

# Plant Taxonomy

## Lec. 1

### **Classification of Living things.**

Classification is dividing the living things into many groups according to their similarities and differences classification is studied by taxonomy.

**Taxonomy:** A field of science dealing with

1. Identification      2. Nomenclature      3. Classification of objects and description of the variation of organisms (plants).

From ancient Greek = Taxo \_\_\_\_ means arrangement

Nomos \_\_\_\_ method or Law

### **Identification:**

is the recognition of certain characters of plant (flower, fruit, Leaf or stem) and the application of a name of a plant with those particular characters. Recognition occurs when the specimen plant.

If comparison of the specimen with all similar species reveals that it differs from them. It may be named as a new species.

### **Nomenclature:**

Is the application of names to taxa in accordance with the International code of Botanic. Nomenclature, (ICBN)

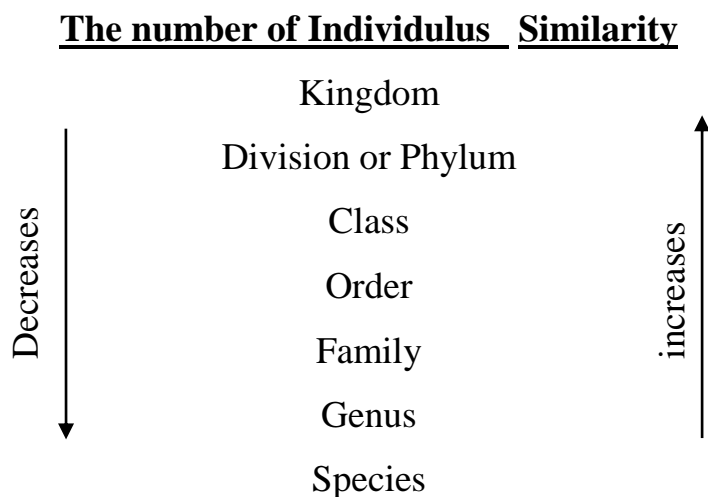
**Classification:** is the placing of plant (or groups) in categories according to a particular system. The biggest category is a kingdom and the smallest category is a species each kingdom is divided into lower categories as follows.

Kingdom → Division or Phylum → Class ↓

Species ← genus ← family ← order

From kingdom to species, the following are observed:

1. Number of group decreases.
2. Number of members decreases.
3. Similarities in organisms increase.



### **Experimental taxonom: or Biosystematic**

Is the taxonomic study of organisms from the stand point of population rather than individuals and the evolutionary processes. Within population, it is largely concerned with, genetical, cytological, pollen grains, anatomical and ecological.

Bio = life \_\_\_\_ systematic = an arrangement of things into groups.

### **Classical taxonomy:**

Relies on morphological and anatomical data and can be carried out in the herbarium and laboratory.

### **Taxon:** (Plural Taxa)

Is a term applies to any taxonomic group at any Rank. For example (species, genus or family .... etc).

### **Flora:**

Is a book or other work describing flora of a given area and usually providing means of Identifying the taxa contained in it.

### **Monograph:**

Is a comprehensive taxonomic treat is normally treating a family or genus on a world- wide basic. A monograph includes a complete synonym description, detailed listing of ecological, geographical, cytological, chemical keys and description maps.

**Revisions:**

Is differ from monograph, is less comprehensive monograph and the systematic treatment is less complete.

**Manual:**

Is a book that provides keys and description to aidin Identifying plants.

## **Lec 2:**

# **Relationship of Plant taxonomy with other Sciences**

### **1- Morphology:**

The study of External structure characters of the plant. Is The branch of biology that deals with form and Structure of all parts of the plants (root, stem, leaves, flower fruit and seeds).

### **2- Anatomy:**

Is the branch of biology concerned with the study of the structure of organisms and their parts (all parts of the plant).

### **3- Ecology:**

Is the study of the relationship between plants and the physical environment.

### **4- Palynology:**

The study of pollen and spores. The taxonomic characters of pollen grains include cell structure, type, polarity, symmetry, shape and grain size.

### **5- Embryology**

The study of successive stages of sporogenesis, gametogenesis, and growth and development of the embryo and seed coat.

### **6- Cytology**

The study of the cells, use chromosome number, Morphology, polyploidy called (cytotaxonomy) chromosomes pairing or behavior at meiosis and Mitosis.

### **7- Numerical taxonomy**

Is a classification system developed for multivariate analysis. Using mathematical formula based on algorithm like cluster analysis.

**8- Chemical taxonomy (Chemotaxonomy):**

This study deals with the chemical character based on similarities and differences in biochemical composition.

**9- Paleobotany:**

Is the study of fossil plants which are generally found buried below ground.

**10-Genetic:**

Is a branch of biology that deals with the study of genes, genetic variation and heredity in plant.

## **Plant Taxonomy**

### **Lec:3**

Plant taxonomy uses Morphological and anatomical characters for the purposes of classification

Structures are observed with the eye, hand lens, or light microscopic or by using scanning electron microscope (SEM).

For classification purposes there is increase use of evidence from fields such as:

Cytology, palynology, paleobotany, Biochemistry Genetics, Ecology, geographical distribution, Embryology and ultra structure.

**Characters:** one features possessed by the organism that may be compared, Measured, Counted, described or assessed.

### **quantitative characters:**

Are these features that can be counted or measured, example: leaf length, number of stamens,.....etc.

### **Qualitative characters:**

Are such as the colour of the flower, leaf shape, or pubescence.....etc.

The good characters which are not affected by the environmental and relatively constant through the population of the taxa.

## **History of Plant Taxonomy**

Classification of organisms have been started from the beginning of human existence basing on their need food and medicine.

Historical taxonomy divided into four periods, each marked by a characteristic principle of the plant.

### **Periods 1**

In this period the scholars of the Greek and Romans were described the plants according to the characters of the plant. The famous scholars of this periods are:

#### **Aristotle (384- 322 B.C)**

Was the first man classify all living things, into groups. He classified plants as herbs, shrubs and trees.

#### **Theophrastus (370- 285 B.C).**

Was the father of botany, a student of Aristotle, classified plants only about 480 taxa, using most obvious characters of gross morphology (Tree- shrubs- subshrubs- herbs) also he recognized differences based on superior and inferior ovaries, and type of fruits.....etc.

### **Carolus Linnaeus (1707- 1778).**

A Swedish naturalist he was professor of medicine and botany. He proposed a system of classification which was published in his system nature "1753" in his system he used characters of stamens: ie.

The number and nature of stamens to distinguish the 24 classes in which he divided the plant kingdom he also used the number and nature of carpels to distinguish the order. i. e. subdivision of his class the published many botanical works of the (species- plantarum). Out lines of the system contains:-

- number of stamen 1,2,3,4.....10.
- didynamous 2+2 stamens.
- Tetradynamous 2+4 stamens.
- Monadelphous- Diadelphous, polyadelphous.
- Syngenesia.
- Gynandria
- Monocious- Dioecious.
- Polygamia.
- Cryptogamia- Non flowering plants.

### **Dioscorides (40-90 A.C)**

Was a Greek physician who interested in the medicinal properties of plants described about 600 taxa.



### **Andrea caselapino (1519- 1603)**

Was classified about 1500 species mainly on the basis of growth-habit (Trees, shrubs, herbs), and fruit and seeds, woody, herbaceous.

### **John Ray (1628- 1705)**

Was the first scholars recognize 2 major taxa of flowering plants. He also tried to group the plants in several families which he called classes.

#### **I. Herbae**

i) imperfect (non flower plants).

ii) perfect (flowering plants).

1- Mono Cotyledonae (with one cotyledons).

2- Dicotyledonae (with two cotyledons).

#### **2- Arborae**

1. Monocotyledon (with one cotyledons).

2. Dicotyledonae (with two cotyledons).

## **Plant Taxonomy**

### **Lec: 4**

#### **De Jussieu (1748-1836)**

Hedevided plants into three groups are:

- 1) Acotyledoncs → Non flowering plants.
- 2) Mono cotyledons
- 3) Dicotyledons.

Within the last two groups he used many of the familiar characters (Superior, inferior ovaries, stamens free and attachment to corolla, free petals... etc).

#### **De Candolle (1778- 1841).**

Out Line System of Classification is:

##### **I- Vasculars (Vascular plants)**

- i) Exogenae (Dicotyledons, Coniferales).
- ii) Endogyeanae (Monocotyledons, Cycadales).

##### **II- Cellulares (Thallophytes, Bryophyta).**

Plant without vascular bundles (absent)

#### **Bentham and Hooker (1800-1884).**

Out Lines of System

##### **i- dicotyledones**

- a. polypetalous (chori petalous)
- b. gamopetalae (sympetalous)
- c. monochlamydeae (apetalous)

##### **ii- gymnospermae**

##### **iii- monocotyledones**

**August W. Eichler (1829- 1887).**

Out Lines of System

**1. Oryptogamae**

- a. Thallophytes
- b. Bryophytes
- c. Pteridophytes

**2. Phanerogamae**

- a. Gymnospermae
- b. Angiospermae
  - 1. Mono cotyledonae
  - 2. Dicoty ledoaes
    - i) Choripetalous
    - ii) Sympetalous

**Adolph Engler (1844- 1930)**

Out Line of the System is:

Division: Embryophytae

Subdivision: Gymnospermae

Subdivision: Angiospermae

Class: Monocotyledonae.

Class: Dicotyledonae.

Subclass: Archichlamydeae

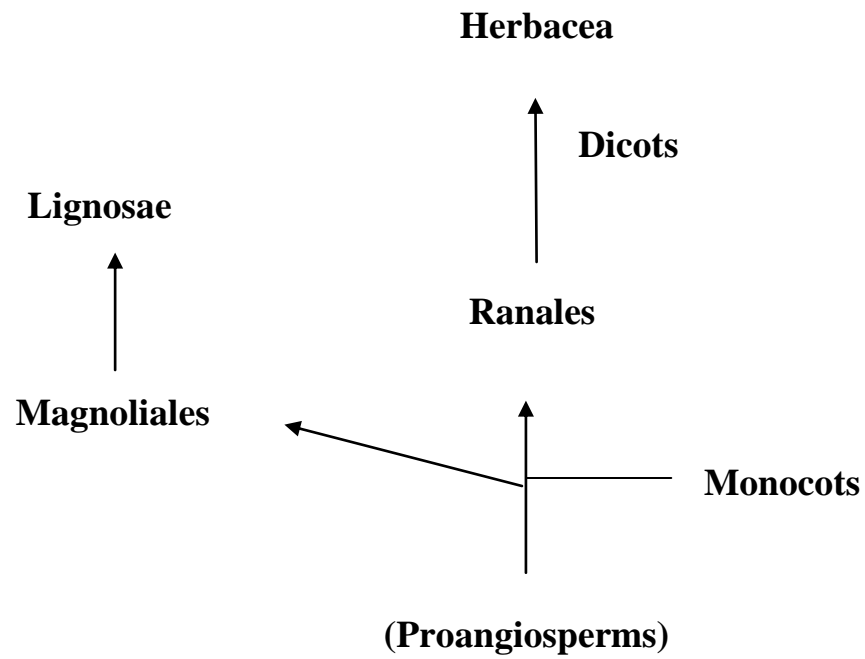
i) Apetalae

ii) Choripetalae

Subclass: Metachlamydeae

**John Hutchinson (1884-1959)**

Outline of the System is:



# **Plant Taxonomy**

## **Lec: 5**

### **Classification System**

#### **1- Artificial System**

Is one that classifies objects together on the basis of only single or fewer characters and the characters do not show any relationships to help in establishing evolutionary and phylogenetic.

Some times group plants using color of their flower or their growth form (herbs, shrubs, trees).

This system was used by Aristotle (384-322 BC) Linnaeus (1707-1778), Theophrastus (370-282 BC) and John Ray (1628-1705).

#### **2- Natural System**

Group of plants with many of the diagnostic characters which show relationships among the species and find out the phylogeny among the taxa.

Taxonomic floras for example: Identify Species, genera, and families by listing as many characters as possible concerning, (anatomy, Morphology, genetic, ecology, biochemistry, pollen grains, cytology, and geographical distribution).

This System was used by De – Jussieu (1748-1836) and De – Candolle (1778-1841).

#### **3- Phylogenetic System**

Is Natural classification that try to identify the evolutionary history of natural groups.

This system was used by August. W. Eichler (1829-1887), Adaph Engler (1844-1930) and John Hutchinson (1884-1959).

This system based on morphological characters, Natural affinities and evolutionary sequence and genetic in addition to fossil records.

## **Lec 6**

### **Nomenclature**

Nomenclature: is a system of names, or the rules for forming these terms in a particular field of arts or sciences.

#### **Types of Nomenclature:**

##### **1- Common Names:**

The earlier day common or vernacular names were used which generally changes with change language, and gives great trouble to a plant collector in foreign country, there he feels the local name to be more difficult than the botanical names.

#### **Advantages:**

It is easy of usage and common understanding in certain geographical areas.

#### **Dis advantage:**

- 1- A single species of plant might have several extra common names.
- 2- Many species that are rare or lack economic importance don't have a common name.
- 3- Don't give clear idea about the relationships of the plant with other plants.

##### **3- Phylogenetic System**

Is naturally Classification that try to identify the evolutionary history of natural groups.

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### 3- Binomial Nomenclature

Carolus Linnaeus devised binomial System of Nomenclature – The scientific name of an organism composed of two Latin words. The first words is called genus (= generic name) followed by the second words called species (Specific Epithet)

**For example: *Vicia Faba* L.**

- 1- These names should be in italics when printed or separately under lined when hand written.
- 2- The genus starts with capital letter, while species in small letter.
- 3- The name of the author written at the end of the scientific name.



## **Genus (Plural Genera)**

Is a class of similar things especially a group of plants or animals that includes several character closely related species.

### **Species**

A group of individual plants that is fundamentally alike is generally treated as species.

Species should be separated by distinct morphological differences from other closely related species.

### **Generic Name**

Monotypic : for example *Ginkgo*, *Cocos*, *Amaryllis*.

Polytypic : for example *Vicia*, *Brassicca*, *Solanum*.

Derivation of Generic Name :

- From Authors :example
- *Theophrasts*
- *Caselpinia*
- *Linnaea*
- *Nicotiana*
- From Characters of plant :example
- *Xanthoxylum*
- *Trifolium*
- From Language :example
- *Tsuga*
- *Ginkgo*
- *Catalipa*
- *Saccharum*

Deveration of specific Epithet

From country :example

*Coffea arabica*

*syriaca*

*chinensis*

*japonica*

*canadensis*

*africana*

**From characters of plant: example**

*rubra*

*alba*

*nigra*

*latifolia*

*angustifolia*

*grandiflora*

*nana*

*gigantea*

*crassa*

*tenuis*

*repens*

*aquatic*

*vulgaris*

*rara*

*sativus*

*tomentosa*

*spinosa*

*toxicaria*

Lec. 8

## **Major and Minor Cratogrie**

### **Major Cratogries**

1.Division or phylum

2.Subdivision

3.Class

4.Order

5.Family

### **Minor Cratogries**

Genus

Subgenera

Section

Subsection

Series

Subseries

Species

Subspecies

Variety

Sub variety

Form

Sub form

Clone

The Spermatophytes which means seed plants are some of the most important organisms on earth seed plants have true roots, stem ,leaves

and flowers: They also contain vessels which allow movement of fluids., carrying water and nutrients to the different parts of the plant.

### **The end of Major Taxa:**

Order-ales

Sub order- ineae

Family-aceae

Subfamily-oideae

Tribe-eae

Subtribe-inae

### **The name of the Common Families:**

Old name	New name(ICBN)
1.Palmae	Arecaceae
2.Gramineae	Poaceae
3.Cruciferae	Brassicaceae
4.Leguminosae	Fabaceae
5.Labiatae	Lamiaceae
6.Compositae	Asteraceae
7.Umbelliferae	Aminaceae
8.Guttiferae	Clusiaceae

ICBN

I-International

C-Code

B-Botanical

N- Nomenclature

## Lec.9

### Type

Type: Is a particular specimen of an organism to which the scientific name of that organism is formally attached.

Type specimen: Generally species are described by taxonomists based on type specimen and the details published in a scientifically recognized publication. A type specimen might be dried and is usually kept in museum or herbarium.

There are several kinds of type specimen:

Such as:

**Holotype:** A specimen designated by the author in the original publication (nomenclatural type).

**Isotype:** A duplicate specimen of the holotype collected at the same time and place (may be in other herbarium).

**Paratype:** A paratype is any of one or more specimens other than the holotype listed as representative and used for the development of the original description of a species or subspecies.

**Syntype:** The specimen which is the basis of new taxon when no holotype is designated by author is known as syntype.

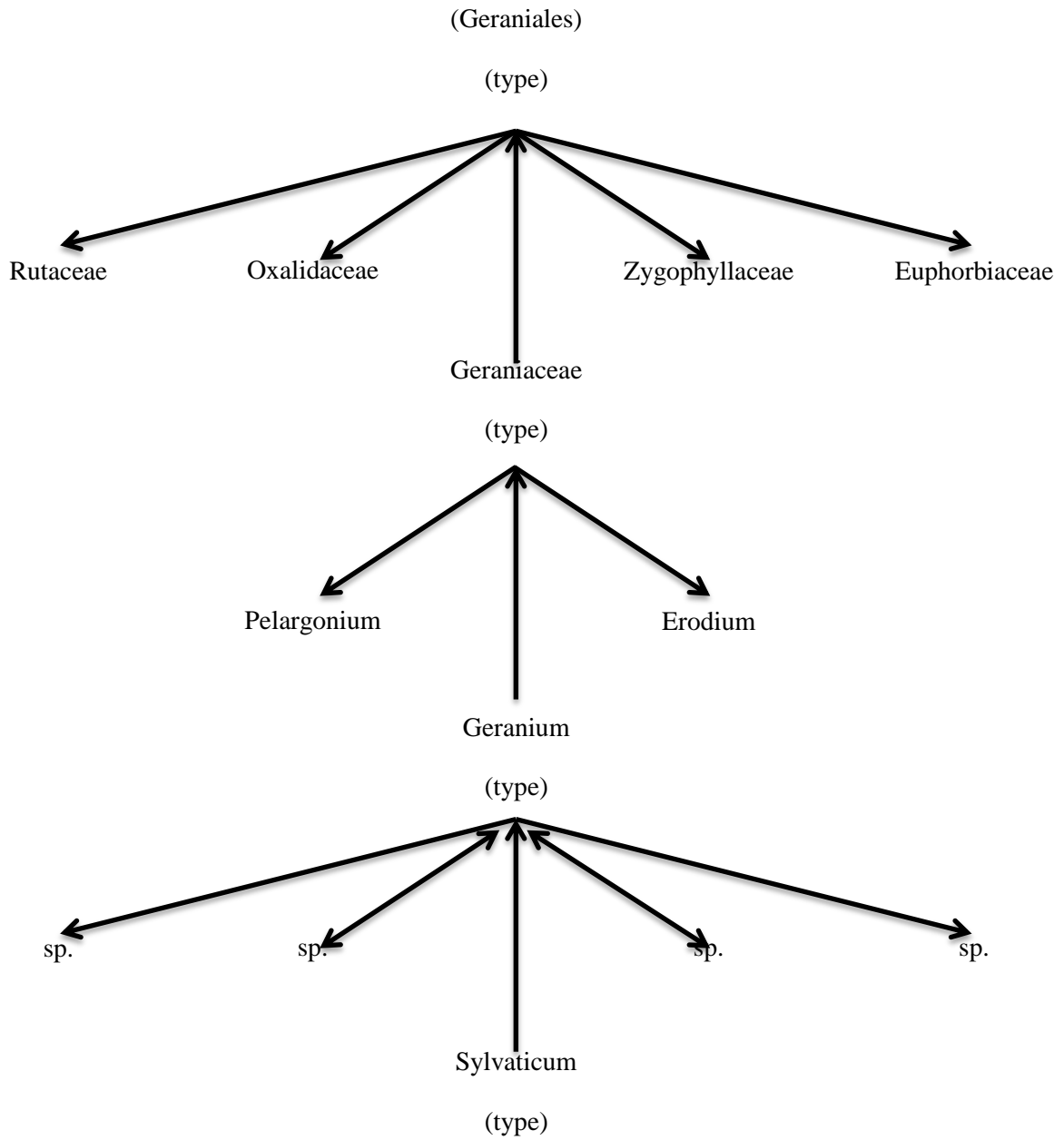
**Lectotype:** A specimen chosen from the author's original material when no holotype has been designated.

**Neotype:** A specimen selected when all original specimens have been lost.

**Topotype:** When no original type material is available and a specimen is collected from type locality is chosen to serve as type it is called Topotype.

## Example: for the Type

Plant: *Geranium sylvaticum*



## **Lec. 10**

### **Spermatophyta**

The Spermatophytes which means seed plants" are some of the most important organisms on earth seed plants have true roots, stem, leaves and flowers: They also contain vessels which allow movement of fluids., carrying water and nutrients to the different parts of the plant.

#### **Characteristics of Seed Plants**

- 1- Seed Plants are the most complex group of plants.
- 2- They have root, stem, leaves and cones or flowers.
- 3- They reproduce sexually and a sexually.
- 4- They produce seeds.
- 5- Their size ranges from a few millimeters to 100 meters.
- 6- There are 260,000 existing species which belong to spermatophyta.

#### **Seed Plants Divided into Two Groups**

- 1- Class: Gymnospermae.
- 2- Class: Angiospermae
- 1- Gymnospermae:

Gymnosperm mean "naked seed". This is because the seeds do not develop enclosed within an ovary but are usually exposed on the surfaces of reproductive structures, such as cones, Gymnosperms have seed but not fruits or flowers. This group includes all the conifers, such as pines .

#### **Characteristics of Gymnosperms**

- 1- Gymnosperms produce seed that develop in cones instead of a flower.
- 2- Most of them have needle like leaves.
- 3- They are evergreen, trees or shrubs, perennial.
- 4- They are woody plants.
- 5- Root Tap roots.

- 6- Seed have 2- or many 2-14 cotyledons.
- 7- Ovules naked not enclosed in carpel.
- 8- They are pollinated by the wind.
- 9- Have vascular tissue, xylum, doesn't have vessels and the phloem have no companion cells and sievetubes.
- 10-The seed contain endosperm that stores food for the growth.

## 2- Angiosperms (Flowering Plants)

Angiosperms are vascular flowering plants, They have stems, roots, and leaves, All flowering plants produce flowers. Maybe herbaceous plants as well as woody plants. Pollination take place by insect, wind, water and animals.

The angiosperms are classified in to (2) groups. These are monocotyledons (monocots) and dicotyledons (dicots).

Dicotyledons		Monocotyledons	
1	Seed embryo with two cotyledons	1	Seed embryo with one cotyledons
2	Flowers parts usually in 4 or 5 or multiples thereof	2	Flowers parts usually in (3) or multiple thereof
3	Veins of leaf usually Reticulate	3	Veins of leaf usually parallel
4	Primary vascular bundles of stem in ring	4	Primary vascular bundles of stem in scattered
5	Vascular cambium for secondary growth present	5	Vascular cambium for secondary growth absent
6	Root system characterized by a large taproot with branch roots growth from it	6	Root system characterized by adventitious roots (fibrous roots)
7	Pollen grains usually having 3 or more pores or furrows	7	Pollen grains having only one pore furrow bundle







## Order: Coniferales

### Family: Pinaceae (Pine family)

The family consist of evergreen trees and shrubs They grow throughout the northern hemisphere most of them survive in temperate and cold regions but some are only found in warm or subtropical climates. Contain 220- 250 species.

The Characteristics of the family Pinaceae

Plants are trees or shrubs, grow in form 2-100 meter, it mostly evergreen. Monoecious, (linear or needle- like) leaves, the embryo have (3-24) cotyledons.

The female cones are large and usually woody (2-60cm) long with numerous spirally arranged scales and two winged seed on each scale.

The male cones are small (0.5- 6.0 cm) long and fall soon after pollination by wind or by birds from some species.

### Family pineaceae Contains the genus:

*Pinus, Larix, Tsuga, Abies. Picea Cedrus.*

Example species: أمثلة

*Pinus brutia*  
*Pinus halepensis*

صنوبر زاويتا  
صنوبر حليبي

*Pinus pinea*  
*Cedrus libanotica*

صنوبر ثمري  
الارز اللبناني



## ترجمة مصطلحات المحاضرة:

Family:	العائلة	Different:	مختلف
Includes:	تضم	Branches	الافرع
Genera:	أجناس	Spherical	كروي
Distributed	تنتشر	Pairs	زوج
Especially:	خاصة	Woody	خشبي
		Leathery	جلدي
		Contains	تضم
		Growing	نامية

Northern hemisphere: نصف الكرة الارضية الشمالي

Rarely:	نادراً	Reproductive	تكاثرية
Shrubs:	شجيرات	Strctures	التركيب
Trees:	أشجار	Cones	مخاريط
Evergreen	دائمة الخضرة	Borne	تتكون
Monoecious	احادي المسكن	Generally	عامة
Spreading:	منتشرة	tip	قمة

Scale like	بشكل حراشف
	لون اخضر
Dark green	غامق
Male	ذكرية
Female	انثوية

## Order: Coniferales

### Family: Cupressaceae (Cypress family) العائلة السروية

The plants of this family are trees or shrubs, ever green, and monoecious. Distributed in the Northern hemisphere. Branches ascending or horizontally spreading.

The leaves are needle- like from young plants becoming small and Scale- like on mature plants Pollen cones length 4-8 mm. seed cones. Yellowish gray, woody, or leathery or in the genus *Juniperus* berry- like and fleshy, the seeds are mostly small and somewhat flattened with two narrow wings and other genera wingless. the seedlings usually have two cotyledons but, in some species up to six.

The family Cupressaceae includes 30 genera and 133 species.

Example species

<i>Cupressus</i>	<i>Sempervirens</i>	السرو
<i>Juniperus</i>	<i>Oxycedrus</i>	العرعر

*Thuja Orientalis*

الثويا الشرقي

## **Lec 12:**

Order: Brassicales

Fam: Brassicaceae (Cruciferae)

(The Mustard Family)

Habit: Annual, biennial or perennial herbs.

Root: Taproot, Swollen due to food storage in different manners,  
Commonly used as a food.

Stem: Herbaceous, Woody erect, branched, Cylindrical.

Leaves: Simple, exstipulate, alternate, entire smooth, and hairy.

Inflorescence: Raceme or Corymb.

Flower: Bisexual, Pedicellate, complete, actinomorphic, tetramerous, and  
hypogynous.

Calyx: 4 free sepals, arranged in 2 whorls imbricate aestivation.

Corolla: 4 petals, polypetalous, valvate or imbricate aestivation.

Androecium: 6 stamens, in two whorls, tetradynamous 2+4, dehiscent  
with pores longitudinally, basifixed.

Gynoecium: Bi carpellary, syncarpous, ovary superior, unilocular but  
becoming bilocular due to the development of a false septum or replum,  
parietal placentation, styl short, with two stigmas.

Fruit: Siliqua or silicle.

Seed: with a large embryo.

### **Floral Formula:**

$\oplus$ , ♀,  $K_{2+2}$ ,  $C_4$ ,  $A_{2+4}$ ,  $\underline{G}_{(2)}$ , parietal pla.

### **Economic Importance of the Family:**

- 1- Food – various species of Brassica are used widely as green vegetables.
- 2- Oil – Different species of Brassica are utilized for oil.



3- Dye.

4- Ornamentals, Species are widely grown in gardens for their beautiful flowers ex. *Alyssum*.

5- Medicines.

### **Diagnostic Characters of the Family:**

1- Flowers, Corolla, tetramerous, cruciform shape with claw.

2- Stamens (6) tetradynamous (2+4).

3- Ovary bilocular, with false septum.

4- Fruit a siliqua or silicula.

### **Plant Example:**

*Brassica oleracea* var. *Capitata* لهانة

*Brassica oleracea* var. *Botrytis* قرنابيط

*Brassica nigra* خردل

*Raphanus sativus* فجل

*Alyssum* sp. ورد الفضة

## **Lec 13:**

### **Plant Taxonomy**

Order: Ranales

Family: Ranunculaceae

Habit: Annual or perennial herbs, rarely shrubs and trees.

Root: Taproot or adventitious.

Stem: Herbaceous, erect, branched.

Leaves: Mostly alternate, simple, exstipulate or compound palmate.

Flower: Bisexual, actinomorphic or zygomorphic Bracteate, pentamerous, spiral, hypogynous.

Calyx: 5 sepals, polysepalous, imbricate.

Corolla: 5 petals, caloured, imbricate polypetalous.

Androecium: Many stamens, polyandrous, spirally arranged, anther, 2 – celled, basifixed. Dehiscing longitudinally.

Gynoecium: Polycarpellary, ovary one – celled superior, parietal placentation. Style short with simple stigma.

Inflorescence: Mostly of cymose type, but maybe solitary or racemose.

Fruit: Aggregate, Usually an etaerio of achenes, follicles, or drupelets.

Seed: Small, with Endosperms and small embryo.

### **Floral Formula:**

$\oplus$ , or %,  $\text{♀}$ ,  $K_5$ ,  $C_5$ ,  $A_\infty$ ,  $\underline{G}_\infty$ , parietal pla.

### **Economic Importance:**

1- Ornamentals.

2- Medicines.

### **Diagnostic Characters:**

- 1- Many Stamens, polyandrous, spirally arranged.
- 2- Gynoecium polycarpellary.
- 3- Fruits Aggregate.

### **Example:**

*Ranunculus spp.* شقيق

*Anemone spp.* انيمون

*Nigella sativa* حبة سودة

*Delphinium spp.* لسان الطير والعصفور

## Lec 14:

### Plant Taxonomy

Order: Asterales.

Fam: Asteraceae (Compositae).

Habit: Almost herbs but a few are shrubs and trees.

Root: Tap root, branched but rarely root – tubers are produced by a few plants such as Dahlia.

Stem: erect, hairy, milky latex present.

Leaves: Simple, rarely compound, alternate or whorled, exstipulate.

Inflorescence: Capitulum (head), consisting of rays and disc florets, which is surrounded by an involucre.

Flowers: Bracteate, bisexual or unisexual, complete or incomplete actinomorphic or zygomorphic and epigynous.

Calyx: Reduced to a few rings of scaly or hairy called as pappus.

Corolla: 5 petals, gamopetalous, tubular, actinomorphic in the disc florets and ligulate or zygomorphic in ray florets.


Androecium: 5 stamens, epipetalous, filament separate, but anthers united to form a tube (Syngenesious) around the style.

Gynoecium: Bi carpellary, syncarpous, ovary inferior, unilocular, with a single ovule. Basal placentation.

Fruit: Achenial, called cypsela.

Seed: with Straight Embryo.

### Flora Formula:

Ray florets:  $\infty$ , ,  $K(p), C_{(3)}$ .

Disc florets:  $\oplus$ , bisexual,  $K_{(p)}, C_{(5)}, A_{(5)} G_{(2)}$  Basal plac.

### **Economic Importance of the family:**

- 1- Food, the leaves of *Lactuca sativa*.
- 2- Ornamentals, *Calendula*, *Aster*.
- 3- Dye, flower of *Carthamus*.
- 4- Oil, *Helianthus annuus* extracted from seeds.
- 5- Medicines, *Matricaria chamomilla*.

### **Diagnostic Characters:**

- 1- Inflorescence capitulum.
- 2- Flowers consist of two florets, Ray and disc florets.
- 3- Calyx pappus.
- 4- Stamens united as tube (Syngenesious).
- 5- Fruit cypsela.

### **Examples:**

*Helianthus annuus* زهرة الشمس

*Lactuca sativa* الخس

*Calendula sp.* الاقحوان

*Matricaria chamomilla* البايون

*Gazania sp.* الكزانيا

*Gundelia sp.* الكعوب

## Lec 15:

### Plant Taxonomy

Order: Rosales.

Family: Rosaceae.

Habit: Plants annual or perennial herbs, shrubs or trees, some time climbers.

Root: Tap root and branched.

Stem: Herbaceous or woody.

Leaf: Simple or compound, alternate, stipules present, petiolate.

Inflorescence: Flowers may be solitary, grouped into racemose or corymbs or cymose type.

Flower: Bisexual, actinomorphic, perigynous, hypanthium mostly present.

Calyx: (5): Sepals, gamosepalous, the aestivation may be valvate or imbricate.

Corolla: (5) Petals or multiple of (5), free with imbricate aestivation.

Androecium: many stamens, free from many cycles, the anthers small 2-celled dehiscent longitudinally.

Gynoecium: it consists of one compound pistil, or many simple pistils, the number (1-5) or many carpellary, apocarpous or syncarpous, ovary superior or inferior ovule with placentation.

Fruits: An etaerio of achene, apome, drupe, berry follicle, an etaerio of follicle.

Seeds: Mostly Non – endospermic.

Floral Formula

$\oplus$ ,  $\text{♀}$ ,  $K_{(5)}$ ,  $C_{5+5+5 \dots \infty}$ ,  $A_{1 \dots \infty}$ ,  $\underline{G}_{1 \dots \infty}$ , or  $\overline{G}_{(5)}$  Central plac. or

Axile plac.

### **Economic Importance of Family:**

- 1- The family gives alarge number of edible fruits, prunus, pyrus, frugaria.
- 2- Ornamental plants, Rosa.
- 3- Medicines value.

### **Diagnostic Characters of the family:**

- 1- Flowers perigynous.
- 2- Ovary superior or inferior.
- 3- Stipulate present.
- 4- Stamens many.

### **The Family divided into six subfamilies (3) mostly Commene:**

- 1- Pomoideae: ovary inferior (2-5) carples fruits, pome.
- 2- Prunoideae: ovary superior fruits drups or berries.
- 3- Rosoideae: ovary superior fruits Aggregate.

### **Plant Examples:**

*Rosa japonica* ورد ياباني

*Pyrus malus* تفاح

*Prunus amygdalus* لوز

*Crataequs azarolus* زعرور

*Pyrus communis* الكمثرى

## **Lec 16:**

### **Plant Taxonomy**

**Class: Dicotyledonae**

**Order: Geraniales**

**Family: Geraniaceae (Geranium family)**

Habit: Mostly Herbaceous plants, Sometimes Shrubby.

Root: Tap root, branched.

Stem: Often fleshy, Erect.

Leaf: Alternate or opposite, Compound or Simple, lobed or divided, the venation mostly palmate, stipules present.

Inflorescence: Cymose or Umbellate.

Flowers: Bisexual, actinomorphic or zygomorphic, bracteate, Pentamerous, Hypogynous.

Calyx: 5 Sepals distinct and imbricate.

Corolla: 5 Petals distinct, nectiferous glands usually alternating with the petals.

Androecium: 5-15 stamens in 1-3 whorls, the anthers 2-celled, dehiscing longitudinally.

Gynoecium: Pistil one, and 3-5 lobed, ovary superior, the placentation axile.



Fruit: Capsular, dehiscing septicidally shizocarpic, usually dehiscent  
mericarps as carpels, (Regma).

Seed: Non endosperms, with embryo curved.

### **Floral Formula:**

$\oplus$ , ♀,  $K_5$ ,  $C_5$ ,  $A_{5-15}$   $\underline{G}_{(5)}$ , Axile plac.

### **Economic Importance of the family:**

Ornamentals Value, Example *Geranium*, *Pelargonium* are grown in the  
gardens for their beautiful flowers.

### **Diagnostic Characters of the Family:**

- 1- Friut Shizocarpic with a beaked.
- 2- Style 2-5.
- 3- Stamens 5-15.

*Geranium sylvaticum* الجيرانيوم

*Pelargonium SSP.* بيلاركونيوم (عطر، شمعدان)

*Erodium SSP.* منقار اللقلق (الطير)