

Angiosperm Family

Ranunculaceae and Malvaceae

1. Classification of Ranunculaceae

2. Characters of Ranunculaceae

3. Distribution of Ranunculaceae

3. Economic Importance

Classification

According to Bentham and Hooker

CLASS:	<i>Dicotyledonae</i>
SUB-CLASS:	<i>Polypetalae</i>
SERIES:	<i>Thalamiflorae</i>
ORDER:	<i>Ranales</i>
FAMILY:	<i>Ranunculaceae</i>

Class : **Dicotyledones** – Reticulate venation ,
Flower Pentamerous .

Sub class: **Polypetalae** – Petals free

Series : **Thalamiflorae** – Flower Hypogynous,
Ovary Superior.

Order : **Ranales** – Stamens indefinite,
Gynocium apocarpous.

Family : **Ranunculaceae** - Flower spirocyclic,
Gynocium Polycarpillary,
Apocarpous, Stamens
indefinite, Spirally arranged
and Extrose.

Introduction

- ▶ Ranunculaceae (little frog) is known as **buttercup or crowfoot** family.
- ▶ The family includes 50 genera and 1900 species'. In India presence 20 genera or 163 species.
- ▶ Members of this family are distributed in tropical & subtropical regions of the world.
- ▶ Members of this family are terrestrial & some are aquatic
- ▶ Most of them poisonous properties hence used in medicines
- ▶ **Common plants** :Ranunculus (Butter cup) , Delphinium (Larkspur), Anemone (Wind flower), Aconitum (monk hood) etc.



Nigella satavia



Aconitum



var. aquatilis

Ranunculus aquatilis





Delphinium

Morphological description

👉 **Vegetative Characters:**

👉 **Floral Characters:**

Morphological description

- ▶ Habit : Annual or perennial herbs , some are shrub or woody climber , rarely tree .

The plants are annual or perennial herbs or a climbing shrubs (Clematis, Naravelia), rarely trees. They perennate by means of tuberous roots (Aconitum) or rhizomes.

Morphological description

- ▶ Root : Tap or adventitious roots , sometimes tuberous and store root (*Aconitum*)

Tap root, adventitious or tuberous (*Ranunculus* spp. and *Aconitum*). The tap root system is in the initial stage but sooner or later replaced by the adventitious roots.

Morphological description

- ▶ Stem : Mostly herbaceous , aerial and annual , climbing in *clematis* and woody in *Paeonia*

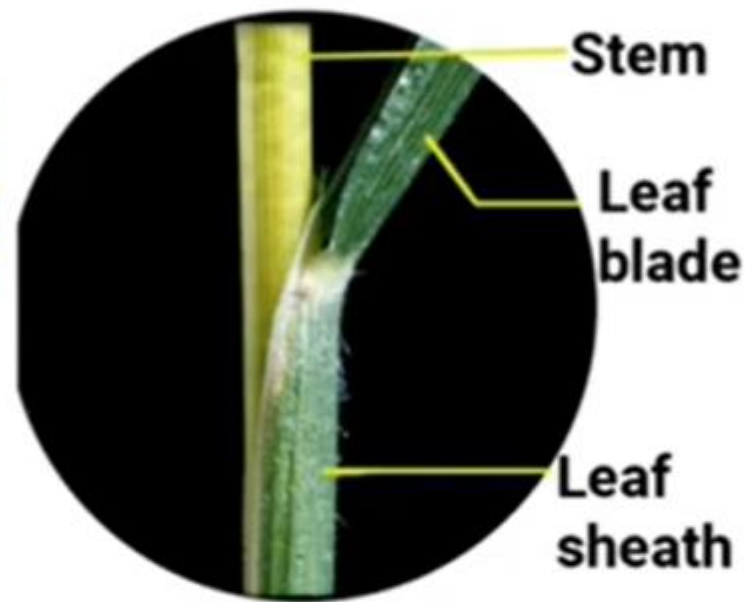
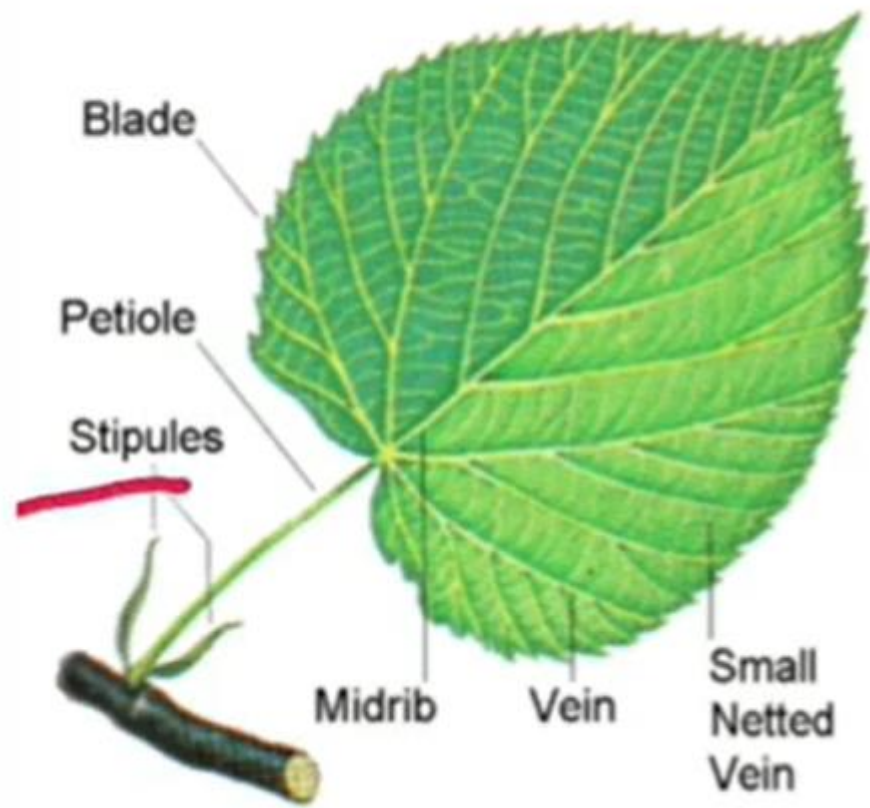
Herbaceous, in some climbing (Clematis) or underground rhizome or erect, branched.

Morphological description

- ▶ **Leaf**: Radical or cauline, exstipulate, petiolate, simple, palmately compound unicostate or multicostate venation.

Generally simple, alternate, or opposite (Clematis),
Exstipulate rarely Stipulate (Thalictrum), Sheathing leaf base, Petiolate rarely Sessile (Delphinium).
In some aquatic species leaves may show Dimorphy (Ranunculus aquatilis); Unicostate or Multicostate Reticulate venation.





Sheathing
leaf base

Morphological description

Floral Characters:

Inflorescence:

Solitary terminal (Anemone),

Axillary (Clematis),

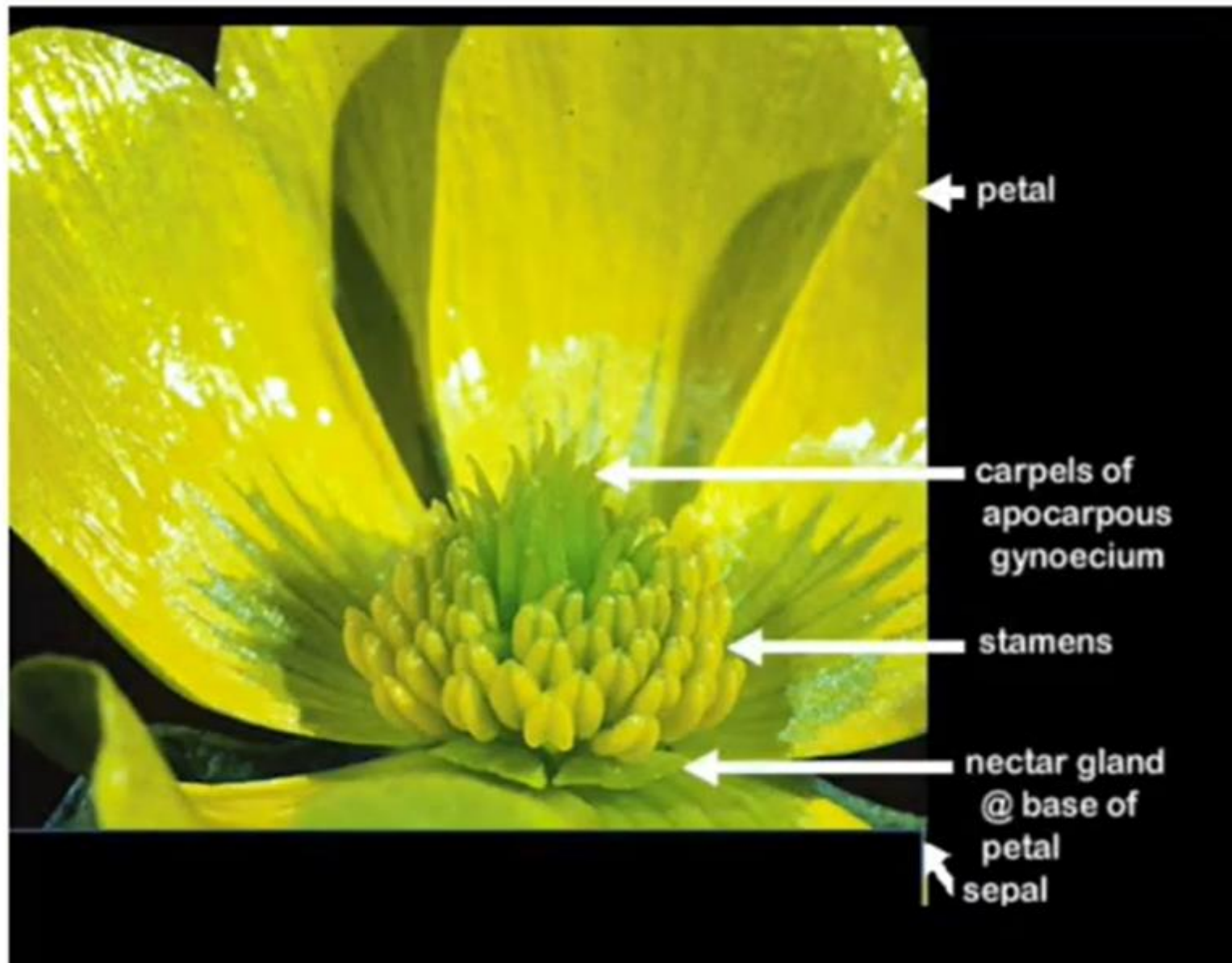
Raceme (Aconitum, Delphinium)

Cymose (Ranunculus spp.).



Flower:

Pedicellate, ebracteate rarely
bracteate, hermaphrodite,
(unisexual in *Thalictrum*). Mostly
actinomorphic (*Ranunculus*) rarely
zygomorphic (*Delphinium* and
Aconitum) hypogynous, complete



← petal

← carpels of
apocarpous
gynoecium

← stamens

← nectar gland
@ base of
petal

← sepal

Calyx:

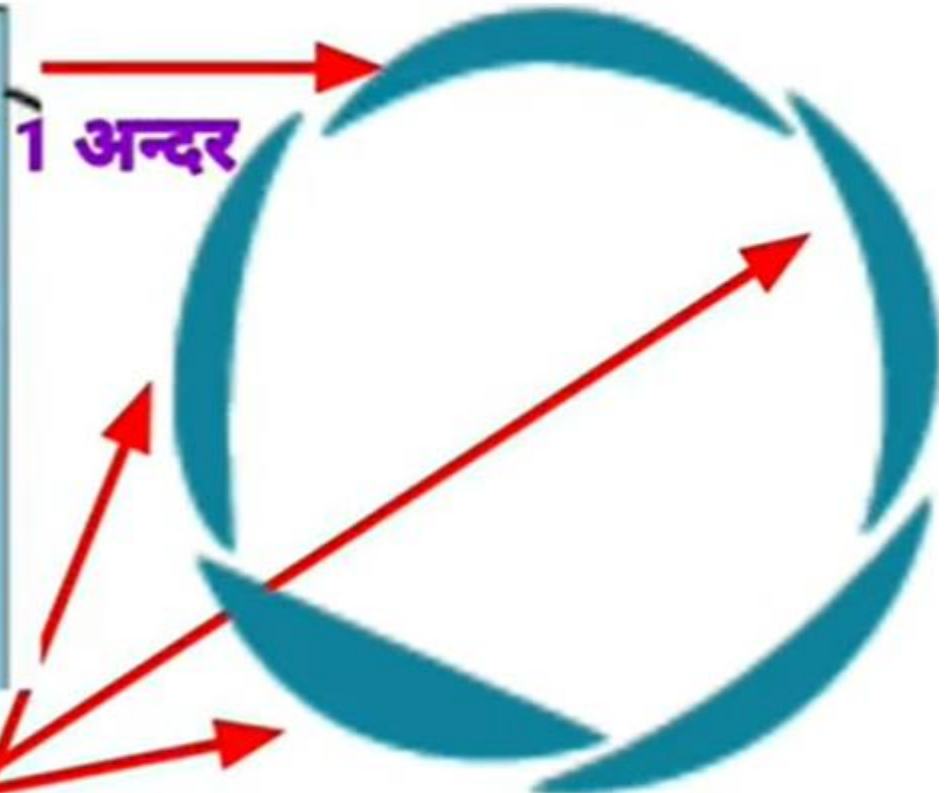
There is no distinction of calyx and corolla in most of the flowers. Sepals 5, caducous, polysepalous, petaloid, imbricate or valvate aestivation.

A. Valvate: Margins of sepals or petals do not overlap but just touch each other.
Example: Calyx in members of Malvaceae, *Calotropis*, *Annona*.



A

C. Imbricate: Sepals and petals irregularly overlap on each other; one member of the whorl is exterior, one interior and rest of the three having one margin exterior and the other interior.
Example: *Cassia*, *Delonix*



1 अन्दर

3 अन्दर और बाहर

C

1 बाहर

Corolla:

Petals 5, polypetalous, variously coloured, caducous or wanting; nectaries present at the base of petals. Petals are united to form spur (Delphinium)



Androecium:

Stamens indefinite, polyandrous, spirally arranged on the thalamus, inferior; anthers dithecous, extrorse and adnate.

Gynoecium:

Polycarpellary (one carpel in Delphinium and 3 to 5 in Aconitum), apocarpous rarely syncarpous (Nigella), ovary superior, marginal placentation (axile in Nigella).



Fruit:



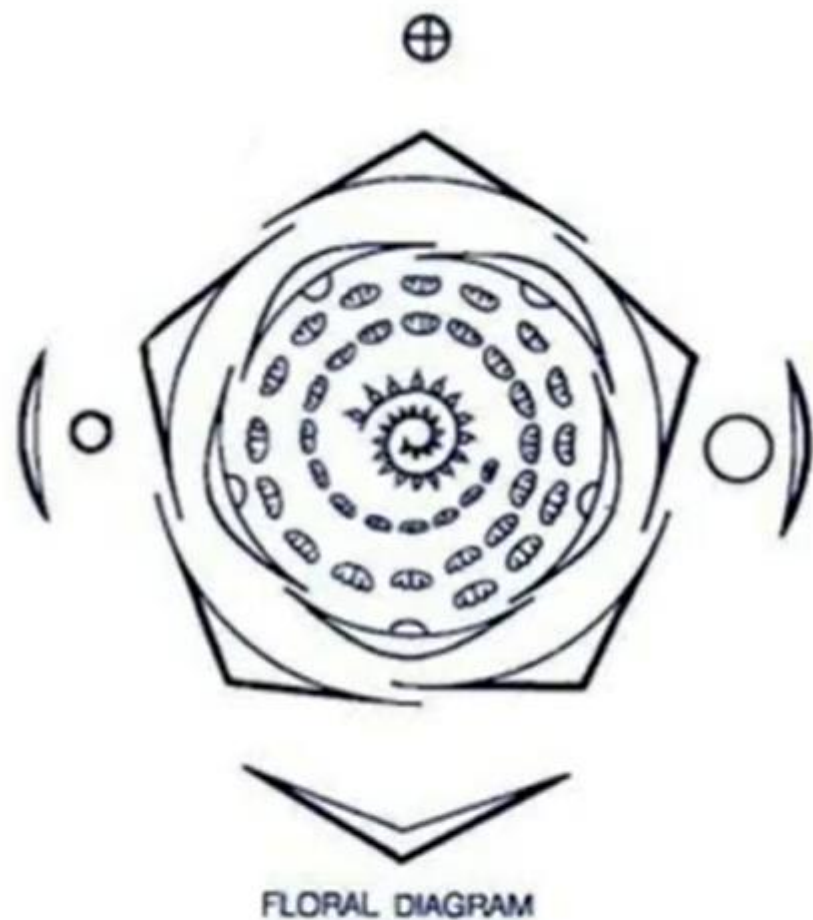
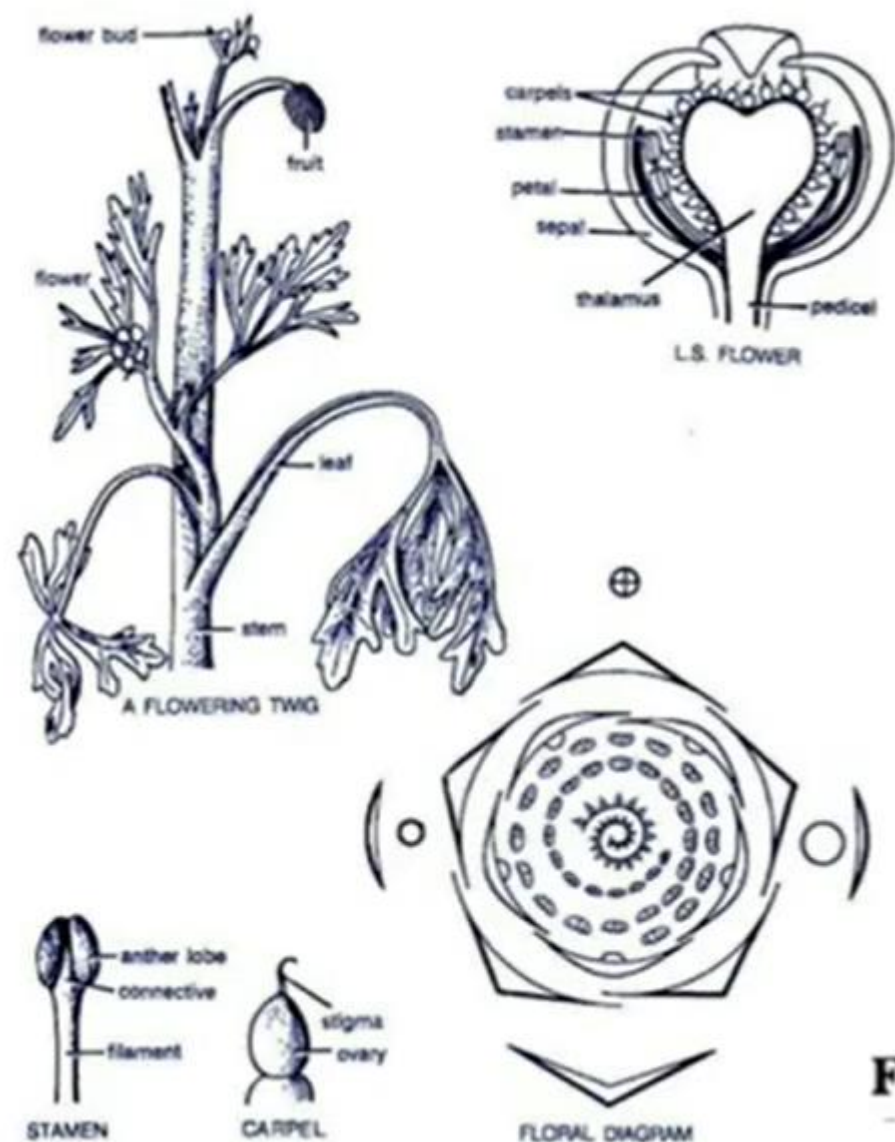
Aggregate, Etario of achenes (Ranunculus),
Etario of follicle (Aconitum), **Follicle**
(Delphinium), **Septicidal capsule (Nigella) or**
Berry (Actaea) Etario of Drupes (Adonis),
Etario of Berries (Hydrastis) and simple Pod
(Xanthorrhiza).

Pollination:

Generally entomophilous (Delphinium, Aconitum, Aquilegia) and anemophilous in Thalictrum.

Floral formula:

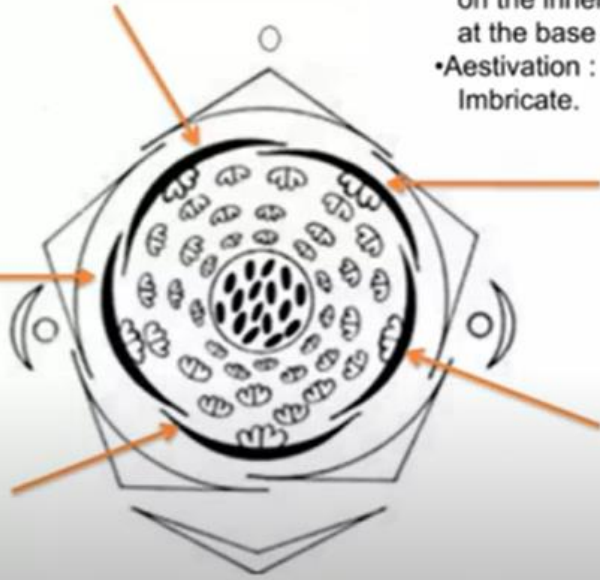
- $\oplus \text{ } \overline{\text{♀}} \text{ } K_{4-5} \text{ } C_5 \text{ } A_{\alpha} \text{ } G_{\underline{\alpha}}$



Floral formula. Br, brl, \oplus , ♀ , K_5 , C_5 , A_{∞} , G_{∞} .

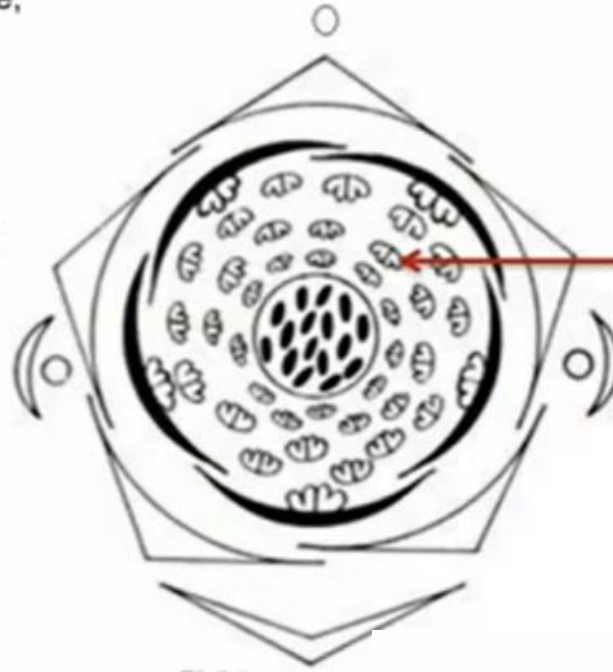
Corolla : C₅

- Petals 5,
- Polypetalous,
- Pocket-shaped nectary on the inner side at the base of each petal,
- Aestivation : Imbricate.



(i)

- Stamens indefinite,
- Polyandrous,
- Spirally arranged
- Anthers elongated
- Filament long,
- Basifixed,
- Extrorse.



Stamens

Gynoecium : □

- Polycarpellary,
- Apocarpous,
- Ovary superior,
- Unilocular,
- Basal placentation



Carpels

Economic Importance of Ranunculaceae:

1. Condiment:

The seeds of *Nigella sativa* (H. Kalongi) are used as spice in pickles.

2. Medicinal:

Aconitum heterophyllum and *A. napellus* yield a number of alkaloids specially aconitin. This is used in acute and inflammatory diseases. The roots of *Thalictrum* yields "mamira", which is used in ophthalmia. *Anemone pulsatilla* is mostly used in feminine diseases and in gastric derangements. Pulsatilla obtained from *Anemone pulsatilla* is a good medicine for menstrual disorder.

Cimicifuga racemosa gives the black Snake root containing resins. This has been recommended for treatment of cholera and nervous pain.

Helleborus niger and *H. foetida* produce glycosides useful as purgatives in veterinary practices.

Delphinium staphisagria is used as antiparasitic ointment.

3. Ornamental:

Some of the plants are cultivated in gardens for their beautiful flowers viz., Ranunculus, Delphinium, Naravelia, Clematis, Nigella and Caltha.



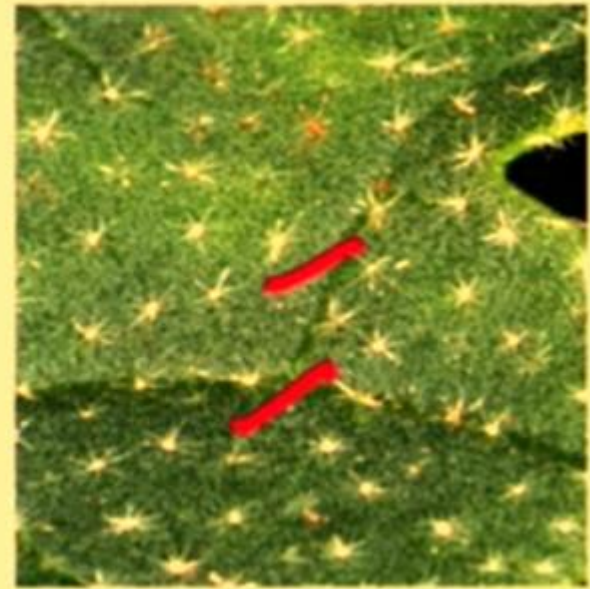
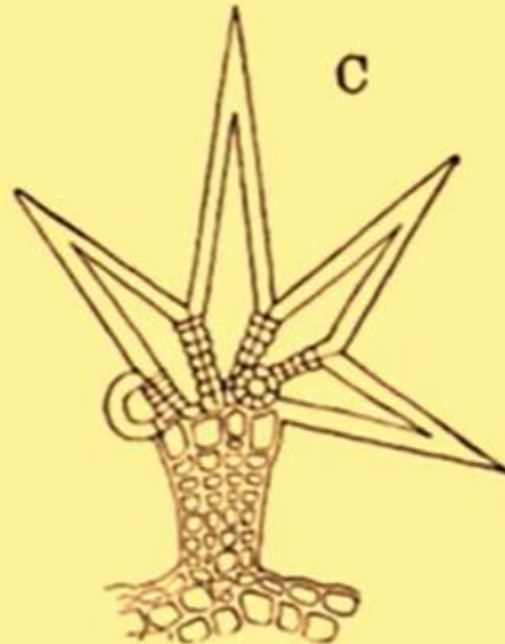
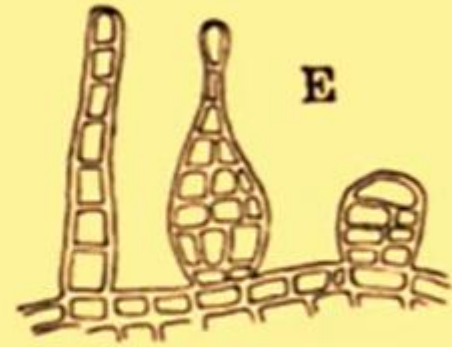
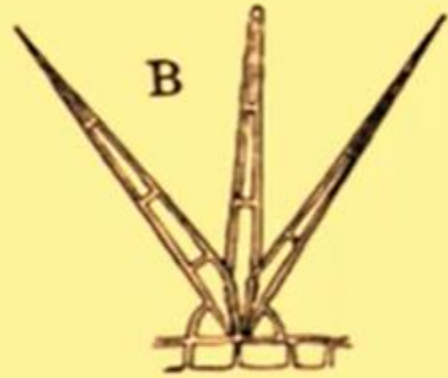
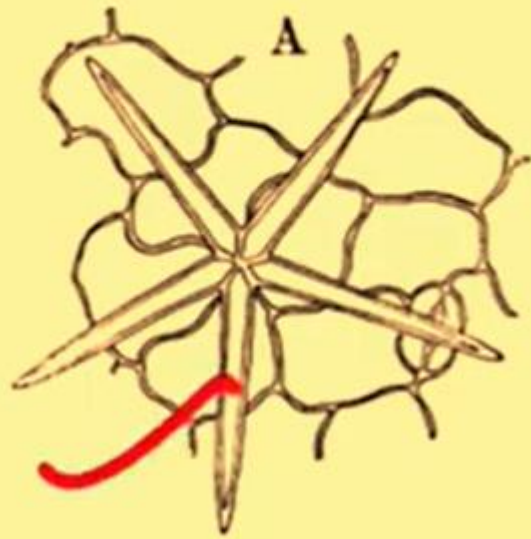
THANK YOU

CLASSIFICATION

CLASS -	Dicotyledonae
SUB-CLASS-	Polypetalae
SERIES-	Thalamiflorae
ORDER-	Malvales
FAMILY -	Malvaceae

Habit:

The plants are generally herbs (Abutilon, Malva, Sida, Urena), shrubs (Hibiscus, Gossypium), and a few trees (Gossypium arboreum) with a mucilaginous sap in all parts. Usually young parts of the plants are covered with stellate hairs.



Root:

Tap, root, branched.

Stem:

Herbaceous (Malva) or woody (Hibiscus), branched, erect or spreading (Sida, Malva parviflora) pubescent with stellate hairs.

~~Leaves:~~

Alternate, petiolate, stipulate, stipules
deciduous (Malva), simple, entire or palmately
divided or lobed, margin wavy or serrate, apex
acute, multicostate reticulate venation.



B. Floral characters:

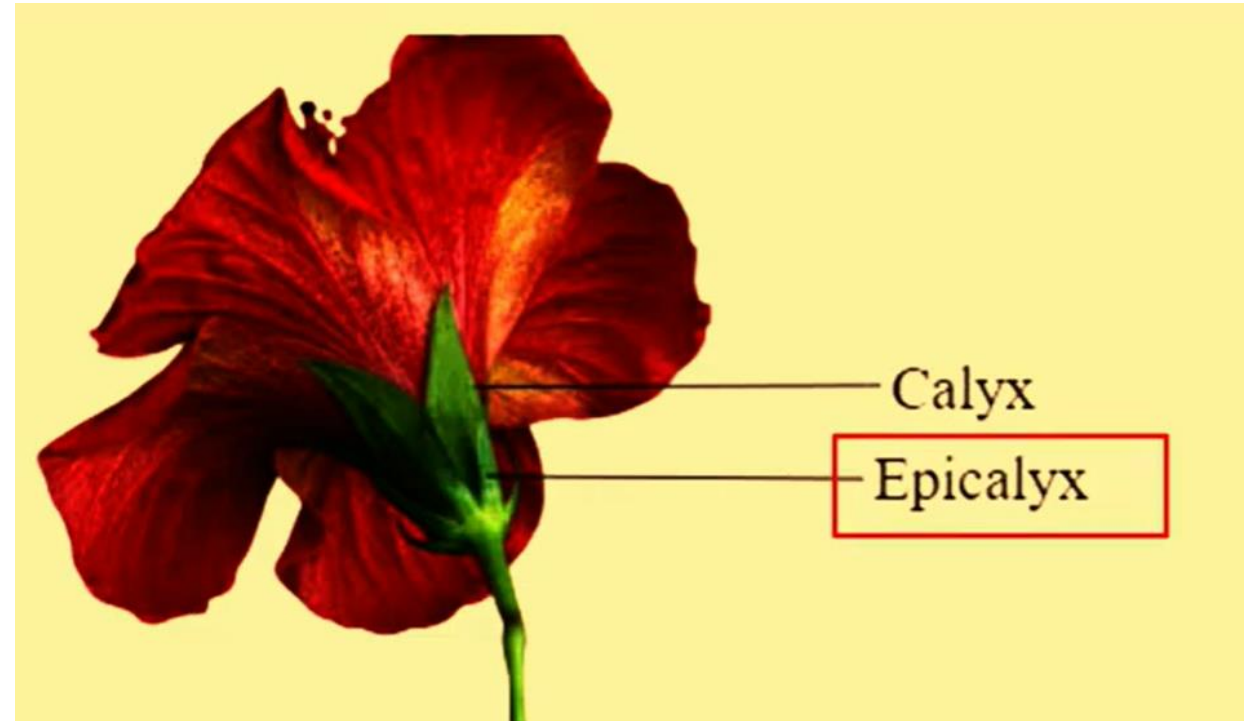
Inflorescence:

Solitary axillary (Hibiscus, Urena), solitary terminal (Abutilon), raceme (Althaea), panicle (Kydia).



Flower:

Pedicellate, bracteate, bracteolate in the form of epicalyx, hermaphrodite rarely unisexual (Napaea), complete, actinomorphic, pentamerous, hypogynous.



Flower:

Pedicellate, bracteate, bracteolate in the form of epicalyx, hermaphrodite rarely unisexual (Napaea), complete, actinomorphic, pentamerous, hypogynous

Epicalyx:

Epicalyx 3 (Gossypium), 7 to 9 (Althaea) and in a few totally absent (Abutilon, Sida).

Calyx:

Sepals five, connate at the base, persistent, sometimes forming a tube (Urena), valvate aestivation.

Corolla:

Petals 5, polypetalous sometimes slightly connate at the base with the staminal tube-thus epipetalous, large showy, twisted. Prominent veins can be observed on the petals.

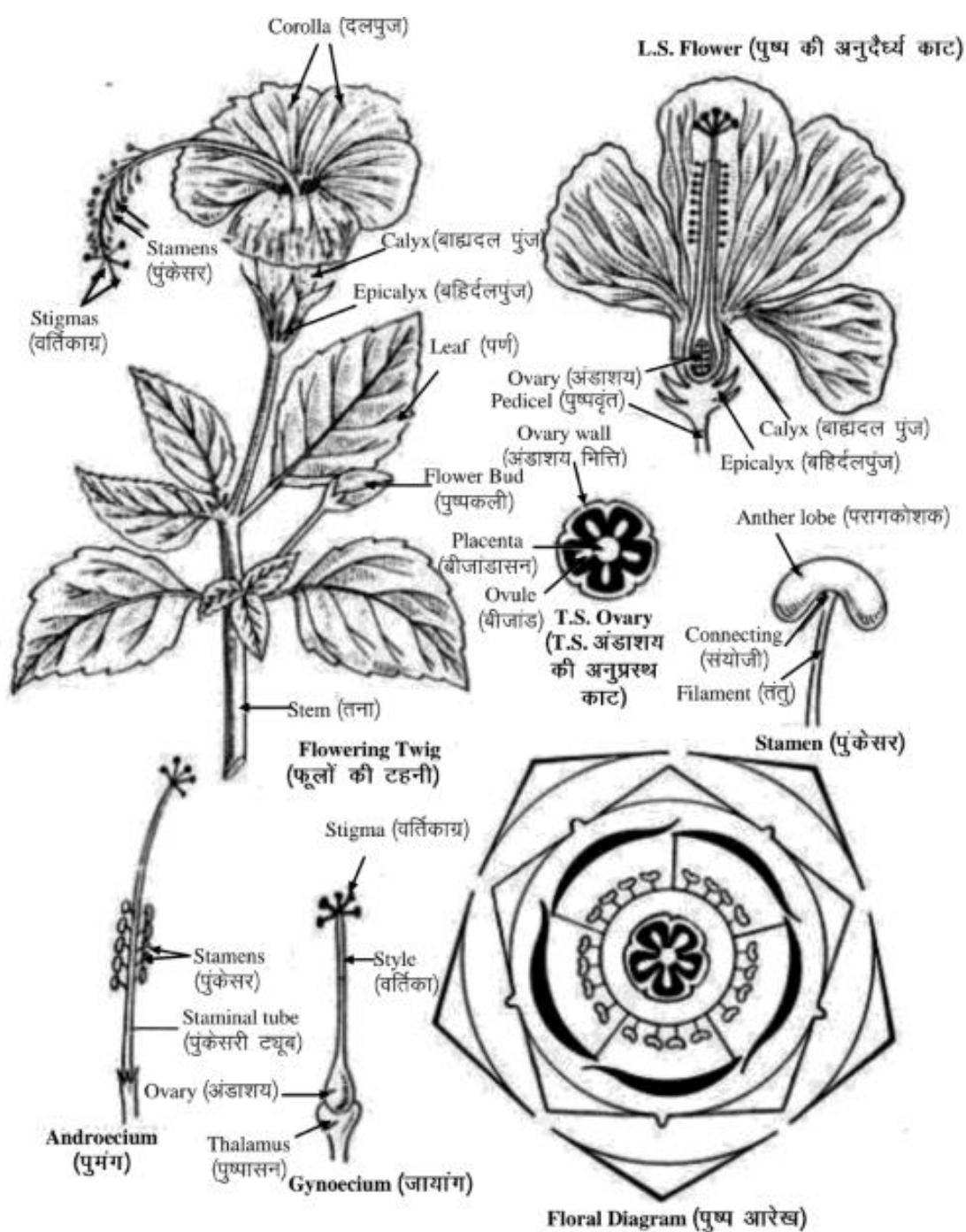


Androecium:

✓
Stamens indefinite, monadelphous, forming a staminal tube; epipetalous staminal tube united with the corolla, anthers monothecous, reniform, basifixed, filament short, introse.

Gynoecium:

Multicarpellary usually five (Hibiscus) or ten (Althaea) indefinite (Abutilon) or 3 (Kydia); syncarpous, ovary superior, penta or multilocular with axile placentation, ovules one to many in each loculus; style one, long, passing through the staminal tube; stigma correspond to the number of carpels.



Floral Formula: $Br^{\oplus} \text{♀} K_{(5)} C_5 A_{(\infty)} G_{(5)}$

Figure 3.4: *Hibiscus rosa sinensis* (चित्र 3.4—हिबिरकस रोजा साइनेंसिस)

3.3.4. Economic Importance of its Members

- 1) *Abutilon asiaticum* (English name - Don and Vernacular name – Kanghi or Atibala) is a shrub grown for its stem fibre that is used to make ropes and cordage.
- 2) *Abutilon indicum* (English name - Indian Abutilon and Vernacular name - Kanghi) is a shrub whose stem on retting produces a fibre that is used to make rope.
- 3) *Althaea rosea* (English name - Hollyhock and Vernacular name - Gulkhera) is an ornamental herb whose flowers are used to produce red dye.
- 4) *Abelmoschus esculentus* or *Hibiscus esculentus* (English name - Lady's finger and Vernacular name - Bhindi) is a plant whose fruits are consumed as vegetables and stems are occasionally used to make fibres.
- 5) *Abelmoschus manihot* or *Hibiscus manihot* (Vernacular name - Ran bhendi) is a plant whose stem yields fibre that is used to make wrapping paper.

- 6) *Gossypium arboretum* or *G. indicum* or *G. neglectum* (English name - Tree cotton and Vernacular name - Kapas, Rui) is a shrub that is grown as a fibre plant.

The fibre extracted from the seed's surface is used to make various textiles, rubber-tyre fabric and other woven goods.
- 7) *Gossypium herbaceum* (English name - Asiatic cotton and Vernacular name - Kapas) is a plant whose seeds yield a fibre that is used to make cloth and other woven goods and its oil-cakes are used as fertiliser and fodder.
- 8) *Hibiscus cannabinum* (English name - Kenaf and Vernacular name - Patsan) is a plant whose stem yields fibre that is used to make paper pulp, ropes, and cordage and its seed oil is also edible.
- 9) *Hibiscus furcatus* Roxb. is a plant whose stem produces fibre that is used to flavour food and its leaves can be eaten.
- 10) *Hibiscus macrophyllus* Roxb. (Vernacular name - Baiza) is a small shrub whose stem yields fibre that is used to make cordage and ropes.
- 11) *Hibiscus mutabilis* (English name - Cotton rose and Vernacular name - Guliajaib) is a bushy shrub whose bark can be used to make cordage and ropes.
- 12) *Hibiscus rosa-sinensis* (English name - Rose of China and Vernacular name – Gurhal) is an ornamental shrub whose flower produces a dark purplish dye that is used to make shoe polish.

- 13) *Hibiscus schizopetalous* (**English name - Coral Hibiscus**) is a shrub that is grown for its orange-red flowers.
- 14) *Hibiscus surattensis* (**vernacular name – Ranbhindi**) is an herb whose stem fibre is used to make cordage and rough cloth and its leaves can be eaten.
- 15) *Hibiscus tiliaceus* or *Paritium tiliaceum* (**English name - Cuban bast and Vernacular name - Chelwa**) is a plant whose bark fibre is used to make ropes and mats and its leaves can be eaten.
- 16) *Malachra capitata* (**English name - Cork wood and Vernacular name – Ranbhindi**) is a herb whose stem fibre is used to make cloth, twines, and ropes.
- 17) *Urena lobata* or *U. sinuate* (**vernacular name – Vilayati san**) is a small shrub whose stem fibre is an alternative of jute which is used to make coarse textiles and cordage ropes. Its mucilaginous seeds are used to make soap.

THANK YOU