops into a seed, which contains the embryo and nutrient reserves (the endosperm).



Main families

The order Coniferales includes several important families, including

Pinaceae: Includes pine, fir, spruce, larch and cedar. Characterized by needle-shaped leaves and typical woody cones.

Cupressaceae (Cupressaceae): Includes cypresses, cedars, junipers, and redwoods. Often characterized by scaled leaves and smaller, sometimes fleshy cones (such as juniper berries).

Taxaceae (Taxaceae): Includes yews. Their ovules are often solitary and surrounded by a fleshy, colorful aril instead of a typical cone.

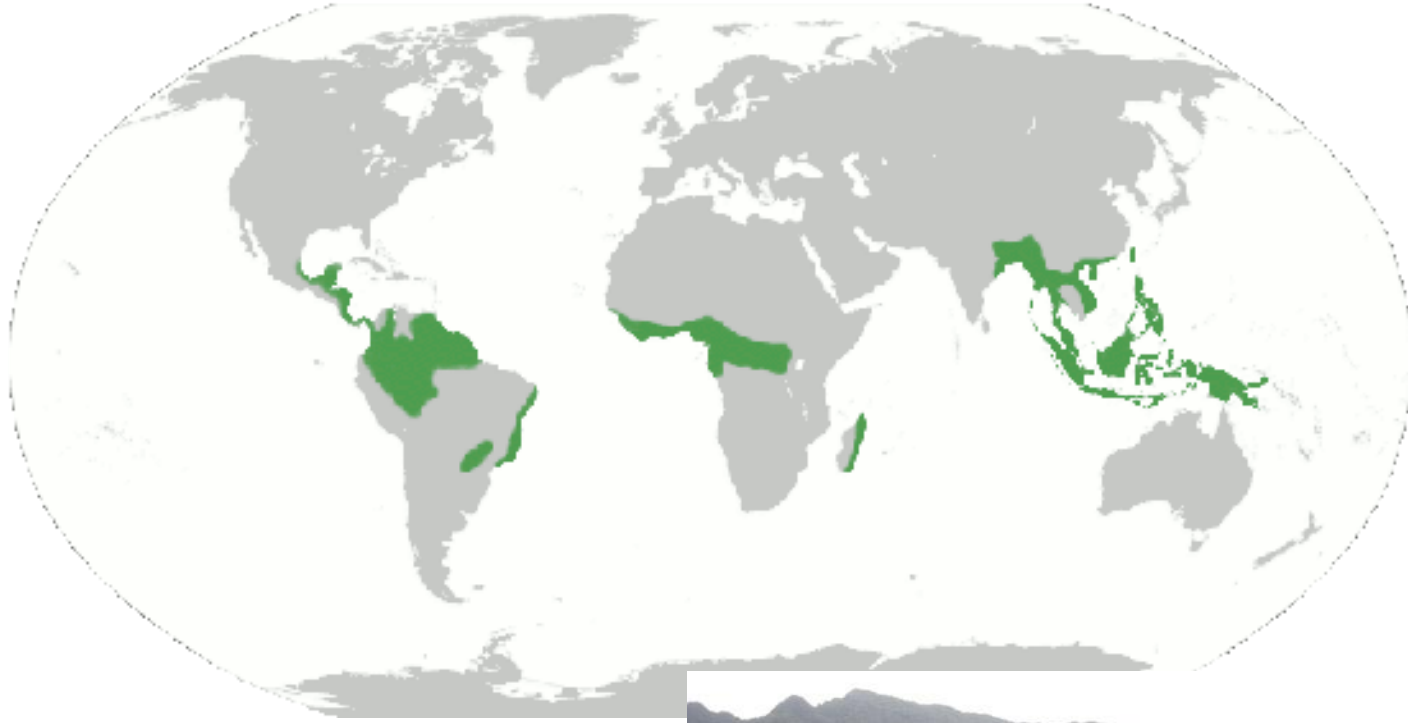
Araucariaceae (Araucariaceae): Includes araucarias and agathis, mainly found in the southern hemisphere.



- Habitat and importance
- Coniferals are found in a wide variety of habitats, from Arctic regions to tropical mountains, and form critical ecosystems such as boreal forests and temperate coniferous forests. They play a major ecological role and are of great economic importance, especially for the production of timber, paper, resins and essential oils.



Forêts tropicales



1_family Pinaceae; (Pinaceae)

- The Pinaceae family is the largest and best known of the conifer families, including trees and, more rarely, resinous shrubs.
- Key features
- Foliage: The leaves are needles, usually evergreen, although some species, such as larches (*Larix*), are deciduous. The needles are often arranged in a spiral on the twigs, or grouped in tufts.
- Reproduction: These are monoecious plants, [male pollen-bearing cones and egg-bearing female cones] are found on the same individual.
- Cones: The female reproductive organs are woody and bulky cones. The seeds, usually winged, are naked and borne by the scales of the cone (gymnosperms).
- Sap: The trees of this family are characterized by the production of a resinous and aromatic sap.

- Habitat: They often dominate cold, high mountain or temperate environments in the northern hemisphere.
- Main genres
- The Pinaceae family consists of about 11 genera and 230 species. Among the best known are:
 - The pines. The fir trees. Spruces. The cedars. The larches (the only deciduous ones). Douglas fir trees. Tsuga.
- These trees are of great importance particularly for the production of wood and paper, and essential oils, the essence of which is turpentine.

2-Family Taxaceae

- is a family of gymnosperm plants, including evergreen trees or shrubs, often not resinous or aromatic. L'Yew as the main representative. These plants are characterized by an often scaly or cracked bark
- The wood is hard and of good quality, but the trees are too few in number to be of economic interest.
- The yew (*Taxus baccata*) is the best known member of the family. It is spontaneous in Europe. Sometimes destroyed by man, due to the toxicity to livestock of its leafy branches; however, it is grown in parks and gardens for its evergreen foliage, its great resistance to various ecological conditions and the fact that it tolerates pruning well.



3-family Cupressaceae (Cupressaceae)

- Cupressaceae (Cupressaceae) is the largest family of conifers, resinous gymnosperm plants that include about 27 to 30 genera and 130 to 140 species, including cypresses, junipers, and redwoods. They are found on all continents except Antarctica and occupy a variety of habitats.
- Key features
- Vegetative apparatus: These are mainly evergreen trees and shrubs, except for a few species, (the bald cypress is deciduous). The bark is often fibrous and exfoliates in vertical strips.
- Foliage: Cupressaceae have two types of leaves, often depending on the age of the plant:
- Juvenile type (oxycedroid): Needle-shaped leaves, often longer and arranged in whorls (as in some junipers).
- Adult type (cupressoid or thuyoid): Small, squamiform (scaled) leaves, often imbricate and arranged in opposite or whorls along the twigs. They are aromatic, containing resin glands.

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Arbre ,cônes et écorce sur le tronc



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- Reproduction: They are mainly monoecious (flowers, male and female, on the same individual), but sometimes dioecious (on separate individuals).
- Male cones: small, solitary and located at the end of the branches.
- Female cones: Small, often globular or ovoid, composed of woody or fleshy scales (like juniper "berries"). They mature in 1 to 3 years and release winged or non-winged seeds.
- Notable genres
- The family includes well-known genera:
- Cupressus: The "true" cypresses (e.g. Common cypress, *Cupressus sempervirens*).
- Juniperus: The junipers and sables.
- Sequoia, Sequoiadendron, Metasequoia: The famous giant sequoias, evergreen sequoias and metasequoias.
- Thuja: The thujas or "white cedars".
- Chamaecyparis: False cypresses (e.g. Lawson's cypress).

Uses and Importance

- Many species of Cupressaceae are of great economic, cultural and ecological importance:
- Lumber: Their wood, often aromatic and very durable (rot-proof), is used in construction, cabinetmaking and for the manufacture of pencils.
- Horticulture: They are widely grown as ornamental plants, for hedges and windbreaks.
- Medicinal and culinary uses: Juniper (*Juniperus communis*) "berries" are used to flavour certain dishes and liqueurs, and cypress essential oil is used in herbal medicine and cosmetics.
- Allergies^{**}: The pollen of many species is very allergenic and can cause significant seasonal reactions (pollinosis).

4-Family Araucariaceae (Araucariaceae)

- The Araucariaceae are an ancient and important family of coniferous conifers, mainly native to the Southern Hemisphere. Considered "living fossils", they were widespread during the time of the dinosaurs, which were disappearing
- Key features
- Appearance and structure: They are generally large trees with a massive and straight trunk, which can reach more than 80 meters in height. Their habit is often very distinctive (pyramidal, columnar or domed) and changes with age. The branches grow in tiered whorls.
- Foliage: The leaves are evergreen, leathery or needle-shaped, arranged in a spiral around the branches. Their shape varies from wide and flat to narrow and tapered (subulate).
- Bark: The bark is often thick, resinous and can peel off in patches or strips depending on the species.

Uses and storage

Several species of Araucariaceae are of significant economic importance.

Their wood is used for construction and carpentry, and their large seeds are eaten as a staple food by some indigenous populations, Today, the majority of species in this family are considered threatened or vulnerable due to overexploitation of forestry and the expansion of agriculture and mining.





<https://www.youtube.com/watch?v=-13wr03RMiY>

Thank you