

Division: SPERMATOPHYTA (Flowering plants)

Most important features of plants in Spermtophyta is having flowers and seeds.

- **Anthophyta** (Flowering plants)
- **Spermatophyta** (Plants with seeds)

Male gametophyte has become **pollen grain, and female gametophyte has become **embryo vesicle**.**

The seed and the embryo are covered with a special seed coat and can wait for germination until optimal conditions form.

Polen grains reach the ovule via wind (anemogamous plants) or bugs (entemogamous plants), etc.

Plants are divided into two subclasses as *Gymnospermae* and *Angiospermae* according to their ability to form a closed ovarium, or not.

anth(o)= Gr. flower; sperm(ato) = Gr. seed
gymn(o)= Gr. naked; angio= Gr. narrow (closed)

Subdivision: GYMNOSPERMAE

(Plants with naked seeds)

An ovarium protecting the ovules is not present. Therefore, stylus and stigma are also absent. The micropyle is open and the pollen grains enter directly into the pollen room found in the ovule and germinate there. Fertilization occurs via the wind, so Gymnospermae plants are **anemogamous** plants.

Gymnospermae plants are in the form of shrubs and trees; herbaceous species are not found among them.

Their flowers lack calyx and corolla; male flowers are reduced to pollen vesicles and female flowers are reduced to ovules. Both male and female inflorescences are in the form of **cones (strobiles).**

Pollination is via the wind

Class: Cycadinae

Fam: Cycadaceae

Grows in tropical or subtropical regions.

Cycas revoluta

(King sago, Sago cycad, sikas)

A starch called **Sago Starch** is obtained from this plant and used as food.

Class: Ginkgoiaie
Fam: Ginkgoaceae

This family dates back to geological periods, however today it is presented with a single genus and a single species.

Ginkgo biloba

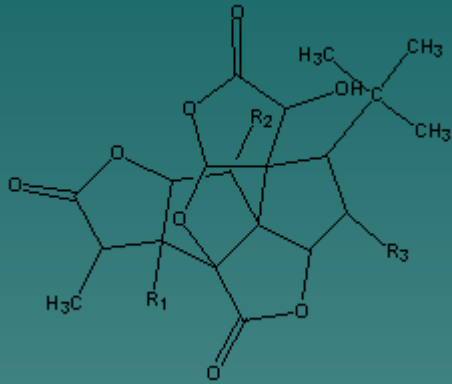
(Ginkgo, Kızsaçı ağacı, Japon eriği)

***Ginkgo biloba*, tree up to 30 m,
grows in the Far East countries
like Japan, China.**

**Has flabellate leaves with
bilobate apex and dichotomic
vein system.**

**Folium Ginkgoae (*Ginkgo folium*) is a drug
obtained from *Ginkgo biloba* leaves.**

The drug contains ginkgolides (ginkgolide A, B, C, J and M) bilobalide and ginkgo flavonosides.



Has vasodilatory activity and is used against forgetfulness, dementia, amnesia and loss of hearing, tinnitus and vertigo.

Class: Coniferae (Coniferous Plants)

This class has 5 families:

Order: Taxales
Fam: Taxaceae

Consists of big trees that do not contain resin.

Seeds are small and when they mature, a red, fleshy structure called **arillus** forms around them.

Taxus baccata
**(Yew, European Yew,
Porsuk ağacı)**

**Red colored arillus is edible.
However, other parts of the tree
including the seeds are
poisonous.**

***Taxus brevifolia* (Pacific Yew, Western Yew)**

Grows in Americas.

A substance called **taxol found in the barks of this species has antitumoral activity.**

Order: Pinales

Fam: **Pinaceae (Pines)**

Most important properties of *Pinus* species:

- Acicular leaves, 6-15 cm long
- Leaves are single on elongated shoots and double on dwarf shoots
- Cones fall down when mature
- Seeds are winged
- Resin channels are found in the trunk and the leaves

Pinus pinea

(Stone pine, Umbrella pine,
Fıstık çamı)

Grows in Mediterranean
climate.

**Cultured due to its
seeds in the
Mediterranean
countries.**

Seeds are called **Pine nut**;
endosperma is rich in oil and
used as condiment.

The tree resembles an
umbrella, that's why it is
called "Umbrella Pine"

Pinus halepensis
(Aleppo Pine, Halep Çamı)

Pinus brutia
(Turkish pine, Kızıl çam)

**Grows in the
Mediterranean,
especially at the coasts**

Terebinthina

An **oleoresin** is collected from **V** shaped cuts that are made on the trunks of *Pinus brutia*.

This oleoresin is called **Terebinthina** (T.K.).

Contains 10-30% volatile oil and 70-90% resin. When left in open air, most of the volatile oil evaporates, and the resin called colophonium is left behind.

From this oleoresin, a volatile oil called **Oleum Terebinthinae (T.K.)** is obtained

The remainder is again Colophonium (resin).

Oleum Terebinthinae is used in the preparation of pommades, insecticides, perfumes.

Usage: to relieve rheumatoid pain (externally). Painkiller, respiratory and urinary tract antiseptic in veterinary medicine.

Colophonium (T.K.),.

**Used in the preparation of plasters,
disinfectants,
soap industry,**

And used against sliding in sports.

Pinus nigra

(Black pine, Karaçam)

**Grows in mountainous regions
and above certain altitudes.**



Pinus silvestris
(Yellow pine, Sarıçam)



Buds of this tree are used as diuretic and expectorant under the names **Turio Pini, Turiones Pini.**

Contains resinous substances and volatile oil.

Dry distillation of the woods yield a tar called **Pix Pini which is externally used in skin disorders.**

Bark of the trunk and the branches contain plenty of substances called **tannins.**

P. brutia and *P. nigra* wood (trunk and branches) also yield a drug called **Pix Pini (Pix Liquida, Pine tar)**.

Usage: Respiratory and urinary tract disorders and especially used for skin disorders of animals.

Pinus griffithii
**(Griffith Pine, Ağlayan çam,
Himalaya çamı)**

Grows in Himalayas between the altitudes of 1600-4000 m, carries 5 leaves on the dwarf shoot. Resin drops are found on the cones, that's why this plant is called **Ağlayan çam (crying pine)**. Terebinthina is obtained from this species in Pakistan.

Pinus succinifer is a tree containing vast amount of resin that used to grow in the Baltic coasts.

Fossilized resin of this species is called **Succinum (amber)**, and used in the making of ornaments.

Barks of the trunks of various pine species (**Cortex Pini**), are rich in tannins and are used as dressing in leather industry.

Yellow colored mature polens of pine trees called **Sporae Pini**.

They are used as tonic due to the vitamins, enzymes etc. that they contain.

Fresh leaves of pine trees yield a colorless, pleasant smelling, pungent volatile oil called **Oleum Pini** which is used as antiseptic, sedative and expectorant. Also used in rheumatoid pain externally.

Abies sp. (Fir, Gökmar, Kökmar)

Abies nordmanniana
(Nordmann fir)

Abies bornmuelleriana
(Bornmueller's Fir, Turkish Fir, Uludağ Gökmarı)

Abies cilicica
(Cilician Fir, Toros Gökmarı)



Abies alba

(Silver Fir, European Silver Fir,
Avrupa Göknarı)

Oleum Abietis

(göknar esansı) is obtained from the leaves.

Also used to obtain Terebinthina in **France**.

***PICEA* sp.**

(Spruce, Ladin)

Picea orientalis (Oriental Spruce, Doğu Ladini)



***CEDRUS* sp.**

(Cedar, Sedir)

Cedrus libani

(Lebanon Cedar, Lübnan Sediri)

***Leaves of C. libani, Folia Cedri (Cedri folium)* are used in perfumery due to the volatile oil that it contains.**

In addition, a tar is obtained from the trunk and branches of the tree called *Oleum Cedri (Cedri oleum)*, **Yellow tar; used internally for urinary tract disorders and used externally for skin disorders as antiseptic.**

Larix decidua

(European Larch, Avrupa Melezi)

Yields Terebinthina
called **Terebinthina
Laricina** (Venice
Terebinthina),
contains 20% volatile
oil, 60-65% resin.

Fam: Taxodiaceae (Bald Cypress Family)

Sequoiadendron giganteum
(Giant tree, Giant sequoia,
Sekoya)

*** *Sequoia* species are
now classified under the
Cupressaceae family

Taxodium distichum
(Bald Cypress, Swamp Cedrus, Bataklik Servisi)

Fam: **Cupressaceae (Cypress Family)**

In the form of trees or shrubs.

Female cone sometimes has wooden scales or is in the form of a fleshy bacca.

***JUNIPERUS* sp.**

(Juniper, Ardiç)

- Female cone is in the form of a berry type fruit.

Juniperus oxycedrus

(Pix Juniper, Katran Ardıcı)

Dry distillation of the
branches yield **Pix Juniperi**
(T.K.) (**Oleum Cadinum**).

This tar is strongly antiseptic and is used externally for skin disorders, scabies*, eczema, alopecia***.**

(*scabies; relatively contagious infection caused by a tiny mite (Sarcoptes scabiei;

****eczema: An acute or chronic noncontagious inflammation of the skin, characterized chiefly by redness, itching, and the outbreak of lesions that may discharge serous matter and become encrusted and scaly.**

*****alopecia: hair loss)**

Juniperus nana (Dwarf juniper, Cüce Ardıç)

Juniperus communis

(Common juniper, Adi ardıç)



Two drugs are obtained from this species:

Fructus Juniperi (Juniperi pseudo-fructus) T.K. Contains bitter substances, has tonic and stomachic activity. Used in hypertension.

From these plants, a volatile oil, **Oleum Juniperi (Juniperi aetheroleum)** is obtained by steam distillation, has diuretic and emmenagogue activity.

(tonic: an invigorating, refreshing or restorative agent or influence; stomachic: stimulating digestion in the stomach; diuretic: tending to increase the discharge of urine; emmenagogue: a drug or agent that hastens menstrual flow)

Juniperus drupacea (= *Arceuthos drupacea*)
(Brushwood, Andız)

A molasse is prepared from the fruits (Andız pekmezi)

In some *Juniperus* species with bacca type fruits, the leaves are like scales and are imbricately arranged.

Juniperus sabina

(Savin Juniper, Savin, Sabin ardıcı)

Branch tips form the drug **Summitates Sabinae** and **Oleum Sabinae** is obtained from this drug. Emmenagogue in low doses, however leads to abortus in high doses.

(abortus: expulsion of a fetus from the womb, especially prior to the 20th week of pregnancy)

Juniperus foetidissima

(Stinking Juniper, Kokar ardıç, Koca ardıç)

Juniperus excelsa

(Greek Juniper, Yüksek ardıç)

Juniperus virginiana

**(Eastern Juniper, Pencil Cedar, Red Cedar,
Kurşunkalem Ardıcı)**

Yields Oleum (Ligni)

**Cedri (sedir yağı) and is
used as immersio oil in
microscopy.**

In two genera of the *Cupressaceae* family plants, the female cone is made of wooden peltate scales.

Cupressus sempervirens (Cypress, Italian Cypress, Akdeniz Servişi)

Unripe cypress cones are rich in **tannins**.

Used for circulatory problems, especially for hemorrhoids and varicose veins.

Oleum Cupressi is obtained from the fresh branches of the species and has antiseptic and antispasmodic activity.

(antiseptic: capable of preventing infection by inhibiting the growth of microorganisms;
antispasmodic: relieving or preventing spasms, especially of smooth muscle)

Thuja occidentalis

(Eastern White Cedar,
Arborvitae, Batı mazısı)

Young branch tips, **Summitates Thujae**
has astringent, diuretic and
emmenagogue activity, however this
drug is also toxic.

Thuja orientalis (Oriental Arborvitae, Doğu mazısı)

(Oriental Arborvitae, Dođu mazısı)



Class: Gnetales
Fam: Ephedraceae
(Ephedra Family)

These plants are in the form of shrubs.

Ephedra campylopoda
(Ephedra, Denizüzümü)

Ephedra major

Ephedra distachya

Herba Ephedrae (Ephedrae herba): Green branches of *Ephedra* species. Contains **ephedrine** (alkaloid)

Respiratory stimulant.

