

Biology
is LIFE

الجامعة المستنصرية

كلية العلوم

قسم علوم الحياة

المرحلة الثالثة

فرع الفطريات وعلوم النبات

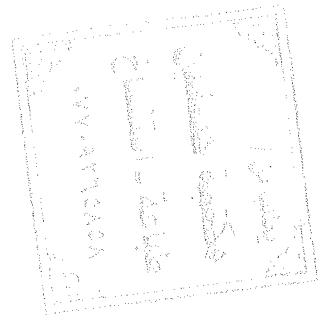
تصنيف نبات عملي

يطلب من

مكتبة حسنين

للطباعة والأستنساخ

السعر: 750



PLANT TAXONOMY LABORATORY

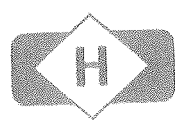
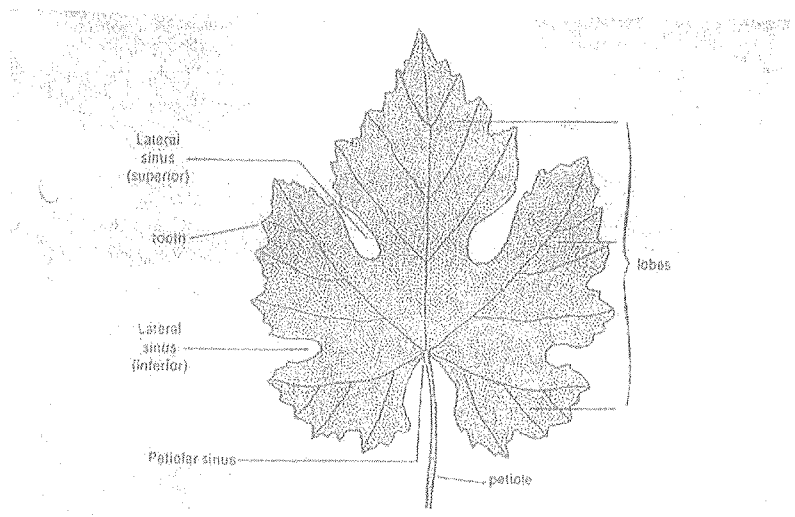
THIRD CLASS

BIOLOGY DEPARTMENT

COLLEGE OF SCIENCE

AL-MUSTANSIRIYAH UNIVERSITY

2016



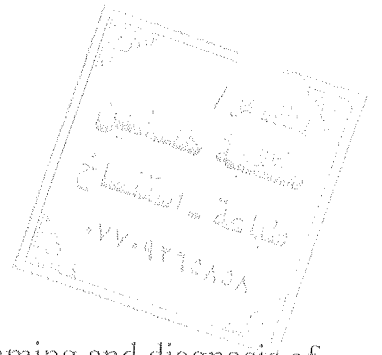
مكتبة حسنين
للطباعة والاستنساخ

بإدارة: محمد (٠٧٧٠٩٢٦٥٨٥٨)

Facebook/ Hassanein Library مكتبة حسنين
E-mail: doublem985@gmail.com

Lab- 1-2-3-4

السعر / 750



Lab – 1 plant taxonomy

Plant taxonomy: It is the science that deals with classification, naming and diagnosis of different types of plants.

Classification: It is putting objects into groups. The term taxonomy was originally coined by Augustin Pyramus de Candolle in 1813.

Nomenclature: It is naming or determining the correct name of a plant according to a nomenclatural system (ICBN international code of botanical nomenclature). Binomial nomenclature which means that each species has two Latin words consisting of its genus and species names. These words are always underlined or italicized.

Ex. Vicia faba
Genus Species

History of plant taxonomy :

- 1- **Theophrastus** (370-285 BC) is the first person in the European tradition of plant taxonomy; he grouped plants on the basis of their habit and duration, recognizing trees, shrubs, and trees, annual, biennial, and perennial herbs.
- 2- **Cesalpino** wrote *De Plantis* (On Plants) in which he described about 1500 plants.
- 3- **Linnaeus**, he provided an easy method of classifying (grouping) plants.

Plant classification according to life span/ Duration:

- 1- **Ephemeral plants:** Plants which complement their life cycle during (1.5-3) months (*Cucumis*).
- 2- **Annual plants:** Plants complement their life cycle during one year or less starting with germination of seed to the formation of fruit and seed, such as (*Oryza*)
- 3- **Biennial plants:** They complement their life cycle during two years, in the first year will be vegetative growth while in the second year will produce flowers, fruits and seeds Such as *Daucus carota*

4- **Perennial plant:** They live for more than two years, such as trees and shrubs.

Classification of plants according to Plant habit (growth form):

1- Herbaceous plants: They have no-woody tissues and complete their lifecycle from seed to death in one year or less (*Vicia*).

2-Woody plants: Plants have strong roots and wooden stems which gets secondary growth. These plants are divided into:

A- Trees: They characterized by containing one main branches of the upper stem section Such as *Phoenix dactylifera*.

B- Shrubs: Plants which have several stems out from near the surface of the soil. Such as *Rosa*.

3- Lians: Plants with wooden stems and often contain tendrils like *Vitis*.

4- Twining plants: Plants with wrapped stems around the other plants Such as *Convolvulus*.

5-Caulescent plant: plant that have distinguish stem that arise above the soil such as *Ricinus*

6-Acaulescent plant : plant that have no distinguish stem above the soil surface such as *Plantago*.

7- Succulent plant: plant that have soft, fleshy and thick leaves and stem such as *Portulaca*

Lab – 2

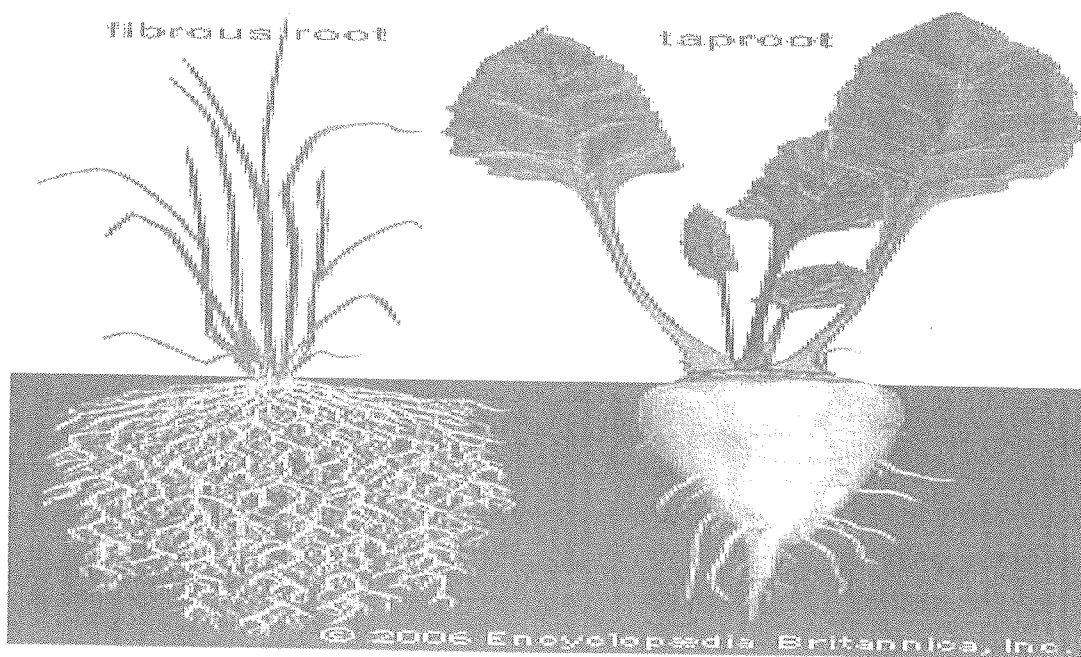
Plant taxonomy

The Root: It's the plant part that grows under the ground and work to anchor the plant in the soil and absorb water and minerals.

Root system:

1-Tap root (in dicot plants).

2- Adventitious root (in monocot plants).



****Types of tap root:**

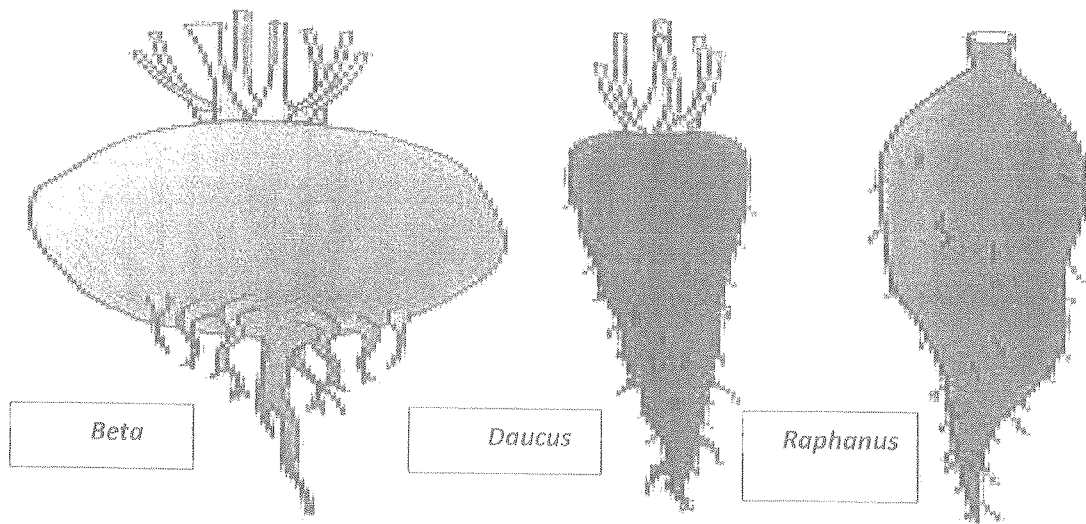
1-normal ex: *Vicia*

2-fleshy:

A/ conical ex: *Daucus*

B/ fusiform ex: *Raphanus*

C/ globoid ex: *Beta*

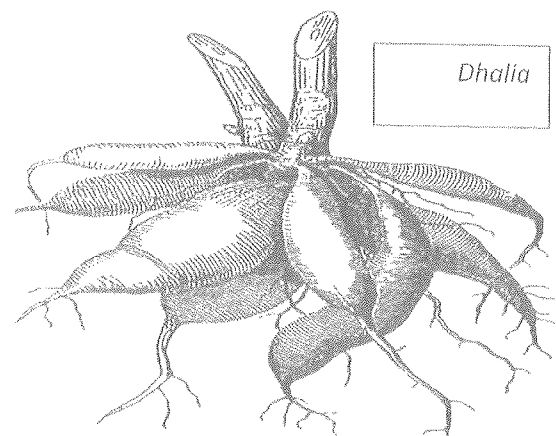
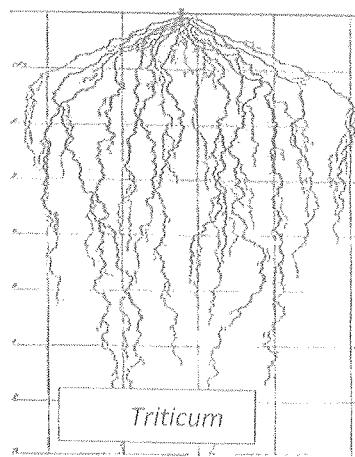


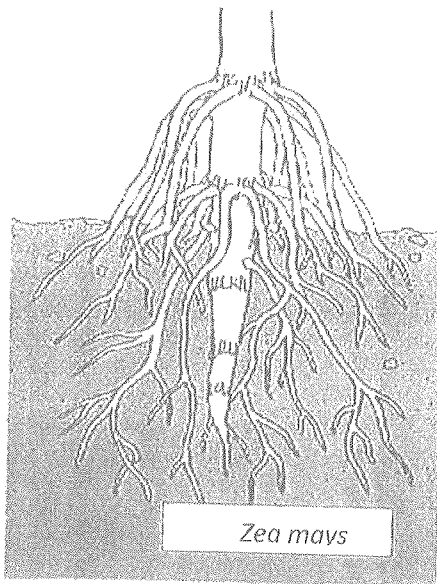
****Types of adventitious roots:**

1-fibrous root ex: *Triticum*

2-tuberous root ex: *Dhalia*

3-Prop root ex: *Zea mays*





*****The stems:**It's the main axis of plant bearing nodes, leaves, buds and flowers.

****Types of stems:**

1-Aerial stems:

A/ Erect ex: *Phoenix*

B/ Ascending ex: *Nerium*

C/ Weak ex: *Convolvulus*

2-Subterranean stem.

A/ Rhizome ex: *Cana indica*

B/ Bulbs ex: *Allium cepa*

C/ Tuber ex: *Solanum*

D/ Corms ex: *Cyperus*

3-Aquatic stem.

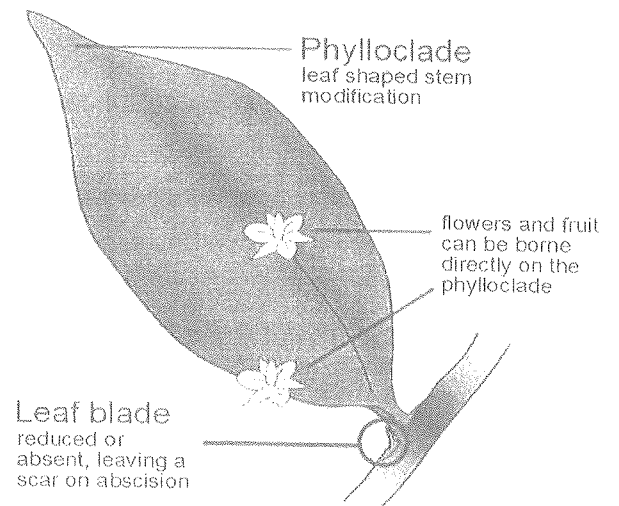
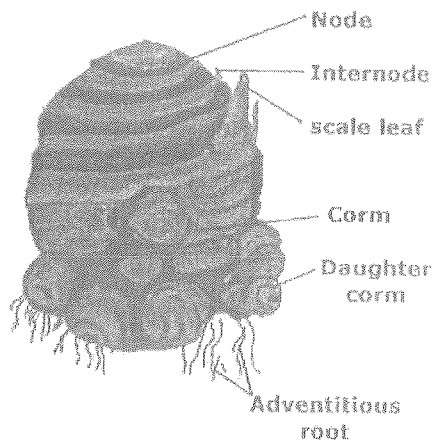
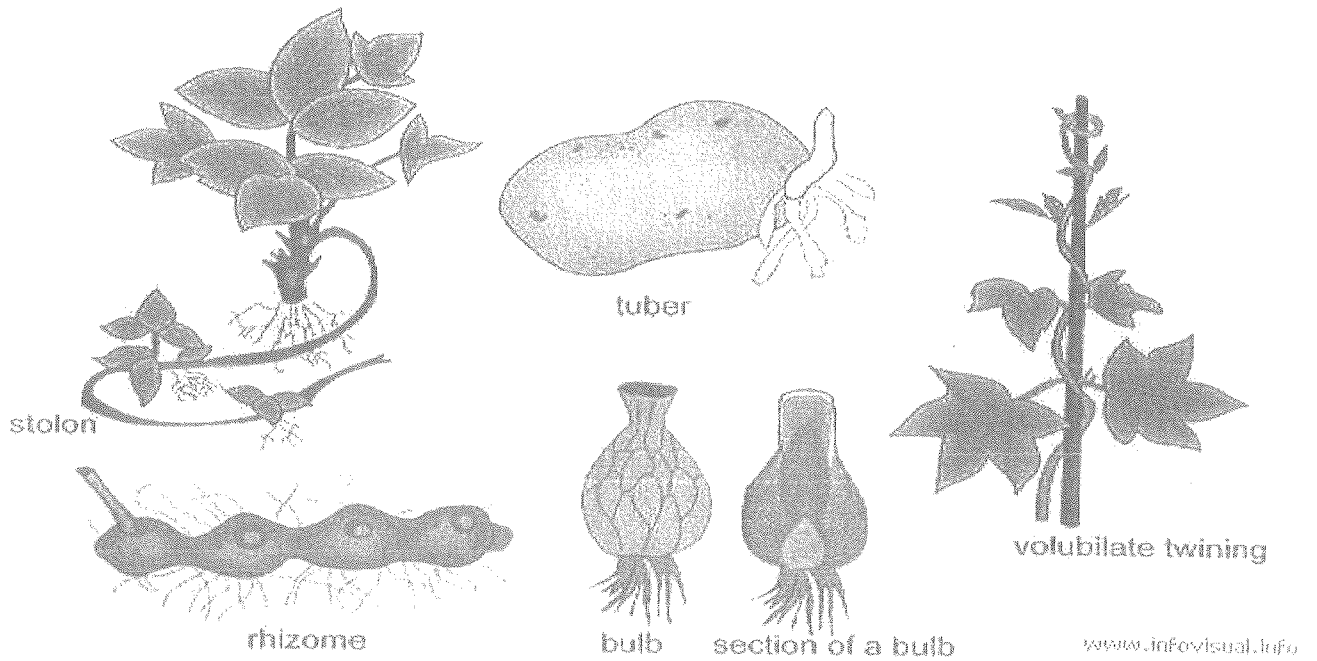
*modified stems:

1-spines ex: *Bougainvillea*

2-tendrils ex: *Vitis*

3- cladophylla ex: *Ruscus*

DIFFERENT TYPES OF STEMS



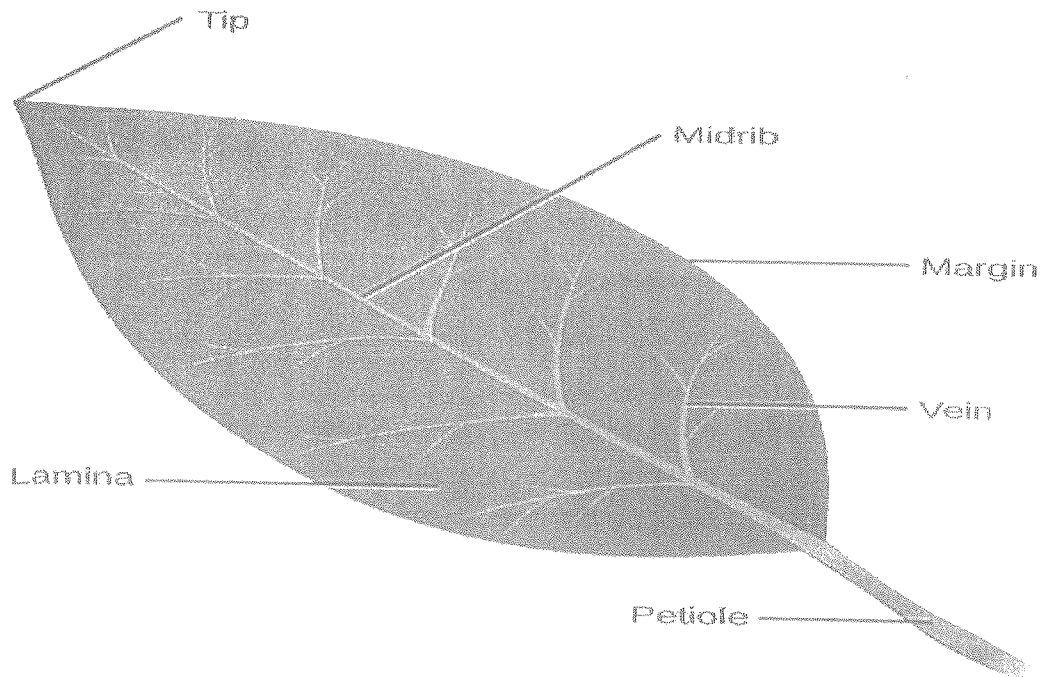
Lab -3

Plant taxonomy

*****The leaf:** It an expanded photosynthetic organ.

****leaf parts:**

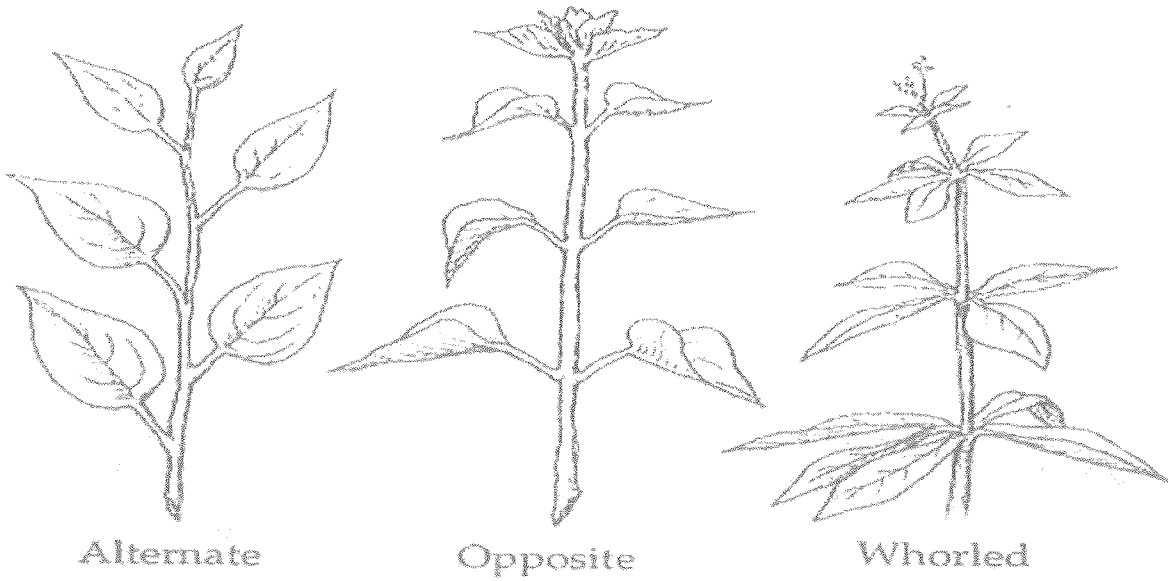
1-Blade(lamina) 2- petiole (if it absent the leaf then called sessile) 3-stipules (if its absent the leaf called estipulate).



*****phyllotaxy:** it's the arrangement of leaf on the stem:

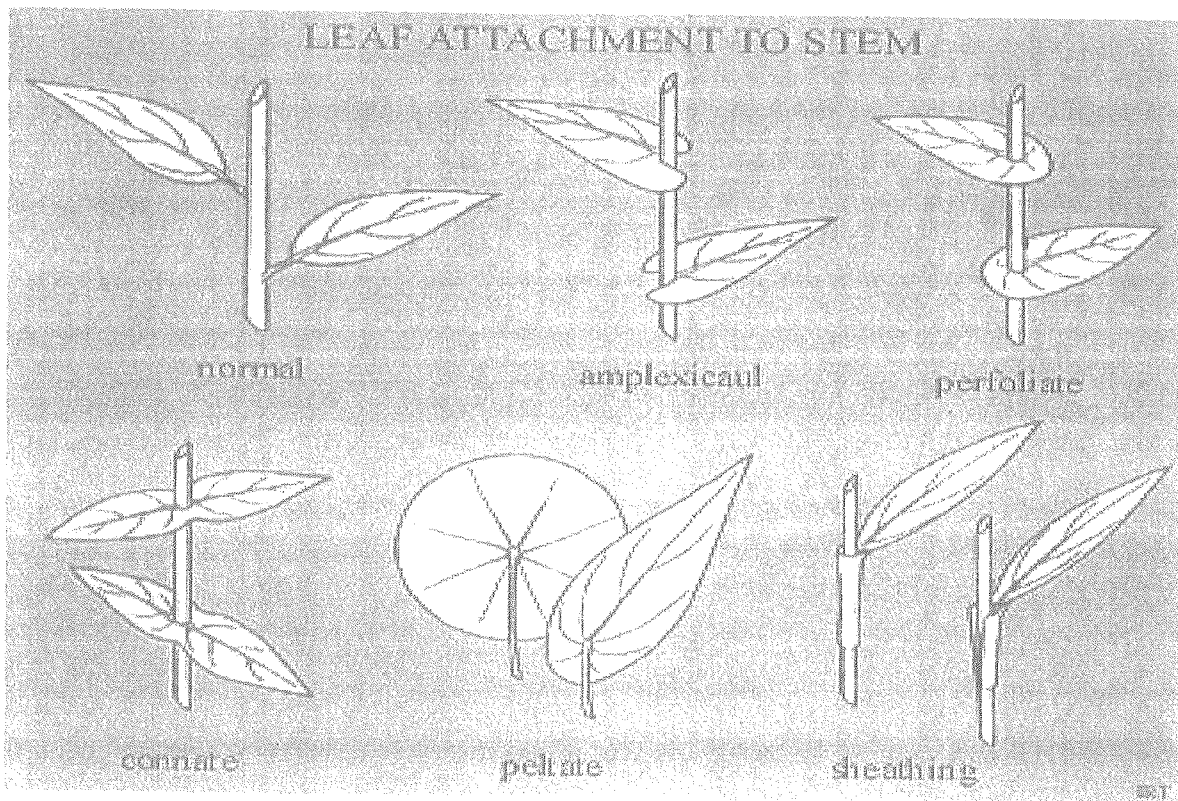
- 1-Alternate: one leaf on each node
- 2-Opposite : two leaves on each node
- 3- Whorled : more than two leaves on each node

Common Leaf Arrangements



***leaf attachment to stem:

1-perfoliate 2- sheathing 3-ligulate 4-normal



مكتبة جامعة مصر / كلية طب / الطباعة والنشر
07709265859

***leaf venation:

1-parallel:

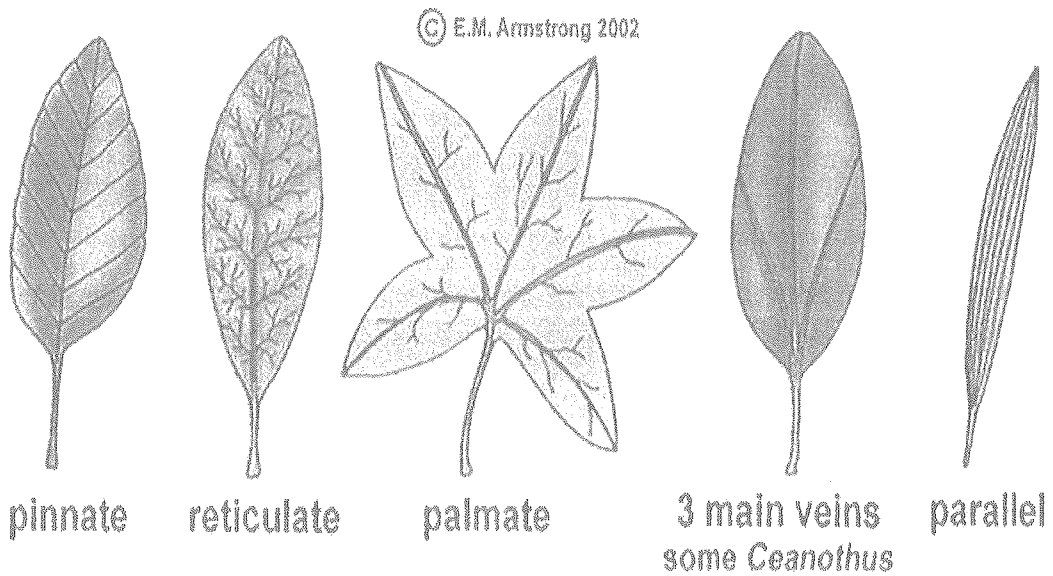
A/ pinnate parallel ex: *Cana indica*

B/ palmate parallel ex: *Washingtonia*

2-Reticulate:

A/ pinnate reticulate ex: *Rosa*

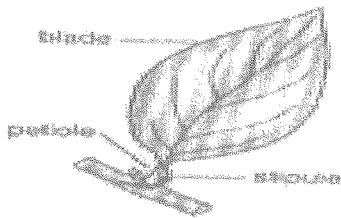
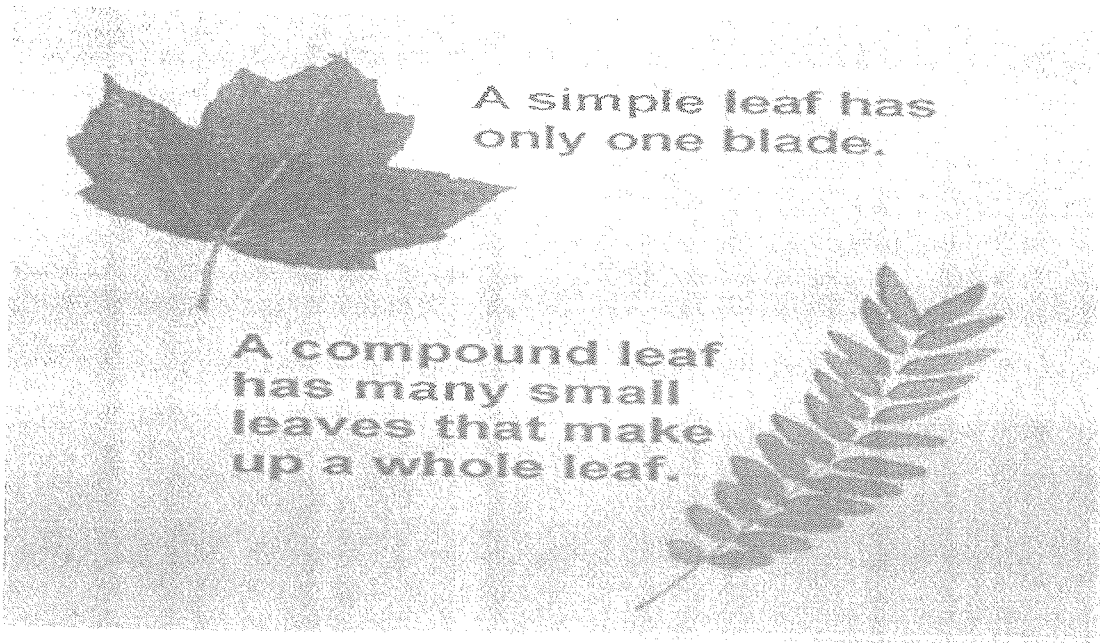
B/ palmate reticulate ex: *Ricinus*



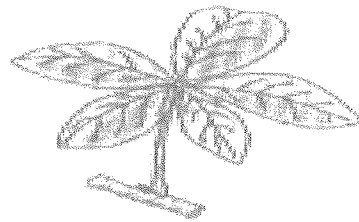
***types of leaf:

1-simple

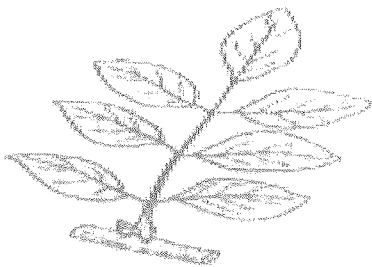
2- compound



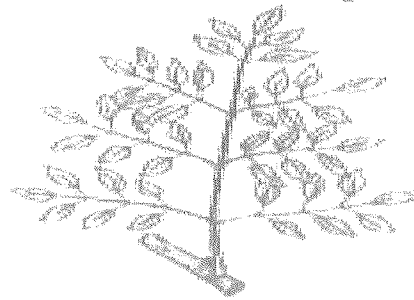
Simple



Palmately Compound



Pinnately Compound



Bipinnately Compound

****Blade forms:**

1-sagitate ex: *Convolvulus*

2-Orbicular ex: *Tropaeolum*

3-Reniform ex: *Malva*

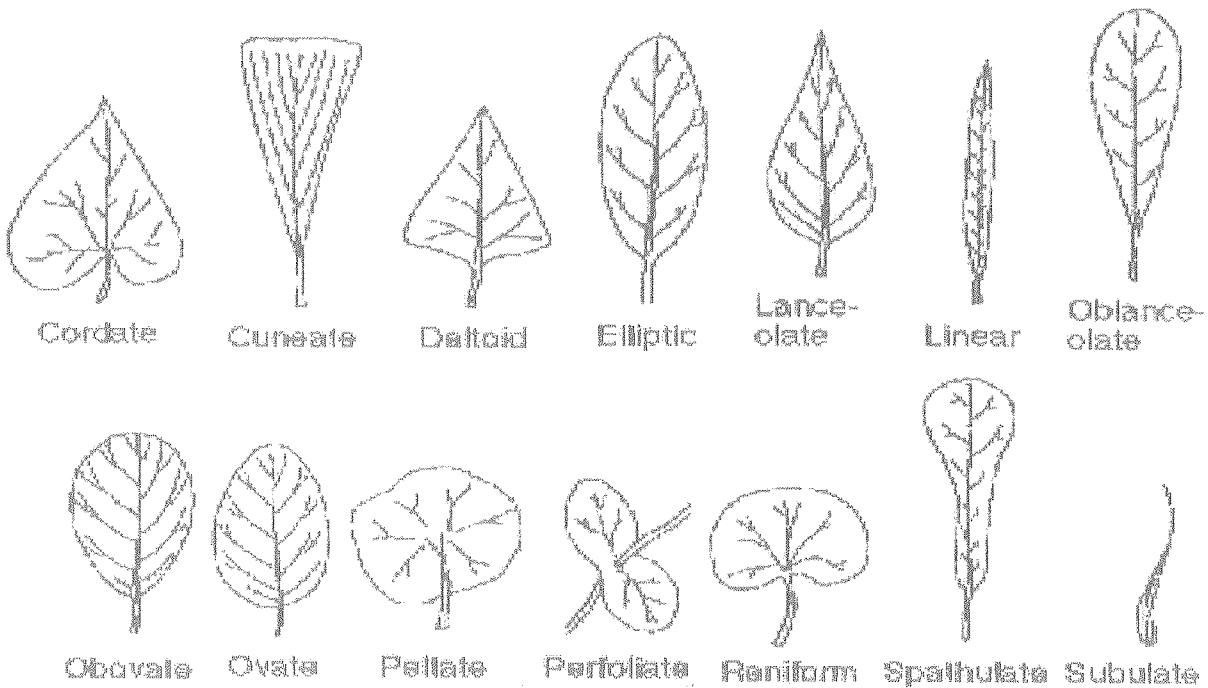
4-Ovate ex: *Ziziphus*

5-Elliptical ex: *Myrtus*

6-Lanceolate ex: *Eucalyptus*

7-Linear ex: Grass

LEAF SHAPES



Lab – 4

Plant taxonomy

*****The flower:** It's the reproductive part in plant.

***flower parts: from base to apex

1-pedicel: is the flower stalk.

2-bract: a modified, generally reduced leaf borne on the side of a pedicel.

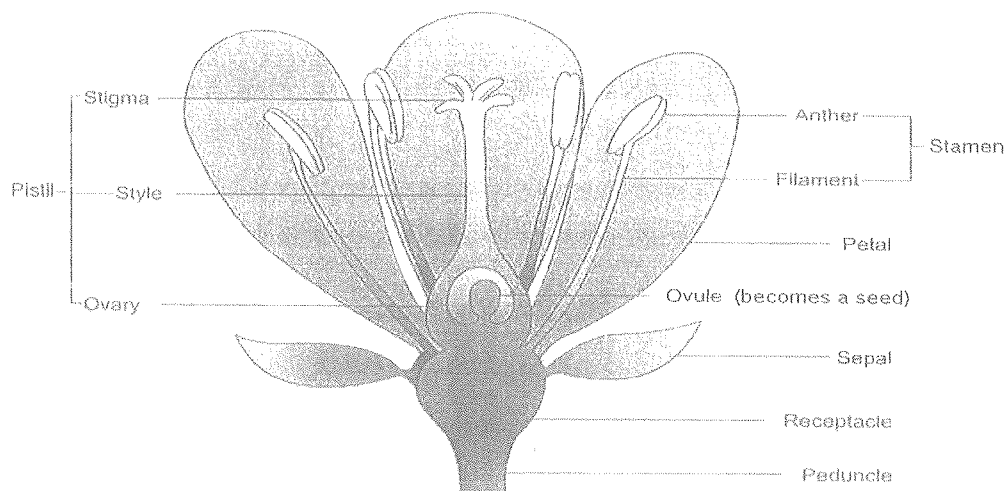
3-receptacle (totus): a region of flower to which other floral parts are attached.

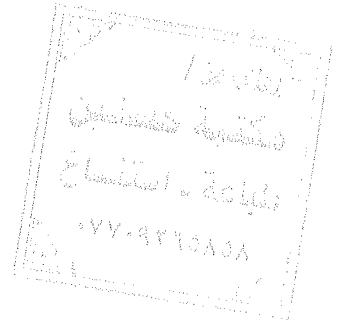
4-calyx : it's the outer whorl of the flower, mostly green, the individual unit of calyx is **sepal**.

5-corolla: it's the inner whorl in flower, mostly colored, the individual unit of corolla is called **petal**.

6-Androcium: it refers to all male organs of a flower, collectively all called stamens it include : anther and filament.

7-Gynocium: it refers to all of the female organs of a flower, collectively all called carpels (pistil) it include: stigma, style and ovary.





Note: calyx and corolla both together are called **perianth**, and if the perianth is not distinguish into calyx and corolla it called **perigon** and each unit of the perigon is called **tepal**.

****flower characteristics:**

1-perfect F.: (bisexual), having both stamens and carpels.

2-imperfect F. : (unisexual), in this case the flower either staminate(male flower) ex: *Oak* or pistillate (female flower) ex: *Salix*, or neutral flower (have stamen and pistil but they are inactive or sterile) ex: ray flower in *Helianthus*.

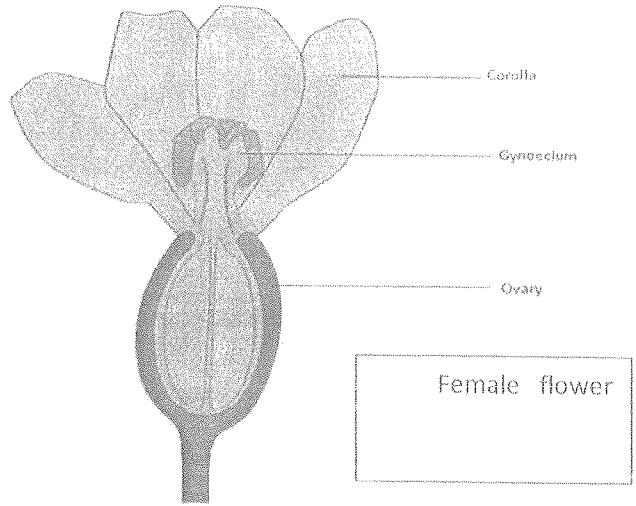
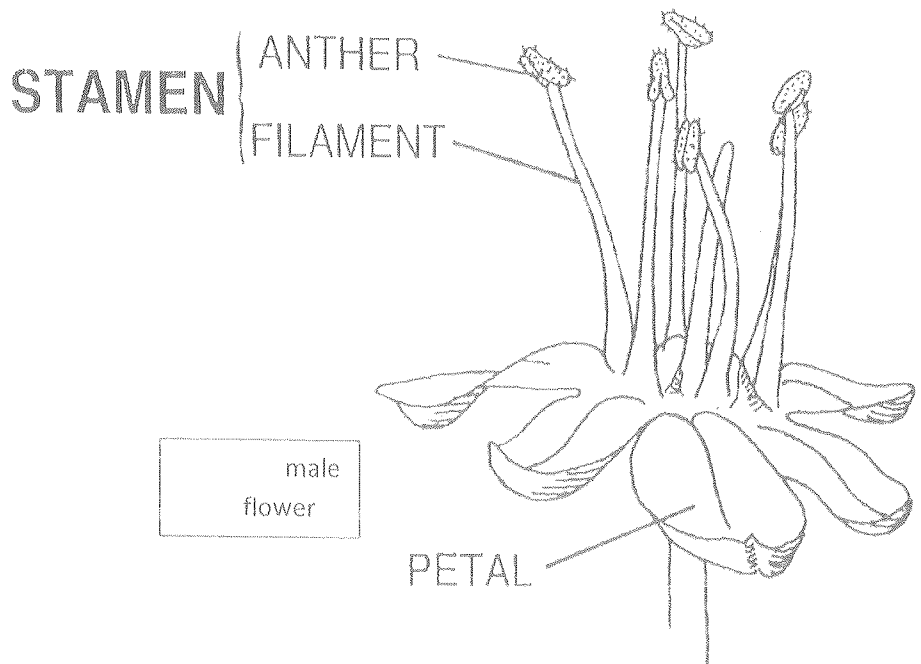
3-complete F.: It contain calyx, corolla, stamens and pistil ex: *Rosa*

4-incomplete F.: lack calyx or corolla or both:

A/ A sepalous flower: loss of sepals ex: *Euphorbia*

B/ Apetalous flower: loss of petals ex: *Morus*

C/ naked flower: loss of both petals and sepals ex: *Salix*

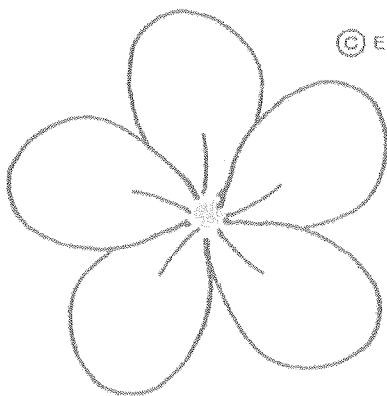
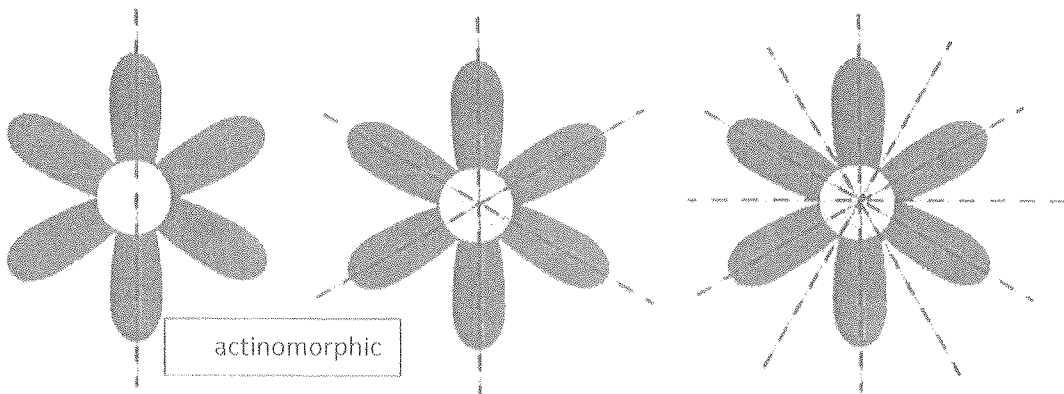


****the flower symmetry:

1-Actinomorphic: ex: *Vinca*

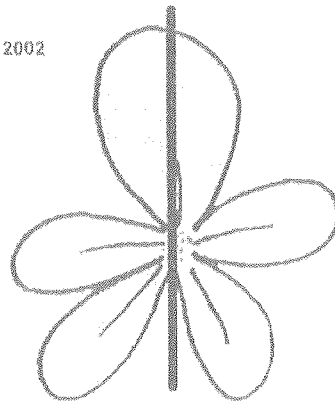
2-Zygomorphic: ex: *Vicia faba*

3-Asymmetrical flower: ex: *Cana indica*

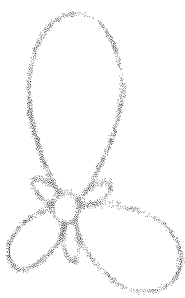
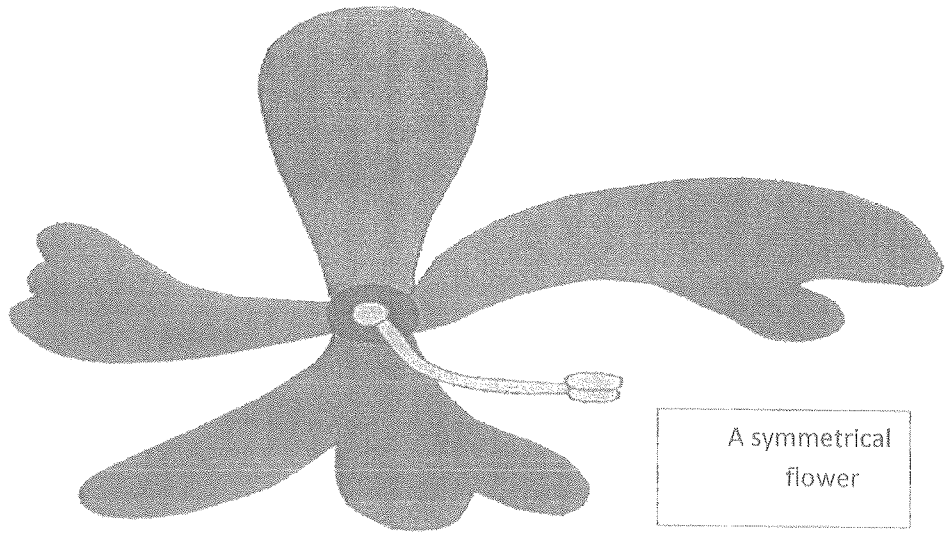


actinomorphic (regular)
(more than one dividing plane)

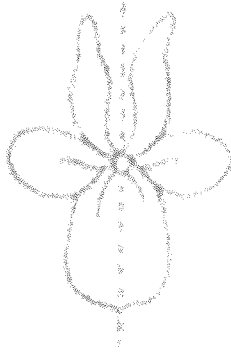
© E.M. Armstrong 2002



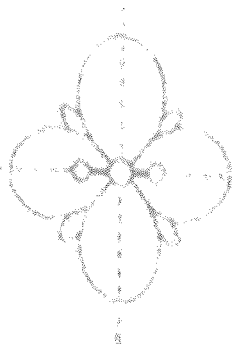
zygomorphic (irregular)
(one bilateral dividing plane)



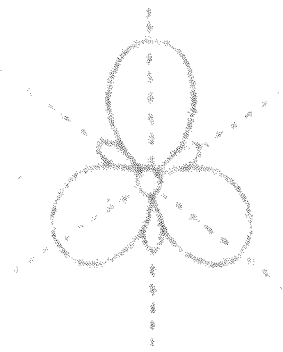
asymmetric



bilateral



bradial



radial

symmetry

Lab 5

Plant taxonomy

**Perianth characters:

- 1- Polypetalous ex: *Rosa*
- 2- Gamopetalous ex: *Convolvulus*
- 3- Polysepalous ex: *Rosa*
- 4- Gamosepalous ex: *Dianthus*
- 5- Perigone ex: *Narcissus*
- 6- Petaloid calyx ex: *Tropaeolum*
- 7- Epicalyx ex: *Dianthus*

**corolla forms:

A/ Actinomorphic – polypetalous :

- 1-Cruciform ex: *Raphanus*
- 2-Caryophyllaceous ex: *Dianthus*
- 3-Rosaceous ex: *Rosa*

B/ Actinomorphic – gamopetalous

- 1-Funnel form ex: *Convolvulus*
- 2- Salver form ex: *Verbena*
- 3-campanulate ex: *Campanula*

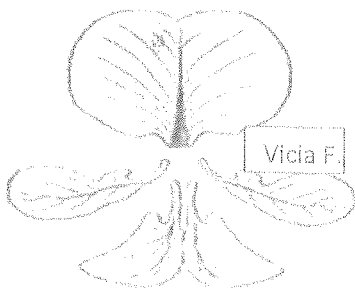
C/ Zygomorphic – polypetalous

- 1-Papilionaceous ex: *Vicia*

D/ Zygomorphic- gamopetalous:

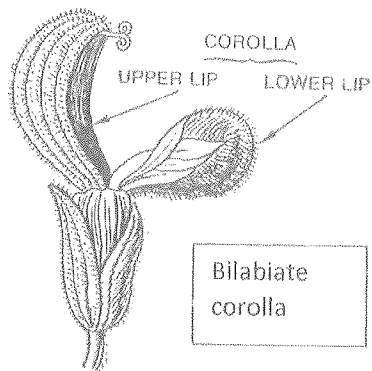
- 1- Bilabiate ex: *Antirrhinum*
- 2- Ligulate ex: ray flower in *Helianthus* plant

****note:** some corolla have appendages called corona or crown like in *Nerium* and *Tropaeolum*



Funnelform





Ligulate



*****Position of ovary in the flower:**

1-Hypogynous flower (superior ovary) ex: *Convolvulus*

2-Epigynous flower (inferior ovary) ex: *Narccissus*

3-Perigynous flower (ovary is superior if its not attached to hypanthium ex: *Rosa*, and its inferior if its attached to hypanthium ex: *Portulaca*)

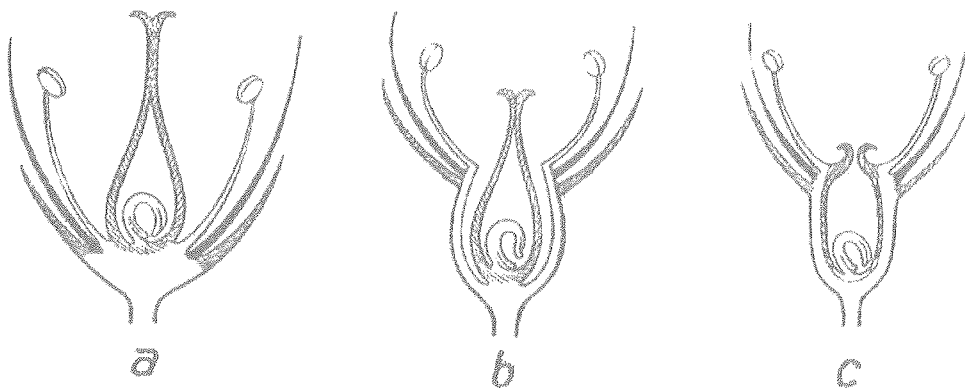
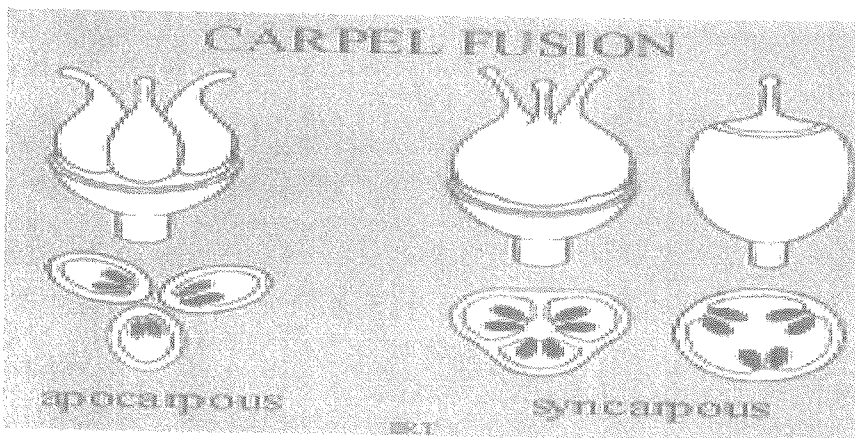


Fig. 239. Schematische Darstellung einer hypogynen (a), perigynen (b) und epigynen (c) Blüte.

****Gynoecium types:

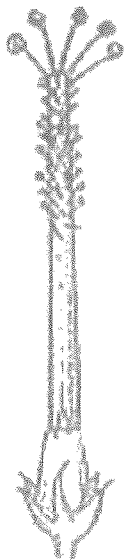
- 1- Monocarpous ex: *Vicia*
- 2- Polycarpous :
 - a/ Apocarpous ex: *Rosa*
 - b/ Syncarpous ex: *Petunia*



*****Androecium types:

- 1- Monodelphous ex: *Hibiscus*
- 2- Diadelphous ex: *Vicia*
- 3- 3-polyadelphous ex: *Citrus*

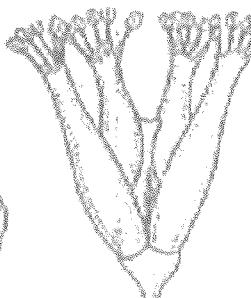
Monadelphous



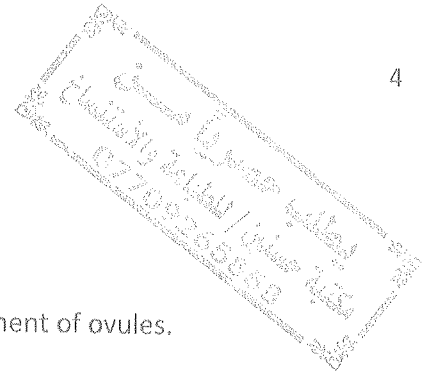
Diadelphous



Polyadelphous



Androecium types

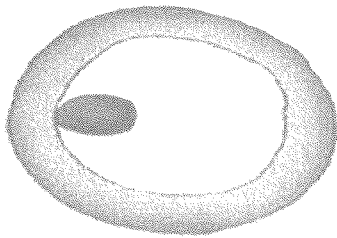


*****Placentation**

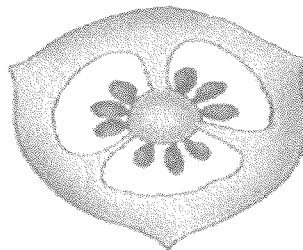
It's the distribution of placentae on the ovary wall and the arrangement of ovules.

****types of placentation:**

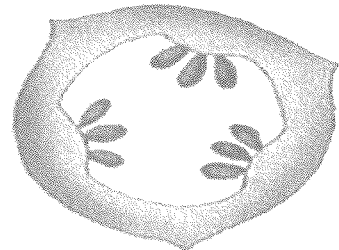
- 1- Marginal ex: *Vicia*
- 2- Parietal ex: *Cucumis*
- 3- Axial ex: *Lycopersicon*
- 4- Free-central ex: *Dianthus*
- 5- Basal ex: disc flower in *Helianthus*
- 6- Apical ex: *Daucus*
- 7- Lamellate ex: *Papaver*



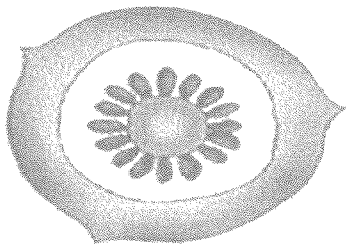
การงอกขึ้นที่ขอบ
(marginal placentation)



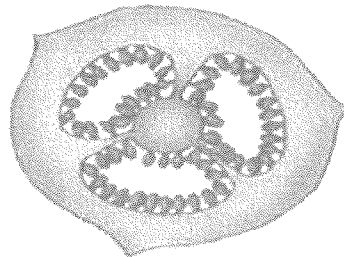
การงอกขึ้นที่แกนร่วม
(axile placentation)



การงอกขึ้นตามแนวผนัง
(parietal placentation)



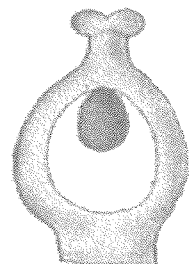
การงอกขึ้นที่จุดกลาง
(free-central placentation)



การงอกขึ้นที่ผิว
(laminar placentation)



การงอกขึ้นที่ฐาน
(basal placentation)



การงอกขึ้นที่ยอด
(apical placentation)

Lab 6

Plant taxonomy

***Inflorescence:

Is the arrangement of flowers on the stem of a plant. All flowers arising from the main stem axis or peduncle.

** Inflorescence parts:

- 1-Peduncle: the stem holding the whole inflorescence, and the major axis.
- 2-Rachis: holding the flowers or more branches within the inflorescence.
- 3-Pedicel: the stalk of each single flower.
- 4- floret: Any flower in an inflorescence.

NOTE: the flower that is not part of an inflorescence is called a solitary flower ex: *Papaver*.

***types of inflorescence:

A-Determinate inf. (cymose): the terminal bud forms a terminal flower and then dies out. Other flowers then grow from lateral buds.

1-monochasium: terminal flower with one flower below. This may repeat (branch) many times, so it may have many types like:

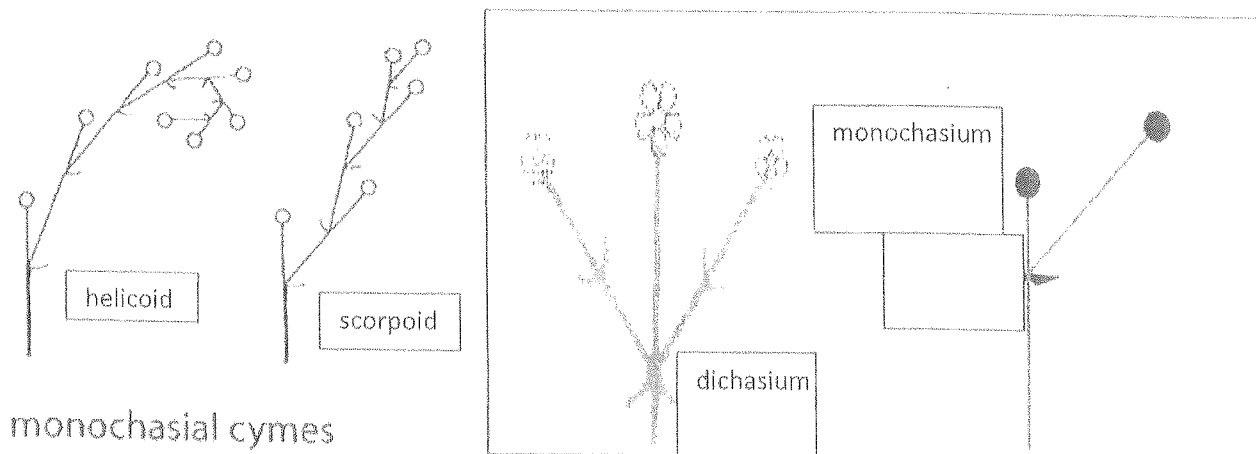
A/ simple monochasium: have one terminal flower with one flower below ex: *Convolvulus*.

B/ helicoid: the one flower below repeat many times to give a long coiled inflorescence (here the floret in one side and the bract if there any would be in the opposite side) ex: *Borago*

C/ scorpioid cyme (have one-sided branching, forming a coiled inflorescence (zigzag like) typical of the families Boraginaceae and Hydrophyllaceae ex: *Linum*

2- dichasium: have a terminal flower that opens first, and two opposite flowers below it (three flowers in all).

cymose



B- Indefinite inf. (racemose): the growing region at the tip of the flower stalk continues to produce new flowers during growth, so the youngest flowers are at the top of the stalk(in a flattened inf. the youngest flowers are in the center and the oldest are on the outside:

1- Spike inf.: stalk less flowers arise from an undivided floral axis ex: *Orchis*.

In the family Gramineae (poaceae) the flowers are grouped in clusters called spikelet (compound spike) ex: *Triticum*.

2- Raceme inf.: the main flower stalk is elongated and bears stalked flowers ex:

The main stalk may branched to form compound raceme like in *Vitis*.

3-catkin inf.: the axis is often long, bears many small stalk less unisexual flowers(the female catkin is usually short and erect, while the male catkin is hang down from the stem ex: *Morus*

4-Spadix inf.: a large fleshy floral axis bearing small, usually unisexual flowers, protected by a large petal-like bract, the **spath**, and it found in the family Araceae.

5-corymb inf.: the lower flower stalks are longer than the higher ones, resulting in a flat-topped cluster of flowers ex: *Cardaria* (it could also branch to form compound corymb ex: *Brassica*).

6-umbel inf.: stalked flowers arise from the same point on the flower axis it found in Umbelliferae family like carrot(*Daucus*)and parsley).

7- capitulum inf.: it is a characteristics of the family Compositae (Asteraceae), the tip of the shoot is flattened and bears many small stalk less flowers surrounded by an involucre (ring) of bracts. This arrangement gives the appearance of a single flower ex: *Helianthus* plant.

Indeterminate inflorescences:
 (first flowers to open are at the base)

