

**SOLANACEAE**

**Nightshade Family**

**Potato Family**

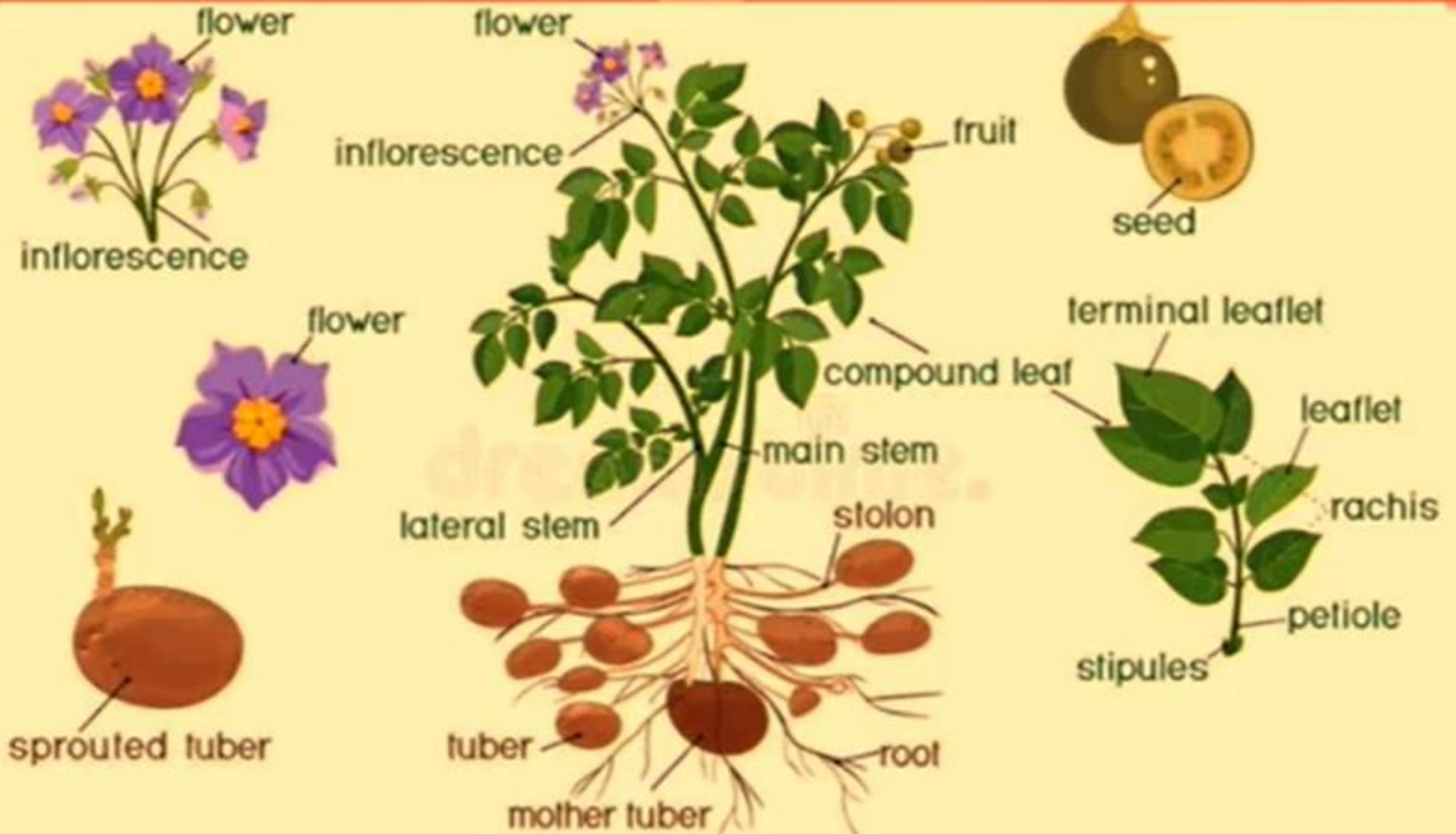
Angiosperm Family

**Solanaceae**

# Classification of Solanaceae

- .....Class – Dicotyledonae**
  - 1. Venation reticulate.
  - 2. Flower pentamerous.
- .Sub-class – Gamopetalae**
  - 1. Petals fused.....
- .....Series – Bicarpellatae**
  - 1. Carpels two.
  - 2. Ovary usually superior.
- .....Order – Polemoniales**
  - 1. Leaves alternate and exstipulate.
  - 2. Flowers actinomorphic.
- .....Family - Solanaceae**
  - 1. Flowers solitary, terminal / cymosly umbelled.
  - 2. Septum is oblique & the placentae are highly swollen.
  - 3. Fruit berry / capsule.

# Vegetative characters





## A. Vegetative characters:-

### A.1. Habit:-



- ♣ The plants are mostly annual or perennial **herbs**: - Solanum nigrum and Nicotiana tabacum,
- ♣ Sometimes shrubs: - Solanum torvum or
- ♣ Small trees: - S. verbascifolium and
- ♣ Climbers: - S. dulcamara.

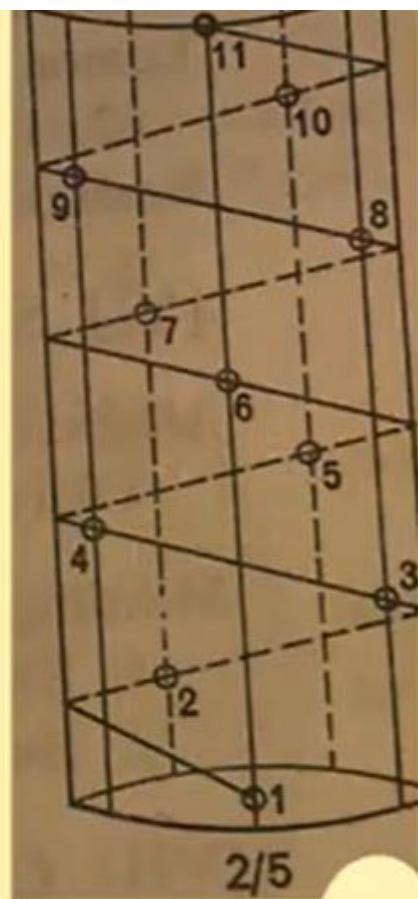
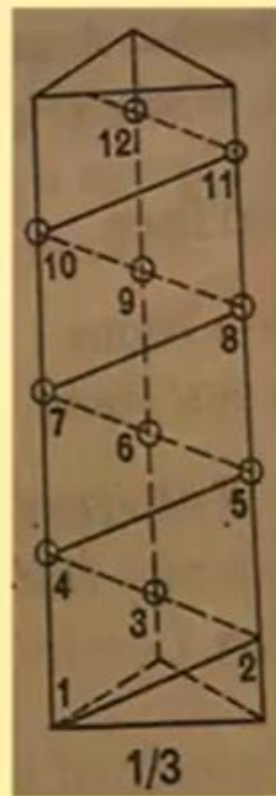
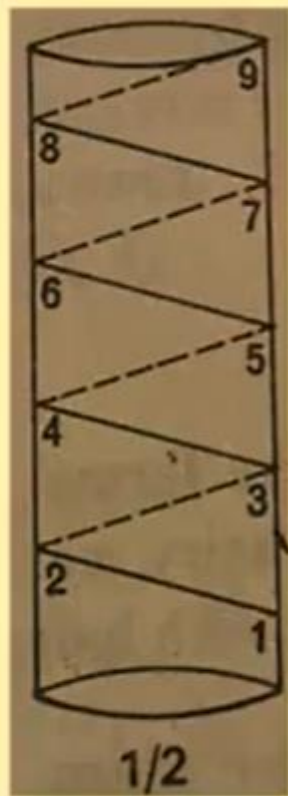
### A.2. Stem:-

- ♣ In the most species, the stem is smooth and branched, but sometimes it is **prickly** (some spp. of Solanum) or **spinous** (Lycium). The spines are modified branches.
- ♣ In Solanum tuberosum, underground stem tubers are formed.
- The **vascular bundle in the stem is bicollateral**.

### A.3. Leaves:-



- ♣ The leaves are alternate, exstipulate, simple, **entire** (Petunia, Cestrum) or **pinnatifid** (Solanum).
- ♣ They are **pinnately compound** in Lycopersicon and Solanum tuberosum.
- ♣ In the inflorescence portion the leaves become sub-opposite or opposite.





## B. Floral characters:-

### B.1. Inflorescence:-

- ♣ The flowers are borne in cymes which are lateral, axillary or terminal.
- ♣ In some species of Solanum, the cymes are extra-axillary appearing to arise from the middle of the internode.
- ♣ The flowers are solitary and axillary in Datura and clustered in Withania.

### B.2. Flower:-

- ♣ Bracteate, actinomorphic (zygomorphic in Salpiglossis and Schizanthus), bisexual (unisexual in Withania coagulans) pentamerous and hypogynous.

### B.3. Calyx:-

♣ Sepals 5, gamosepalous, odd in anterior and aestivation – valvate (Whithania) or twisted (Datura).

♣ They are persistent in many cases and may be accrescent as in Physalis.

### B.4. Corolla:-

♣ Petals 5, gamopetalous, odd in posterior and aestivation – valvate (Whithania) or twisted (Datura).

♣ The corolla is trumpet-shaped (Datura), campanulate (Physalis), infundibuliform (Petunia) or rotate (Solanum).

♣ The corolla is bi-lipped in Schizanthus.



## B. Floral characters:-

### B.5. Androecium:-

- ♣ Stamens 5, polyandrous, epipetalous and alternipetalous.
- ♣ Stamens are 4 and 2 in Salpiglossis and Schizanthus respectively. The remaining stamens are represented by Staminodes.
- ♣ The anthers are **conniving** (Solanum), dithecous, introse and dehiscing by longitudinal slits or by apical pores (Solanum).

## B. Floral characters:-

### B.6. Gynoecium :-

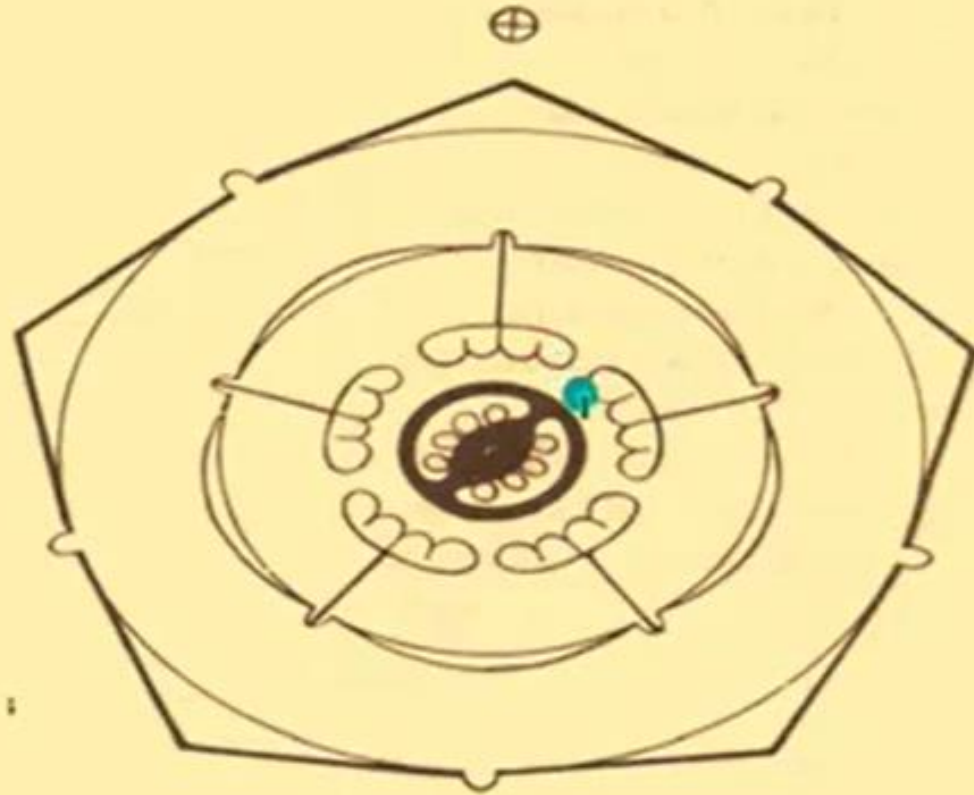
- ♣ It is bicarpellary (the number of carpels increase in Lycopersicon and Capsicum), syncarpous and ovary is superior and bilocular (sometimes as in Datura and Nicandra, the number of locules increases from 3 to 5 by the formation of false septa) with many ovules in each locule on axile placentation. The placentae are swollen and the septum is oblique.
- ♣ In Capsicum, the ovary becomes unilocular in the upper region by receding of placentae and placentation appears to be parietal.
- ♣ The style is linear and stigma is capitate or shortly lobed.
- ♣ A hypogynous nectariferous disc is present at the base of ovary.

### **B.7. Fruit and seed:-**

- ♣ The fruit is **berry** which is sometimes enclosed within an inflated bladder-like calyx (Physalis) or it is a **capsule** which dehisces by valves (Datura).
- ♣ The seeds are numerous, compressed, discoid or sub-reniform, endospermic and with curved or straight embryo.



# Withania somnifera



$Ebr \oplus \text{♀} K_{(5)} \overset{\curvearrowright}{C}_{(5)} A_5 G_{(2)}$

**THANK YOU**

**Apocynaceae**



# APOCYNACEAE

## **Dogbane Family**

**because some taxa were used as dog poison.**

.....Class – Dicotyledonae

1. Venation reticulate.
2. Flower pentamerous.....

Sub-class – Gamopetalae

1. Petals fused.....

.....Series – Bicarpellatae

1. Carpels two.
2. Ovary usually superior.....

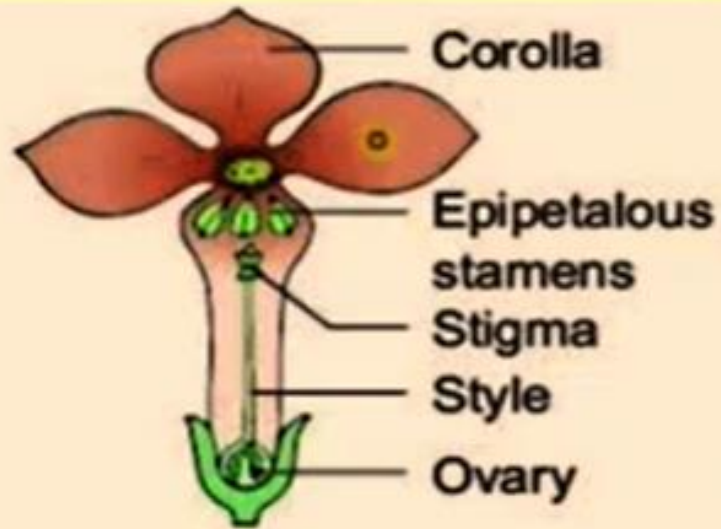
.....Order – Gentianales

1. Leaves opposite.
2. Flowers actinomorphic.
3. Stamens epipetalous.....

Family - Apocynaceae

1. Inflorescence cymose.
2. Stamens gynandrous.
3. Ovaries two, free but united by style.
4. Latex present.....

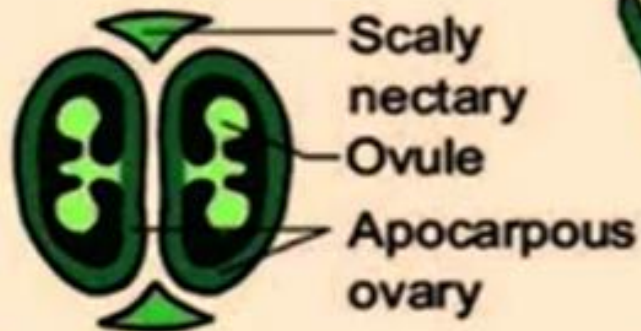
# Vegetative characters



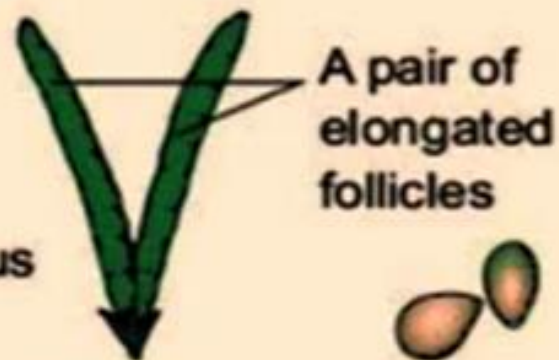
L.S. of the flower



Gynoecium



C.S. of the ovary



Fruit

Seed



Floral diagram



## A. Vegetative characters:-

### A.1. Habit:- ✓

♣ The plants are: -

**Herbs:** - Lochnera,

**Shrubs:** - Nerium, Thevetia,

**Trees:** - Holarrhena, Plumeria or

**Climbers:** - Vallaris.

### A.2. Stem:-

➤ The stems are armed with spines as in Carrisa.

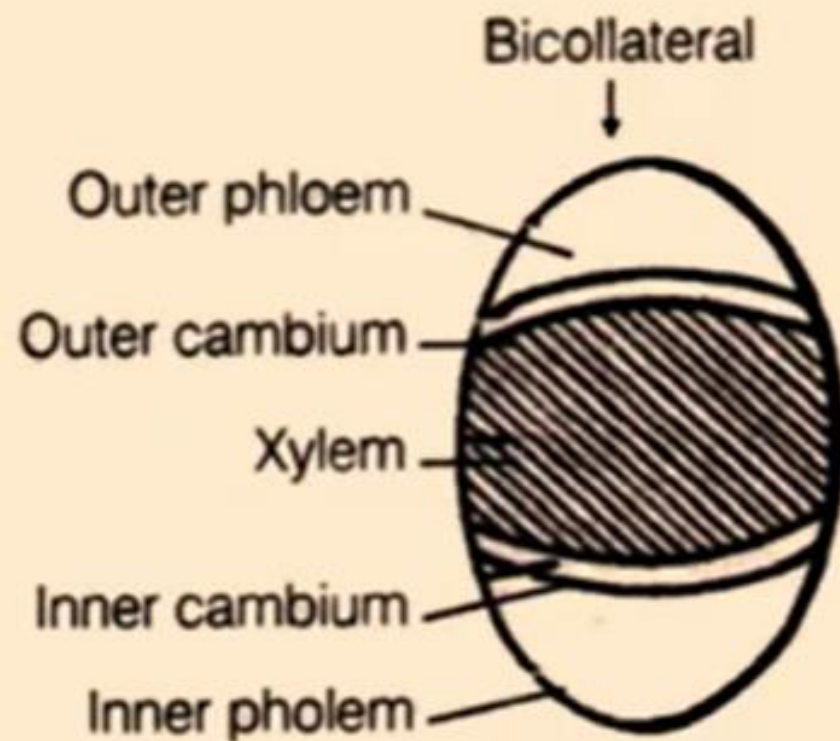
➤ Adenium has succulent stems and leaves.

➤ The vascular bundles are bicollateral.

➤ Presence of milky latex in stem and leaves is the characteristic feature of the family.

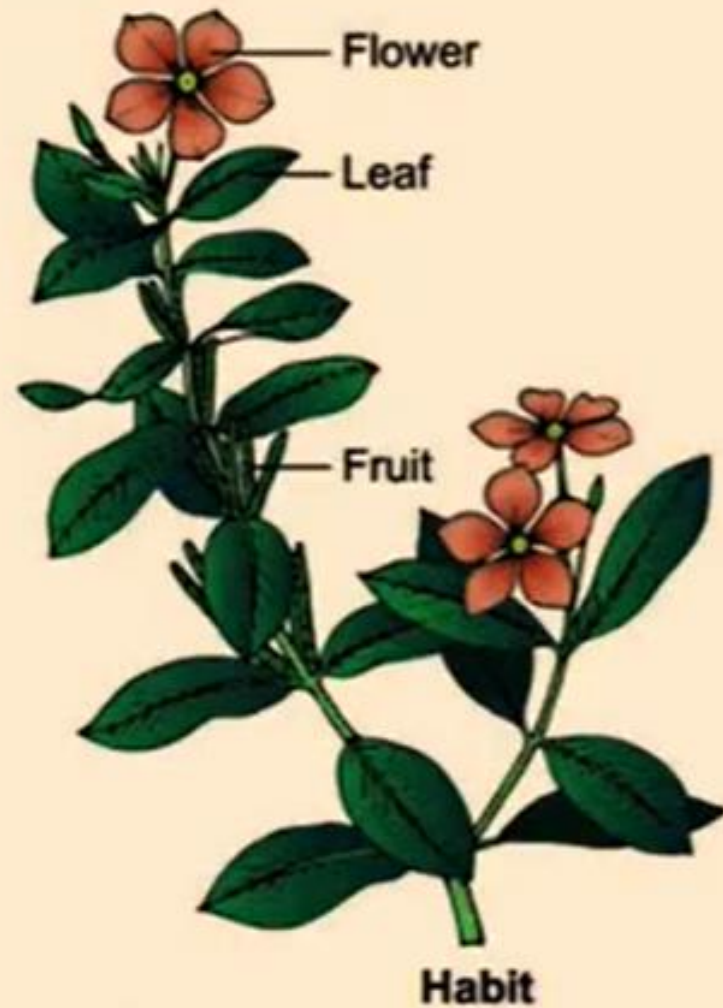
☺ **Bicollateral vascular bundle: -**

- 1. It is confined to certain dicot stem only.**
- 2. It is also conjoint but always opens type due to presence of fascicular cambium.**
- 3. It consists of two patches of phloem (outer and inner), two strips of cambium (outer and inner) one patch of xylem at the center.**



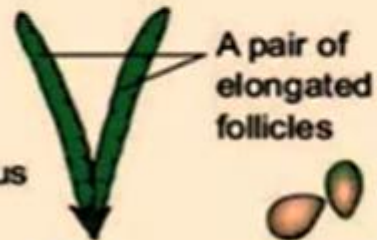
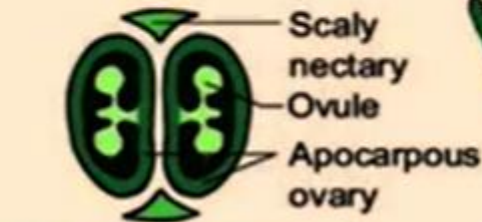
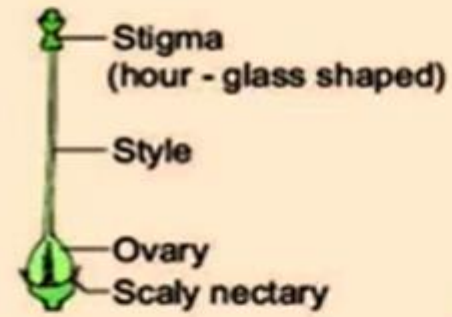
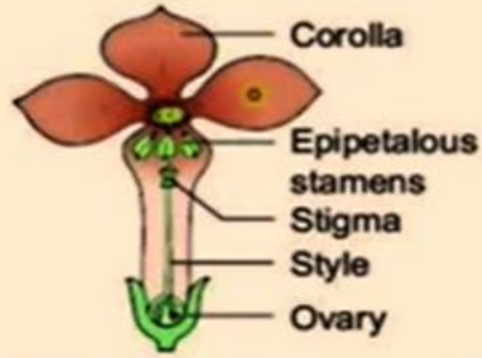
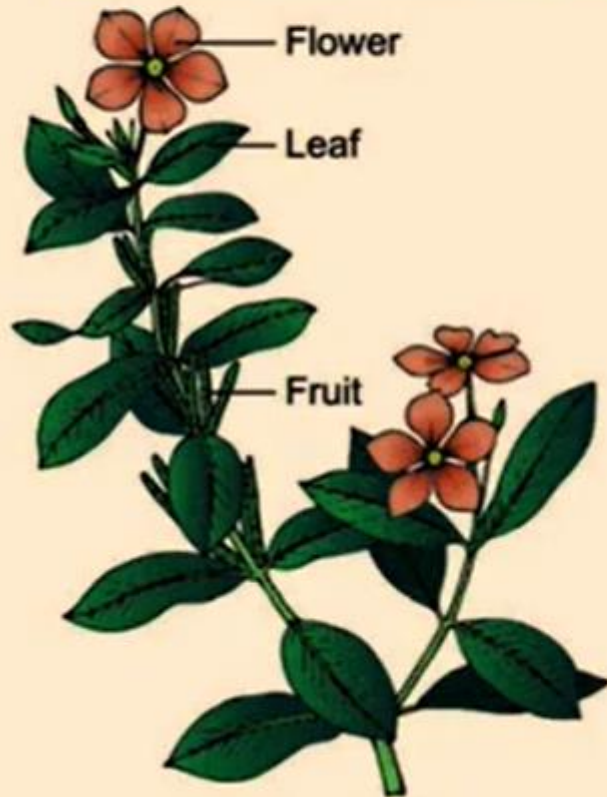
### A.3. Leaves:-

- ♣ They are opposite decussate (alternate in Thevetia), scattered (Plumeria and Nerium), whorled (Rauvolfia), simple, entire





# Floral characters



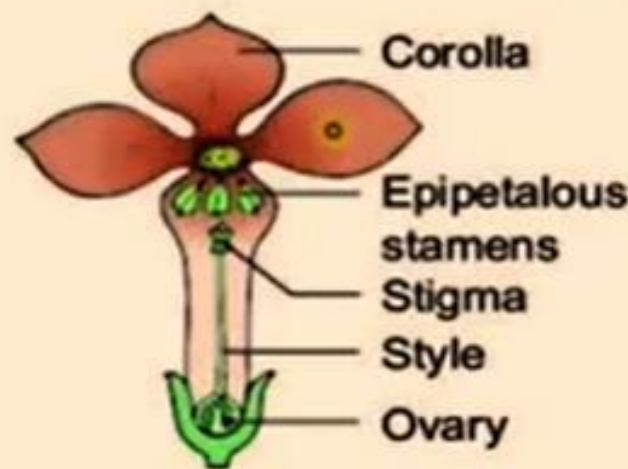


## B. Floral characters:-

### B.1. Inflorescence:-



- The flowers are arranged in axillary cymose (Allamanda) or (Plumaria) or paniced inflorescence.
- Rarely, the flowers are solitary (Vinca and Catharanthus).



L.S. of the flower

### B.2. Flower:-

- ♣ Flowers are bracteate, bracteolate, perfect, hermaphrodite, actinomorphic, pentamerous and hypogynous (epigynous in Epigynum).

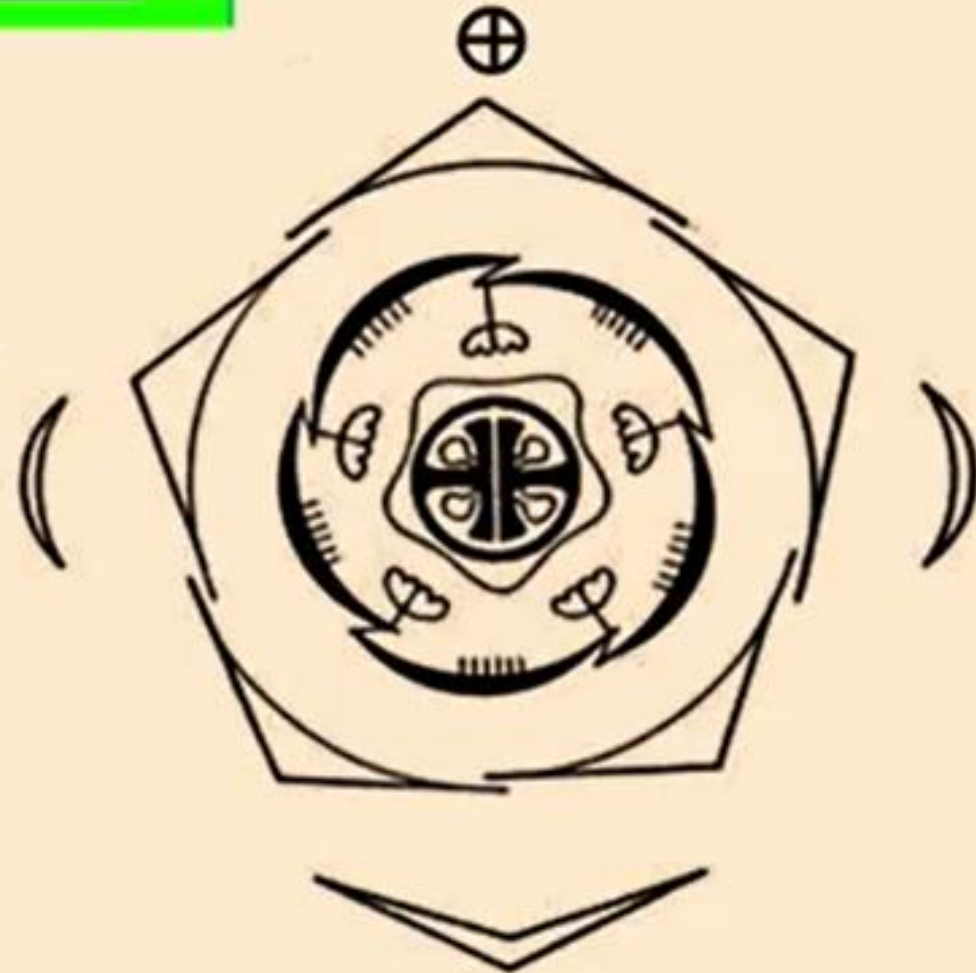
### B.3. Calyx:-

♣ Sepals 5, polysepalous, odd in posterior and aestivation – quincuncial (Thevetia & T. diversicata) or valvate (C. roseus).

### B.4. Corolla:-

- Petals 5, gamopetalous and odd in posterior.
- It is **hypocrateriform or salver form** (Vinca and Tabernaemontana), **infundibuliform or funnel-shaped** (Nerium), **campanulate or bell-shaped** (Apocynum) and **urceolate or urn-shaped** (Urceola).
- On the inner side of the throat of corolla tube, hairy outgrowths or other appendages may be present and it is something like the corona of Asclepiadaceae.
- The aestivation is usually twisted, but rarely it is also valvate.

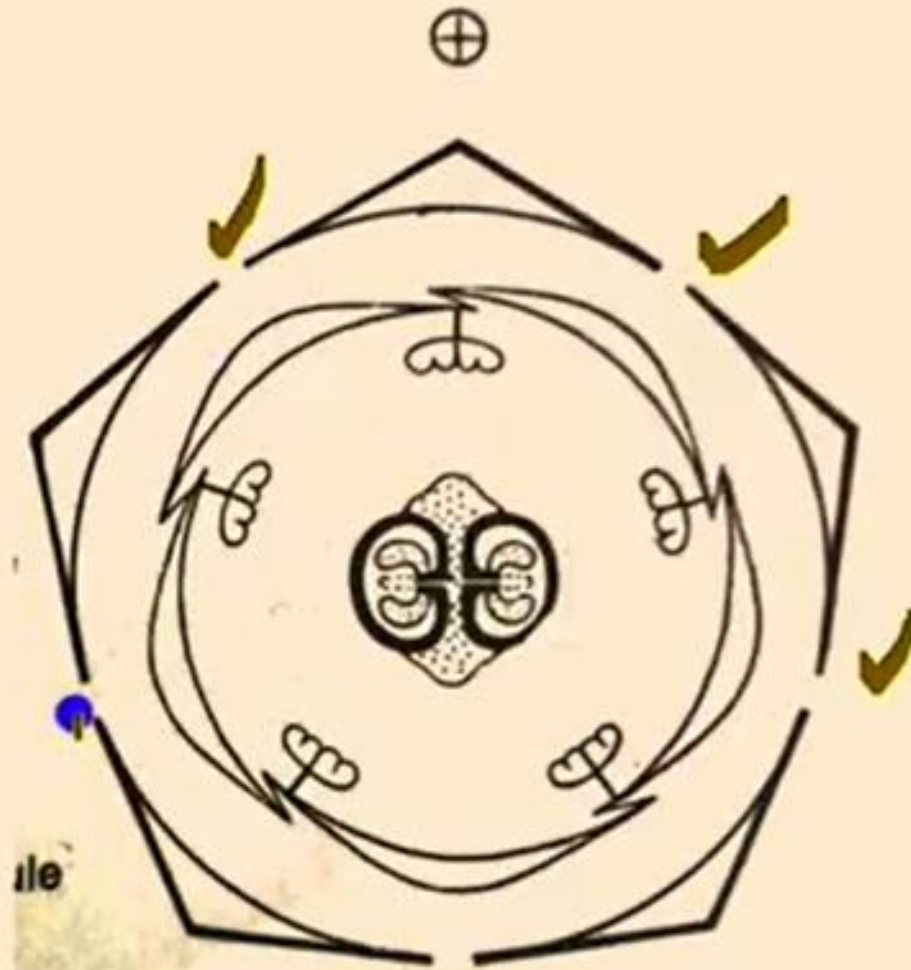
# Thevetia peruviana



$\text{Br brl}_2 \oplus \text{♀} \text{K}_5 \widehat{\text{C}}_{(5)} \text{A}_5 \underline{\text{G}}_{(2)}$



# C. roseus



$$\text{Ebr} \oplus \text{♀} \text{K}_5 \text{C}_{(5)} \text{A}_5 \text{G}_{(2)}$$

## B. Floral characters:-

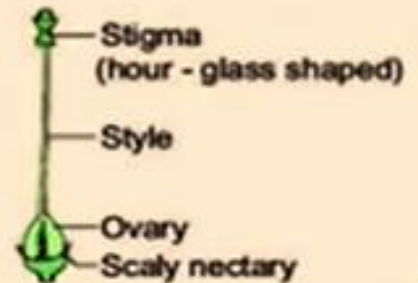
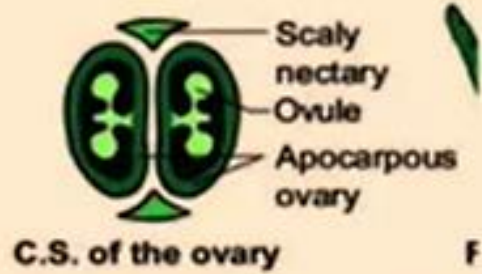
### B.5. Androecium:-



- It constitutes of Stamens 5, epipetalous, polyandrous but connivent around the stigma and alternipetalous.
- Anthers are sagittate, ditheous, inserted, introse and dehiscing longitudinally.
- Pollen grains are granular and free but are united into tetrad as in Condylocarpus (compare with pollinial masses of Asclepiadaceae).

### B.6. Gynoecium:-

- It is bicarpellary with superior or rarely partly inferior ovary (Plumeria).
- The ovaries of two carpels are frequently free or connate only at the common style. Each ovary is unilocular with marginal placentation.



**THANK YOU**



# **EUPHORBIACEAE**

## SYSTEMATIC POSITION ( **Bentham and Hooker's** )

Kindom : **Plantae**

Division : **spermatophyta**

Class : **Dicotyledons**

Sub class : **Monochlamydeae**

Series : **Unisexuales**

Family : **Euphorbiaceae**



- The family Euphorbiaceae consist of 300 genera, and about 7,500 species.
- This is fourth largest of all angiosperm families.
- They are cosmopolitan in distribution but particularly well represented in Africa, and South America.
- In India, it is represented by more than 70 genera, and about 450 species.
- In Gujarat 25 genera and 63 species are found.



## VEGETATIVE CHARACTERS

**Habit** -The plants have a great variation in their habit. The plants may be annual herbs (*Phyllanthus amarus*), shrubs (*Ricinus Communis*) or tree (*phylanthus emblica*).

**Root** -Tap and branched.

**Stem** - Aerial, herbaceous or woody, erect or prostrate, cylindrical, branched, solid or hollow (*Ricinus communis*), usually contains milky latex (*E.tirucalli*) Or watery latex (*Jatropha curcas*).





**Leaves** - Stipulate or exstipulate, petiolate, alternate

(*Ricinus communis*), simple, entire, reticulate venation,

In xerophytic species of Euphorbia leaves are absent.





## FLORAL CHARACTERS

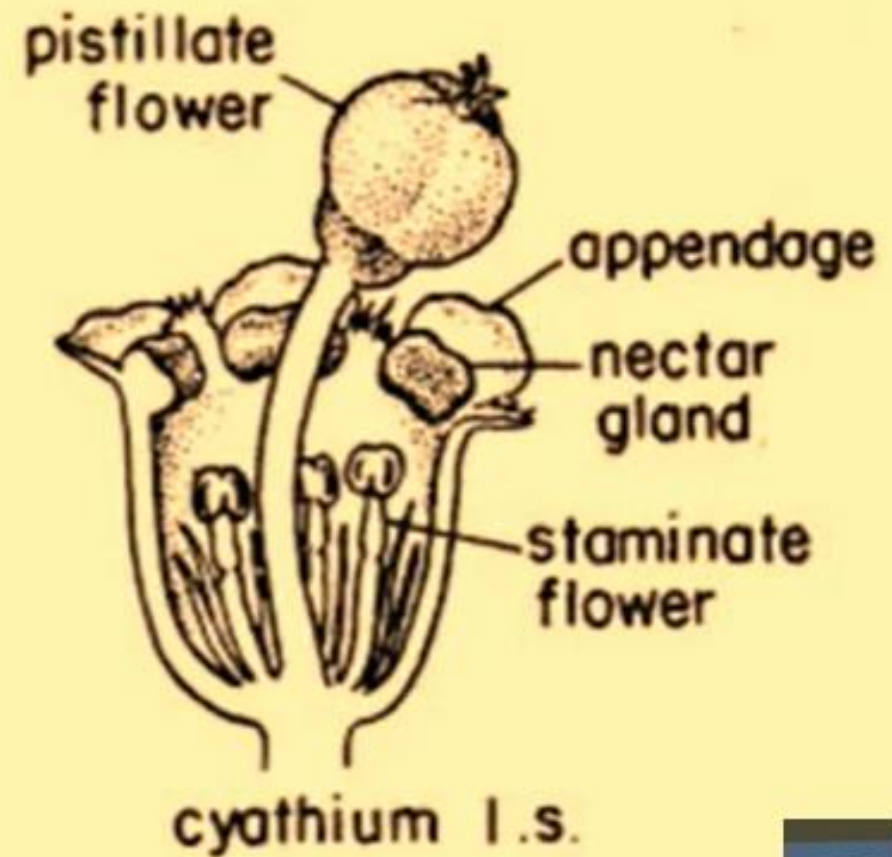
**Inflorescence** - The inflorescence varies greatly. It may be cyathium, racemose (*croton sparsiflorus*), penicel (*Ricinus communis*)



racemose (*croton sparsiflorus*)



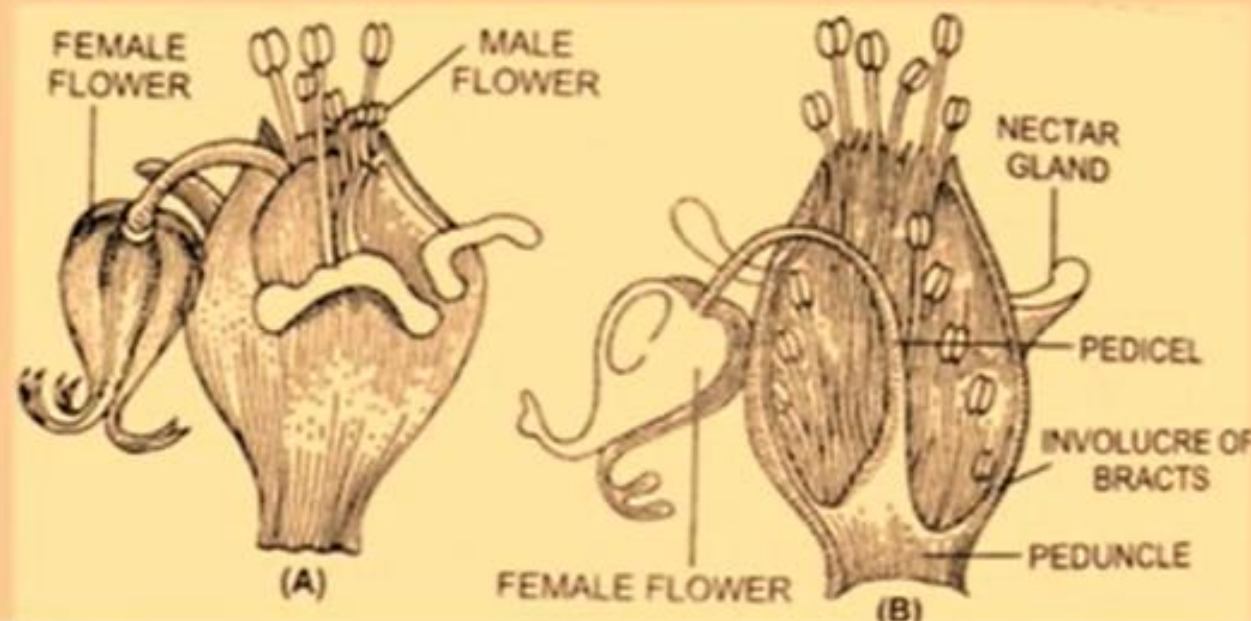
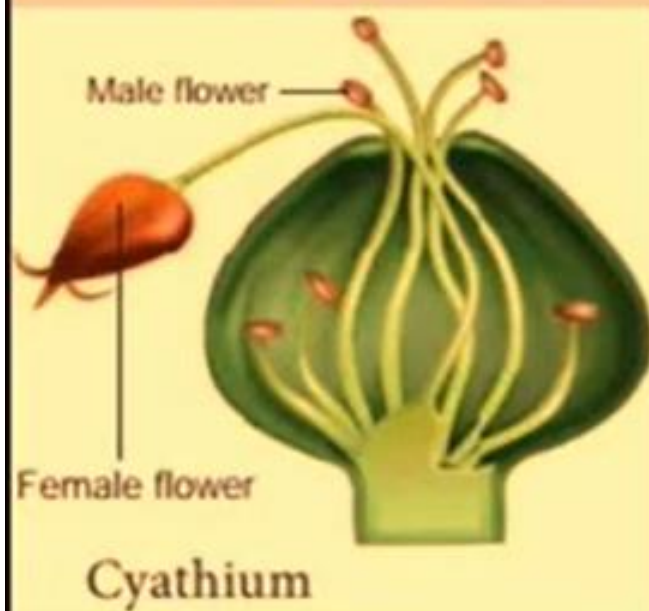
penicel (*Ricinus communis*)



*Euphorbia* inflorescence



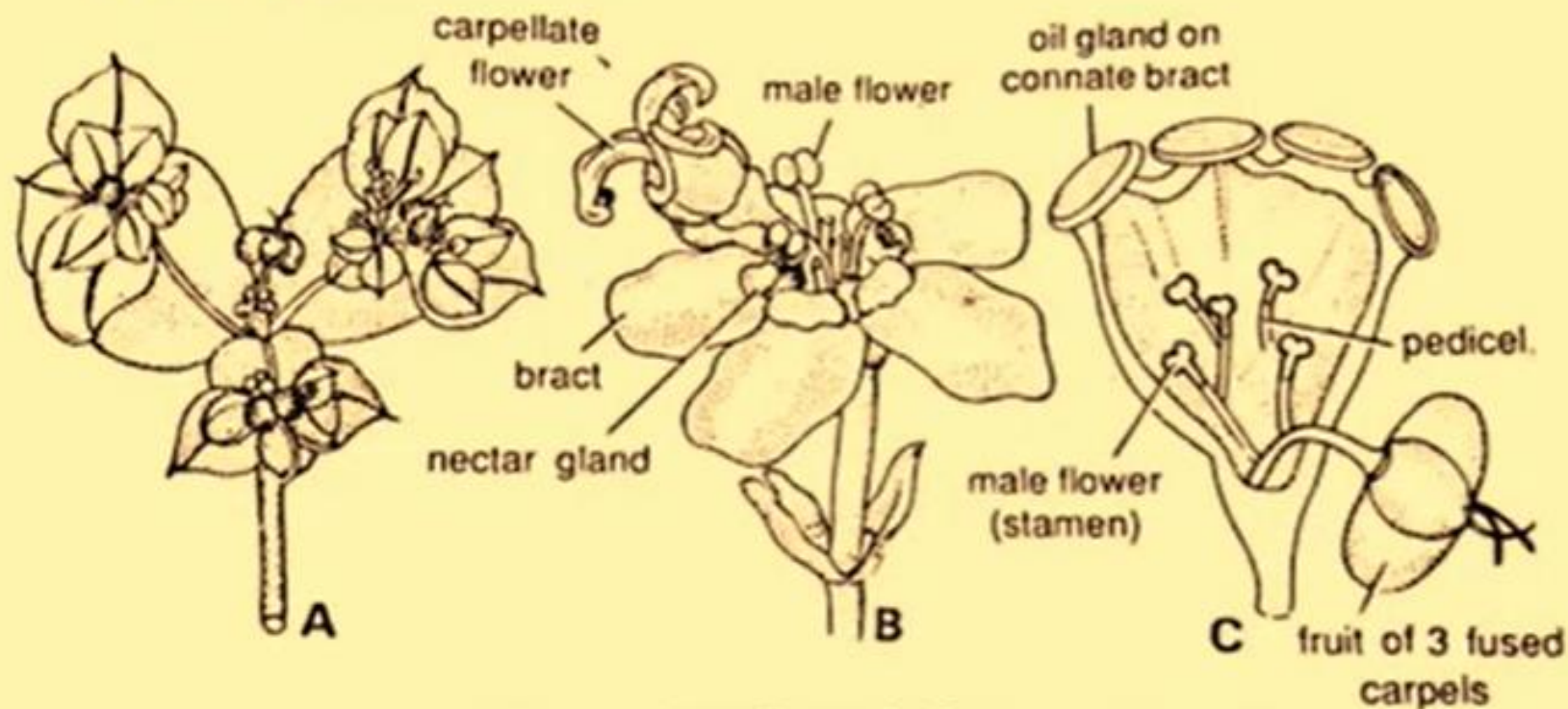
**2. Cyathium:** The bracts or the involucre fuse and form a cup-shaped structure on the margin. This houses the glands. In the central part of the cup-shaped structure, you can find the female flowers. These mature earlier. Due to the growth of pedicel, this comes out from the cup-shaped structure. Small male flowers surround these female flowers. These are also found on Pedicel. The male flowers, which lie towards the centre, mature earlier than the flowers which are towards the periphery. This inflorescence is found in Euphorbiaceae family like *Euphorbia*, *Poinsettia*, *Pedilanthus*.





**Flowers:** Bracteates, ebracteolate, pedicellate, unisexual, monoecious

or dioecious, incomplete, regular, actinomorphic and hypogynous.



**Fig. 18.95** A: Cyathia of *Euphorbia helioscopia*; B: A cyathium of *E. corollata*, and C: L.S. cyathium of *E. helioscopia*.



**Perianth** : In *croton sparsiflorus*, the male flowers have two whorls of perianth whereas the female flowers have a single whorl of perianth.

The male and female flowers are usually devoid of perianth(aphyllous).

The tepals are polyphyllous in *phyllanthus* and gamophyllous in *Ricinus communis*. The perianth lobes are free or united sepaloids or petaloids. The aestivation is valvate or imbricate.





## **Perianth:-**

- \* It is the collective name of undifferentiated calyx and corolla.
- \* Unit is tepal.
- \* Represented by **P**.

## **Cohesion:-**

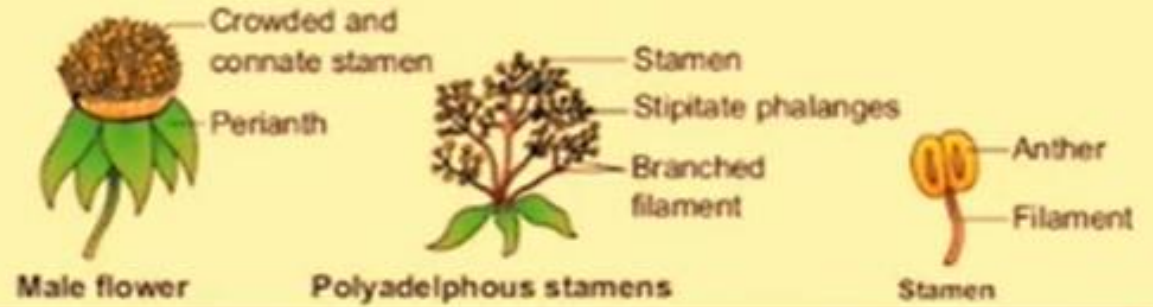
1. Polyphyllous or polytepalous:- when tepals are free.
2. Gamophyllous or gamotepalous:- when tepals are fused.

## **Types of tepal:-**

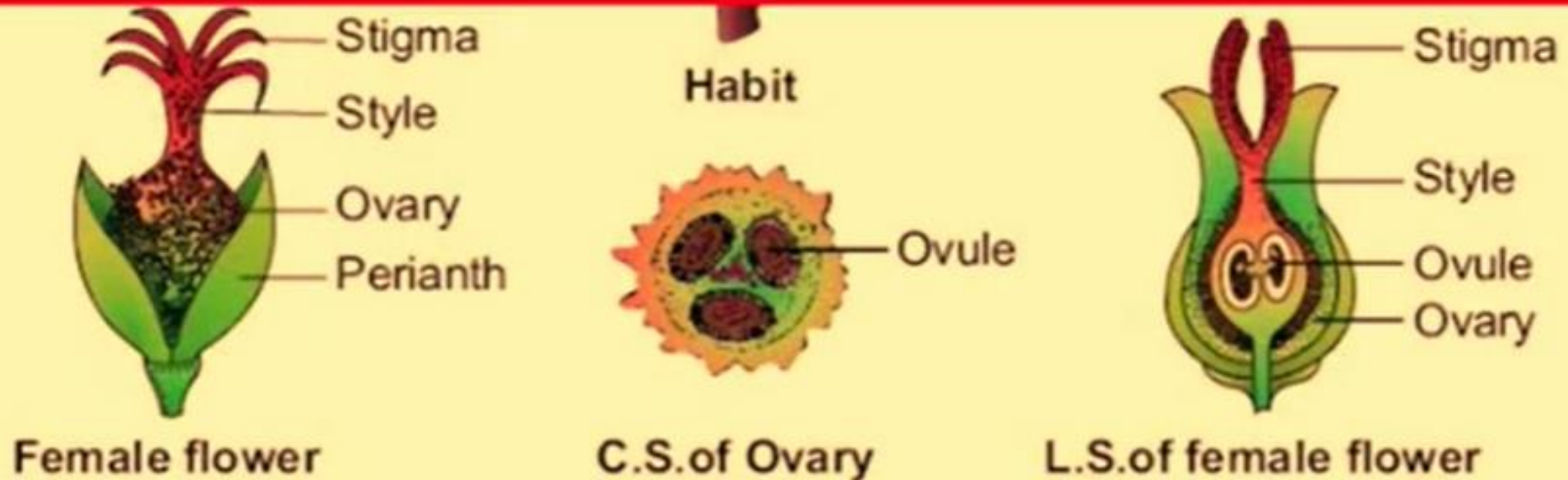
1. Sepaloid:- Sepal-like.
2. Petaloid:- petal-like.

**Aestivation:- like calyx & corolla.**

**Androecium** - stamens one to many, free or united. The anthers are dithecous.



**Gynoecium** - Three carpels (tricarpeillary), syncarpous, trilocular, superior. Each locule contains one or two pendulous, anatropous ovules. The placentation is axile.





Fruit - The fruits are schizocarpic , regma or drupe.

Seed – Endospermic.

Pollination - Entomophilous,

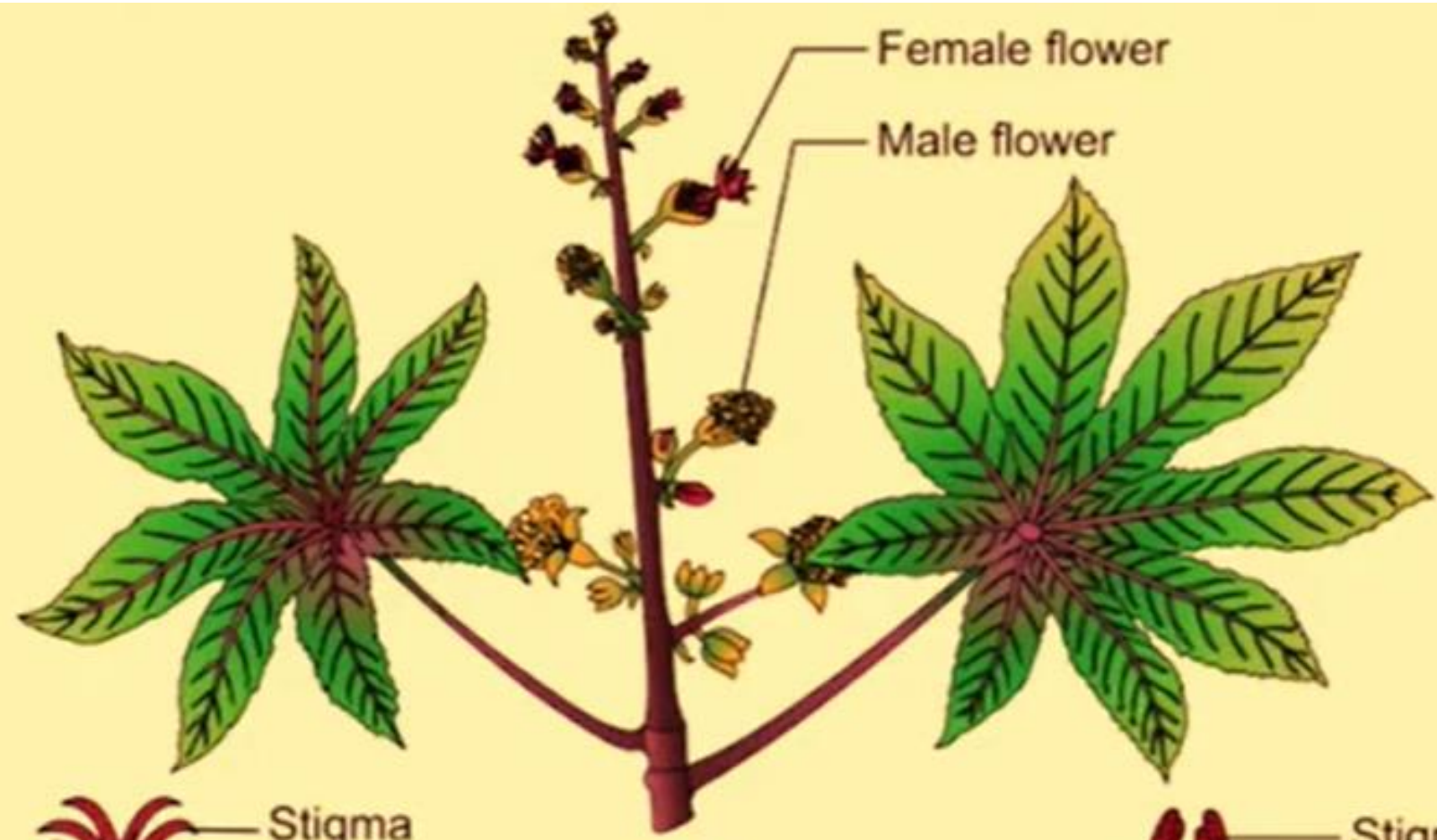


**Floral Formula :**

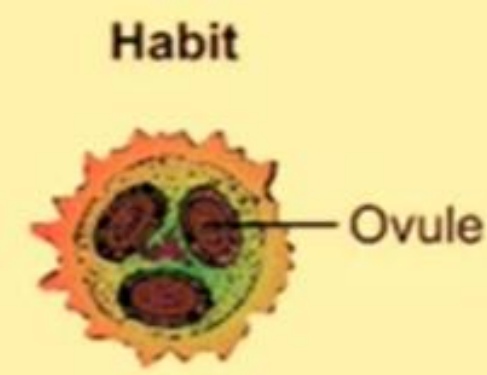
Male flower :  $Br, Brl, \oplus, \text{♂}, P_{0 \text{ or } 5}, A_{1-\alpha}, G_0$

Female flower :  $Br, Brl, \oplus, \text{♀}, P_{0 \text{ or } 5}, A_0, \underline{G}_{(3)}$





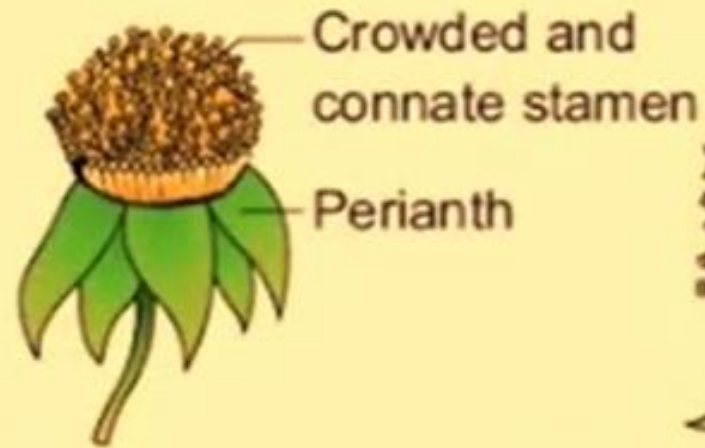
Female flower



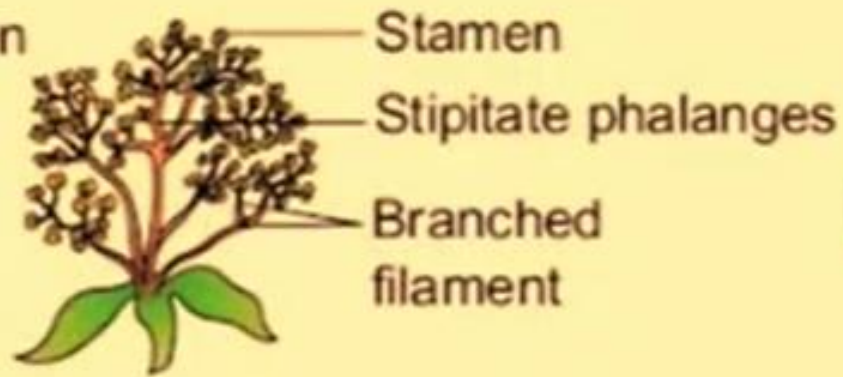
C.S.of Ovary



L.S.of female flower



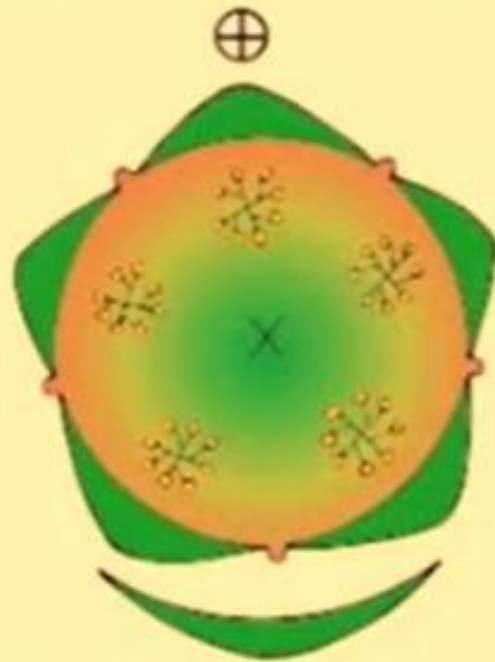
Male flower



Polyadelphous stamens



Stamen



Floral diagram of male flower

Floral formula of male flower  
 $Br., Ebrl., \oplus, \sigma, P_{(5)}, A_{\infty}, G_0$

Floral formula of female flower  
 $Br., Ebrl., \oplus, \text{♀}, P_{(3)}, A_0, \underline{G}_{(3)}$



Floral diagram of female flower

Figure 5.22: *Ricinus communis*

**THANK YOU**