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Flowers: - Morphologically, a flower is a stem tip that bears four whorls, or series, of specialized appendages. All four series are constituted by modified leaves, the first two series are sterile and the other two are fertile.

Flower terminology

1- Complete: a flower having all four whorls of sepals, petals, stamens, and pistils.

2- Incomplete: a flower lacking one or more of these whorls.

3- Perfect, or bisexual: a flower with both stamens and pistils; can be complete or incomplete

A- Pistillate, or female: an imperfect (unisexual) flower that lacks stamens

B- Staminate, or male: an imperfect (unisexual) flower that lacks pistils

4- Monoecious: a species in which an individual plant that bears both pistillate and staminate flowers (e.g., tuberous begonia, hazel, oak, corn)

5- Dioecious: a species in which an individual plant that bears only pistillate or staminate flowers (e.g., date, holly, cottonwood, willow)

6- Polygamous, or polygamomonoecious: a species in which an individual plant that bears perfect, pistillate, and staminate flowers (e.g., horse chestnut).

Floral organs:

Perianth:- It is the envelope of sterile leaves enclosing the fertile organs of the flower. The perianth is either differentiated into sepals and petals, or undifferentiated (perigone or tepals).

A- Calyx:- It is usually green outer whorl of a flower consisting of separate or fused sepals (unit of calyx).

Functions of calyx

1- The calyx serves primarily to protect the developing flower bud.

2- in some cases, to support the flower once it has bloomed.

3- In some species, the calyx persists even when the fruit matures, as seen in eggplant, strawberry, and tomato. Given that it is not directly involved in reproduction, the calyx is considered an accessory part of the flower.

Types of calyx

A- Polysepalous Calyx: This type of Calyx has sepals that are free and separate from each other. They are found in flowers like Hibiscus where individual sepals encircle the base of the flower, forming a protective shield around the developing bud.

B- Gamosepalous Calyx: The sepals in this type are fused or united, forming a single structure. The Petunia is a classic example of gamosepalous calyx.

C- Caducous Calyx: It is a calyx where the sepals fall off after the flower blooms. This can be seen in trees like the Maple, where the calyx serves its protective purpose during the bud's development.

D- Petaloid Calyx: The sepals transform to colors like petals. This phenomenon can be seen in plants like the Poinsettia, where the calyx protects and contributes to the flower's reproductive success by attracting pollinators like bright-colored petals.

E- Persistent Calyx: The sepals remain after the flower has bloomed. Instead of withering away, they stay attached to the developing fruit, offering continued support and protection. Ex. Eggplant.



Polysepalous



Petaloid sepals



Caducous Calyx



Gamosepalous

C- Corolla:- It is the second outermost layer of perianth, is usually brightly coloured. Corolla helps to display the flower and attracts the pollinators, the unit of corolla is petal.

******Types or shapes of corolla**

I. Apopetalous Actinomorphic

A. Cruciform: Four petals arranged in the form of a cross. Example: Mustard and Cauliflower.

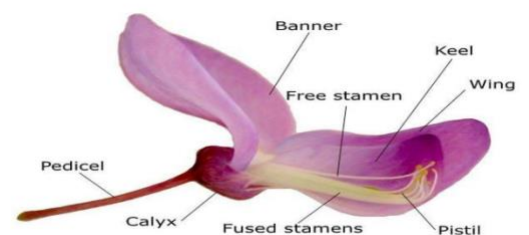
B. Caryophyllaceous: Five petals with long claws with limb at right angles to the claw. Example: Caryophyllaceae. *Dianthus*.

3. Rosaceous: Five to many sessile or minutely clawed petals with radiating limbs. Example: Rose.



II. Apopetalous Zygomorphic

A- Papilionaceous: They consist of five distinct petals organized in a butterfly shape. Corolla has three types of petals. One usually large posterior petal called (standard), two lateral petals-wings and two anterior sympetalous petals. Example: Pea and Bean.



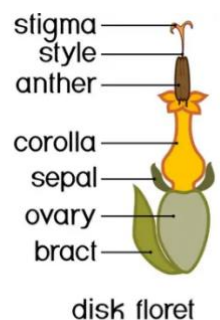
III. Sympetalous Actinomorphic

A- Tubular: Petals united to form a narrow tubular structure with very short limbs. Example: Disc floret of sunflower.

B- Campanulate: Petals fused to form a bell-shaped corolla. Example: *Campanula*.

C. Rotate: Petals fused to form a wheel shaped corolla with very short tube and a spreading circular limb.

D. Salver shaped: Petals fused to form a long narrow tube with spreading limbs. Example: *Vinca*



IV. Sympetalous Zygomorphic

A- **Bilabiate:** Corolla with two lips. Example: *Ocimum*.

B- **Ligulate:** Tubular corolla with a single strap-shaped limb. Example: Ray floret of *Helianthus*.

