EXPERIMENT

Aim

To study and identify different types of inflorescences (cymose and racemose).

THEORY

The arrangement and mode of distribution of flowers on the shoot of a plant is called inflorescence. It plays an important role in the taxonomical studies and identification of plants. Penduncle and pedicel are the main parts of the flower which help in determining the inflorescence shown to the flower. Peduncle is a portion of stem on its branch that bears clusters of flowers while, the stalk of the flower is called pedicel.

Types of Inflorescences

On the basis of position in the shoot system, inflorescence is of the following types:

Inflorescence

- **Terminal inlorescence** — It terminates the growth of the branch.
- **Axillary inlorescence** — It is terminal on a short axillary branch, which is reduced to an inflorescence.
- **Intercalary inlorescence** — There are terminal clusters that have been left behind by continuing apical growth of the main axit.
- **Cauliflory inlorescence** — The development of inflorescences on older branch is cauliflory in nature.

MATERIAL REQUIRED

Practical record book, pencil, eraser, hand lens, fresh or preserved inflorescences of locally available plants water.

PROCEDURE

1. Collect the inflorescences of locally available plants. Keep them in a beaker with water.
2. List the plant species in the tabular form.
3. Identify the type of inflorescences (raceme/cyme or special) giving reasons.
4. Note down the position of the inflorescence in the plant (axillary/terminal).
5. Draw a well labelled diagram of each inflorescence and note down the arrangement of flowers (oldest and youngest flower) on the peduncle and any other features of special interest.

S.No.	Name of plant	Botanical Name	Inflorescence		Position of ovary in flower
			Type	Position	
1. 2. 3.					

OBSERVATIONS

RACEMOSE INFLORESCENCE

(a) Raceme: Mustard

Identification Characteristic

The inflorescence shows the indefinite growth of peduncle and terminal bud does not form the flower.

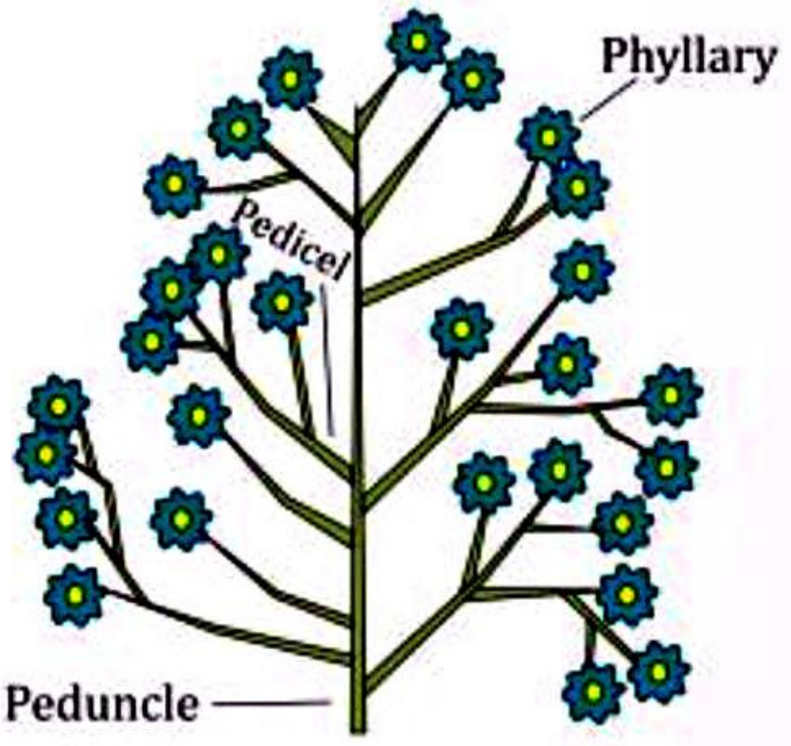
General Characteristics

1. Main axis or peduncle is elongated and unbranched that bears numbers of flowers laterally.
2. Flowers are stalked (or pedicillate) and show acropetal succession, i.e., older flowers at the base and younger flowers towards tip.
3. Mustard, larkspur, radish and Crotalaria also show raceme inflorescence.

(b) Corymb: Candytuft

Identification Characteristics

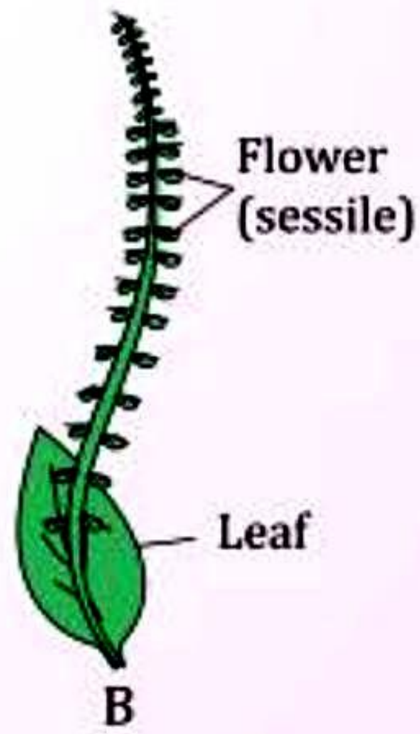
1. The peduncle is unbranched and grows indefinitely.
2. Peduncle is slightly condensed.
3. Older flowers with longer and young flowers with shorter pedicel.



General Characteristics

1. Flowers are borne on short peduncle, i.e. main axis is short.
2. The peduncle is unbranched and bears pedicellate flowers in an acropetal manner.
3. The pedicels of the lower flowers are longer, thus all the flowers come to lie at the same level.
4. Candytuft, Cheiranthus, Cassia auriculata and Gynandropsis are the other examples of corymb inflorescence.

(c) Spike: Achyranthes



Identification Characteristics

1. Peduncle is unbranched and grows indefinitely.
2. Many flowers are arranged acropetally.

General Characteristics

1. It has an elongated axis or peduncle.
2. Flowers are arranged in acropetal succession, i.e., older flowers at lower sides and young flowers at top.
3. Flowers are sessile and bisexual.
4. Achyranthes, Callistemon (bottle brush), Amaranthus (chaulai) are the other examples of spike inflorescence.

(d) Catkin: Mulberry

Identification Characteristic

Peduncle unbranched, grows indefinitely and bears bracteate, sessile flowers.

General Characteristics

1. The inflorescence is compact with a short peduncle that are often hanging.
2. Pendulous spike which bears naked pistillate or staminate flowers, but not both, i.e. the flowers are unisexual.
3. Flowers are sessile and arise in an acropetal succession/ manner.
4. On maturity the spike falls as a single unit.
5. Mulberry (Morus), Betula (birch) and Quercus (oak) are the other examples of catkin inflorescence.

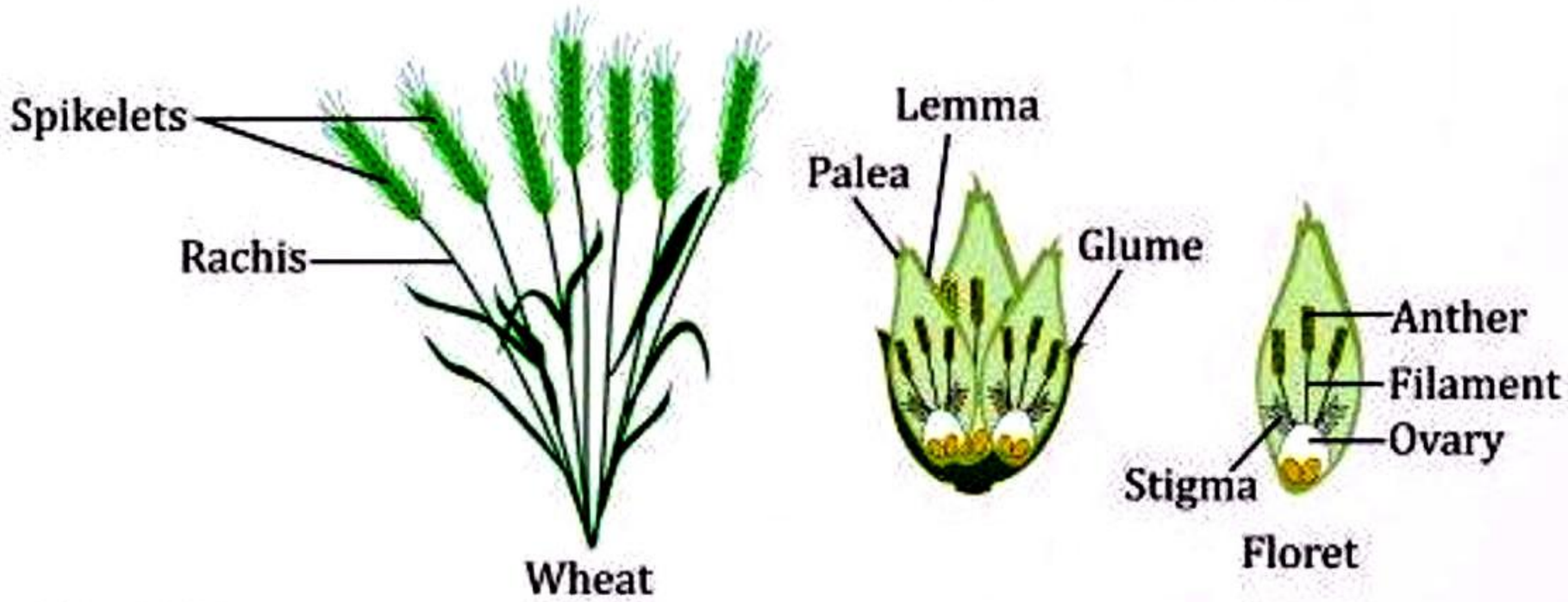
(e) Spikelets: Wheat

Identification Characteristics

1. It consists of one or more flowers.
2. Axis of the spikelet called rachilla contains bracts in the axil of which sessile flowers are borne.
3. Flower bearing bracts are called lemma.

General Characteristics

1. It is a very small spike with one of the few small flowers or florets.
2. Few flowers are contained by an axis called rachilla and two sterile glumes or scales are found at its base.
3. Just above the scales, a flowering glume is present which is called as lemma with a flower in its axil.
4. Opposite to lemma there are two small nerved bracteoles called palea.
5. So, the flower is enclosed by lemma and palea.
6. Wheat, rice and sugarcane are the other examples of spikelet inflorescence.



(f) Spadix: Colocasia

Identification Characteristics

1. Peduncle is fleshy and unbranched and grows indefinitely.
2. Flowers are borne in acropetal manner and are sessile.

General Characteristics

1. It is a special type of spike where the floral axis becomes fleshy.
2. The peduncle bears sessile and unisexual flowers. Upper flowers are male and lower flowers are female.
3. The entire inflorescence is covered by one or more, green or often brightly coloured bracts called spathe.
4. Colocasia, banana is an example of spadix inflorescence with bright red bracts.

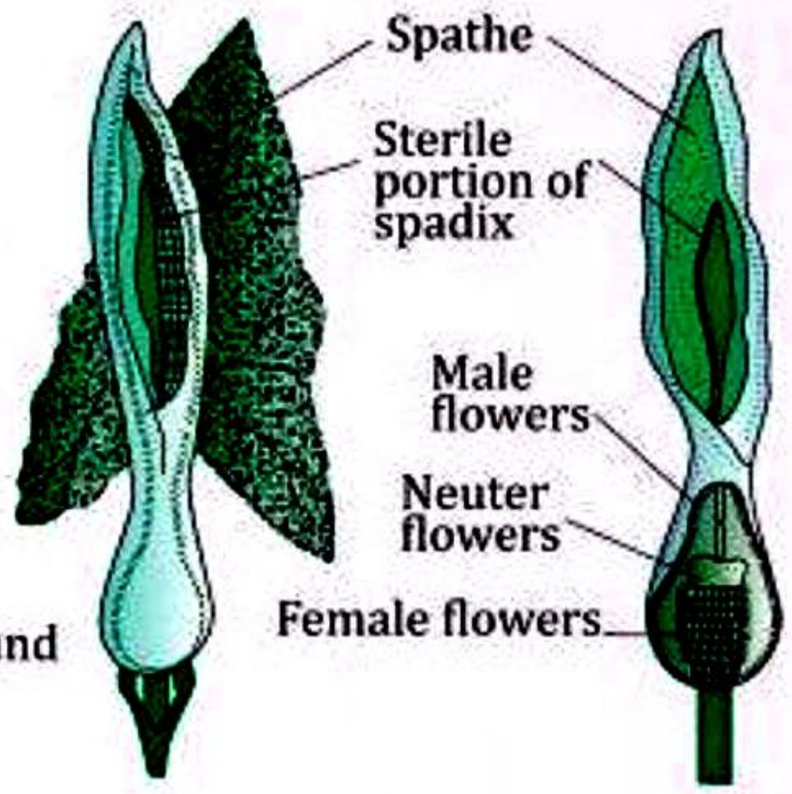
(g) Umbel: Coriander

Identification Characteristics

1. In this peduncle is unbranched and reduced significantly.
2. Flowers are mainly arranged in acropetal sequence.

General Characteristics

1. The main axis or peduncle is reduced and bears at its tip, a group of flowers which have pedicels of more or less equal lengths so that flowers seem to spread out from a compound.
2. In the umbel, there is a whorl of bracts forming an involucre at the base of flower and each flower develops from the axil of a bract.
3. Sometimes umbel becomes branched and is called as compound umbel
4. The flowers arise in centripetal succession.
5. Carrot, coriander, fennel, cumin, etc. are the other examples of umbel inflorescence.



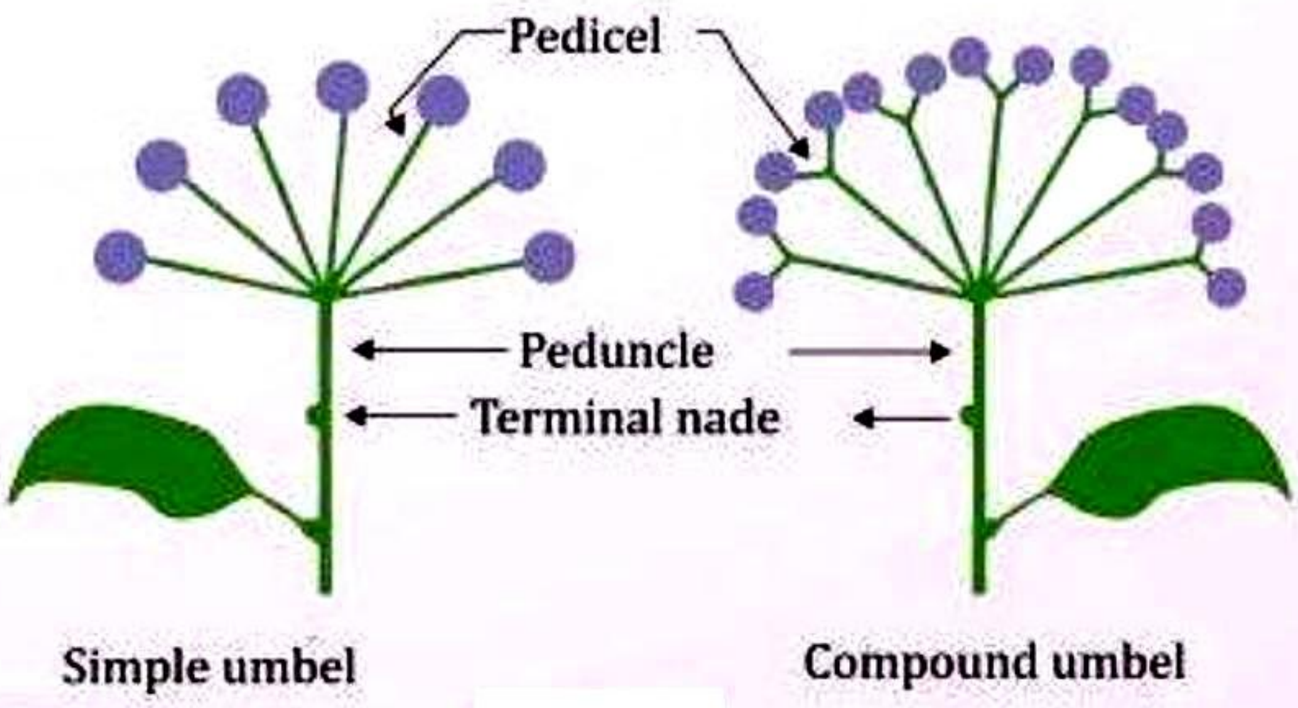
(h) Head or Capitulum: Sunflower

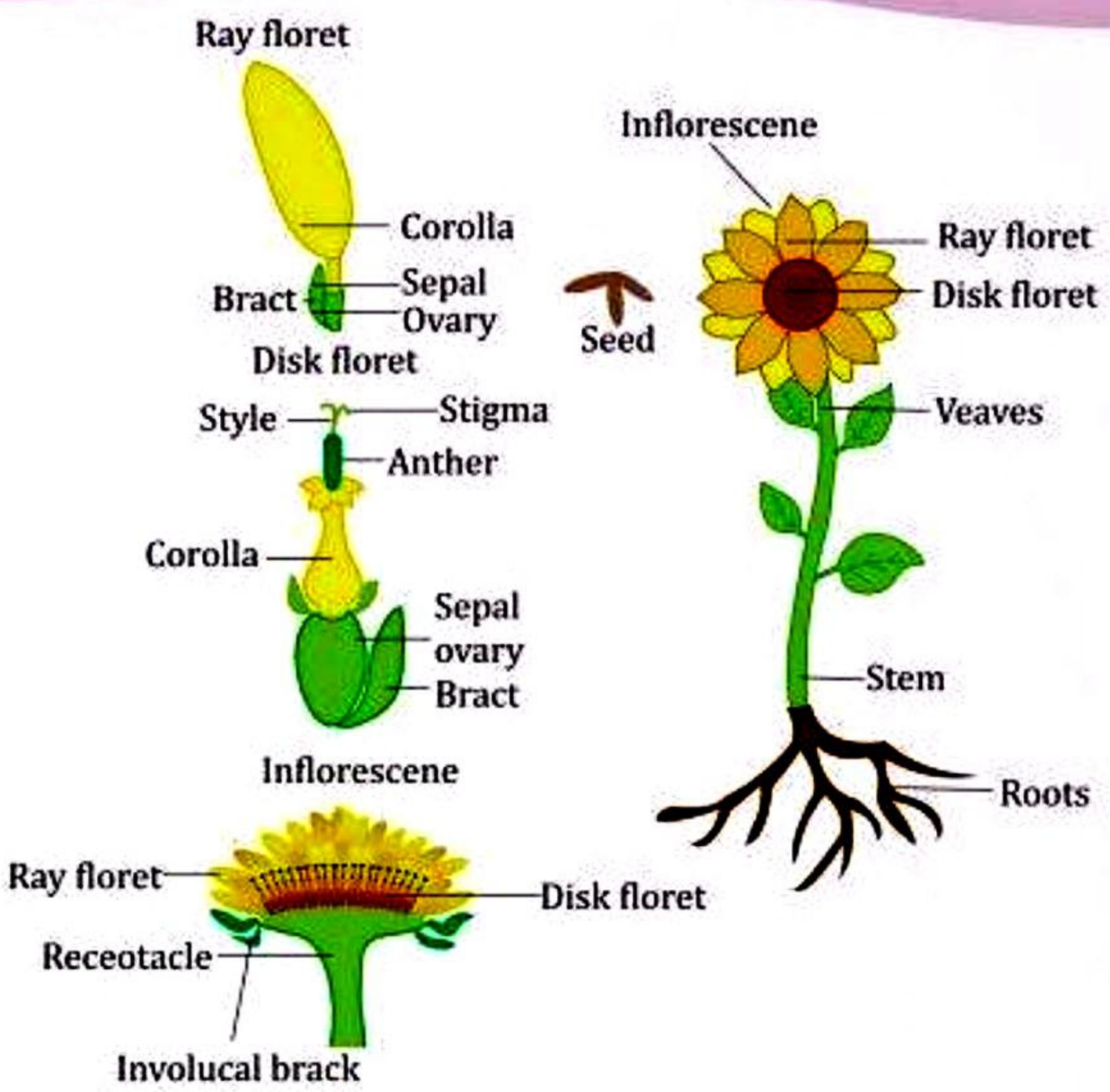
Identification Characteristics

1. The peduncle is highly condensed and is discoid.
2. Many sessile flowers called florets are attached to the disc-shaped thalamus.

General Characteristics

1. Main axis is flattened into a more or less convex structure which is called a receptacle.
2. Receptacle bears a mass of small sessile flowers called florets on its surface, with one or more whorls of prominent bracts at base forming involucre.
3. Head contains older outer flowers and younger inner flowers, i.e., flowers are arranged in a centripetal manner.
4. **Florets are of two types:**
   (i) Ray florets Marginal, strap-shaped, sterile florets which are always zygomorphic and may be arranged in one or more whorls.
   (ii) Disc florets Central, tubular, bisexual florets that are usually actinomorphic.





5. Sunflower, Marigold, Chrysanthemum and Cosmos also show head or capitulum type of inflorescence.

CYMOSE INFLORESCENCE

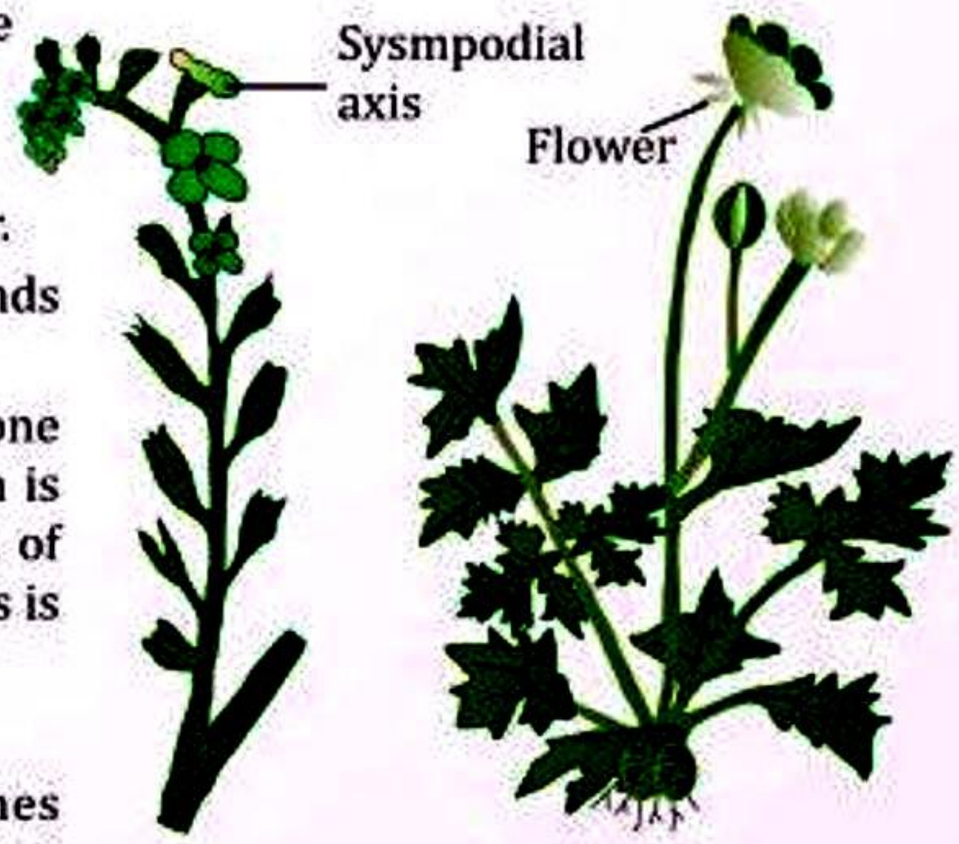
(a) Monochasial or Uniparous Cyme: Begonia

Identification Characteristics

1. In this inflorescence, peduncle terminates into flower.
2. Below this flower, only one lateral branch develope from the axle of the flower.

General Characteristics

1. Main axis of the inflorescence terminates into a flower.
2. It produces only one lateral branch at a time which ends into a single flower.
3. Lateral and succeeding branches again produce only one branch at a time like the primary one. This pattern is repeated and the peduncle is formed by the fusion of axillary branches and the main axis. This type of axis is called sympodial.
4. Monochasial cyme is of two types:
   - **(i)** Helicoid cyme When all the lateral branches develop on the same side of peduncle, forming a sort of helix, the arrangement is called helicoid cyme, e.g. Begonia.
   - **(ii)** Scorpioid cyme when the lateral branches develop on alternate sides forming a zig-zag pattern,



the arrangement is called scorpioid cyme, e.g. cotton.

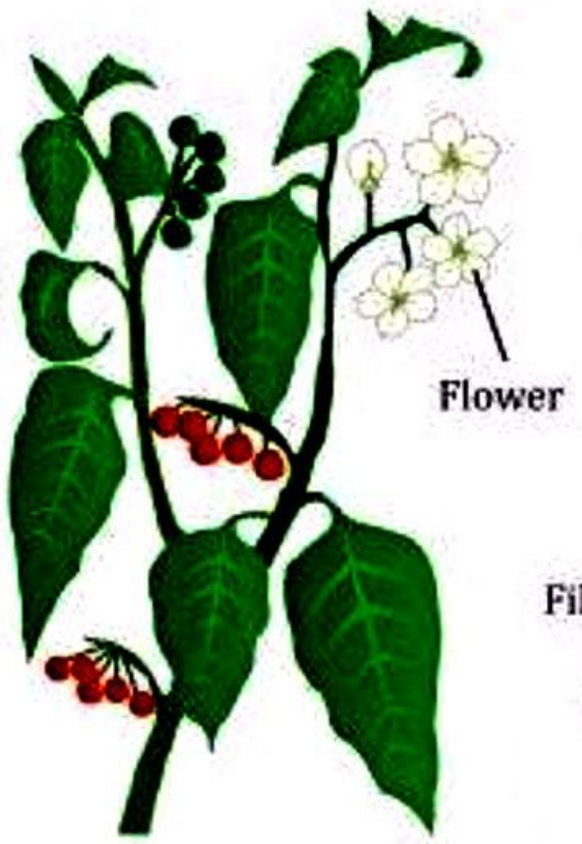
(b) Dichasial or Biparous Cyme: Jasmine

Identification Characteristics

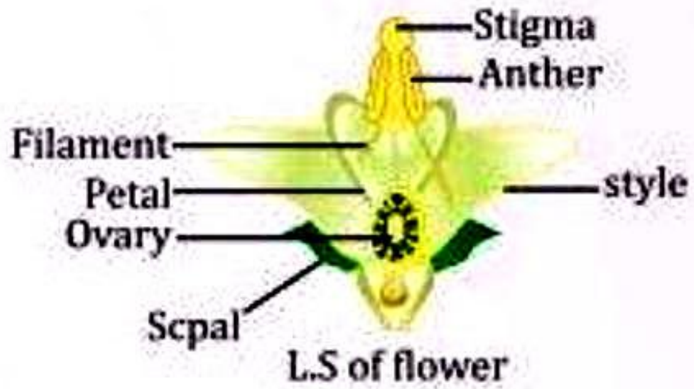
1. In this, growth of the peduncle is definite because it terminates into flower,
2. Below the flower.

General Characteristics

1. The main axis terminates in a flower.
2. The succeeding flowers develop in the same manner.
3. Thus, dichasial cyme inflorescence consists of only three flowers, out of which the central one is the oldest and the two lateral ones arising in the axils of bracts below the older flower are the youngest.
4. Jasmine, Dianthus, teak, Stellaria and Spergula are the other examples of biparous cyme.




A flower

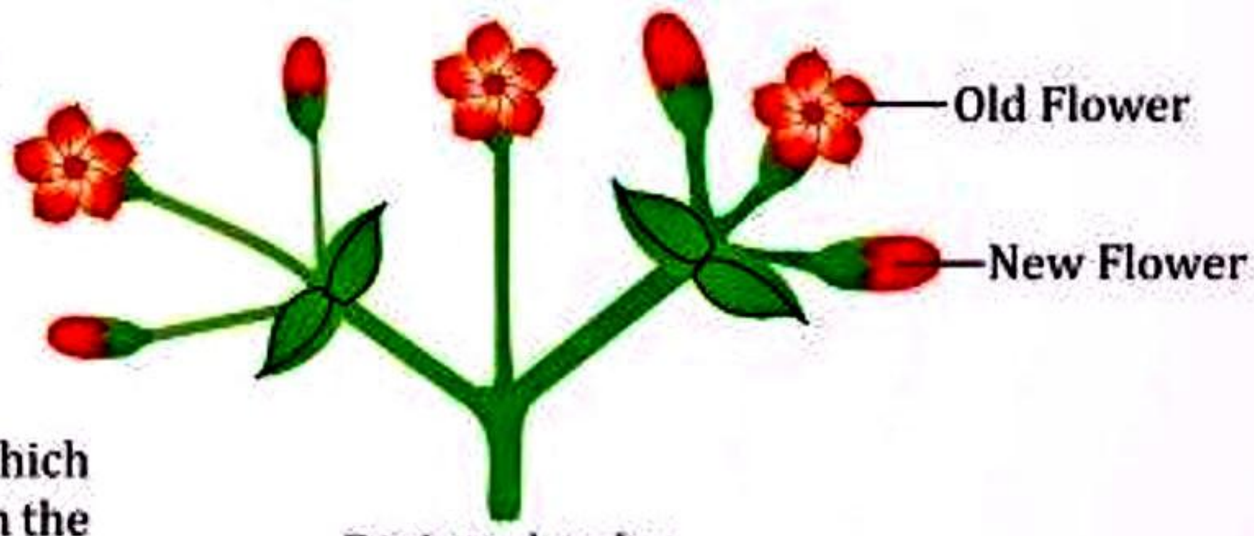


L.S of flower

(c) Polychasial or Multiparous Cyme: Calotropis

Identification Characteristic

Peduncle terminates into flower, below which more than two branches develop laterally in the axil of bracts.



Basipetal order

General Characteristics

1. The lateral branches repeat main axis growth.
2. As a number of lateral flowers develop more or less simultaneously, so it looks like an umbel.
3. Calotropis, Viburnum, Asclepias, etc. also have polychasial or multiparous cyme.

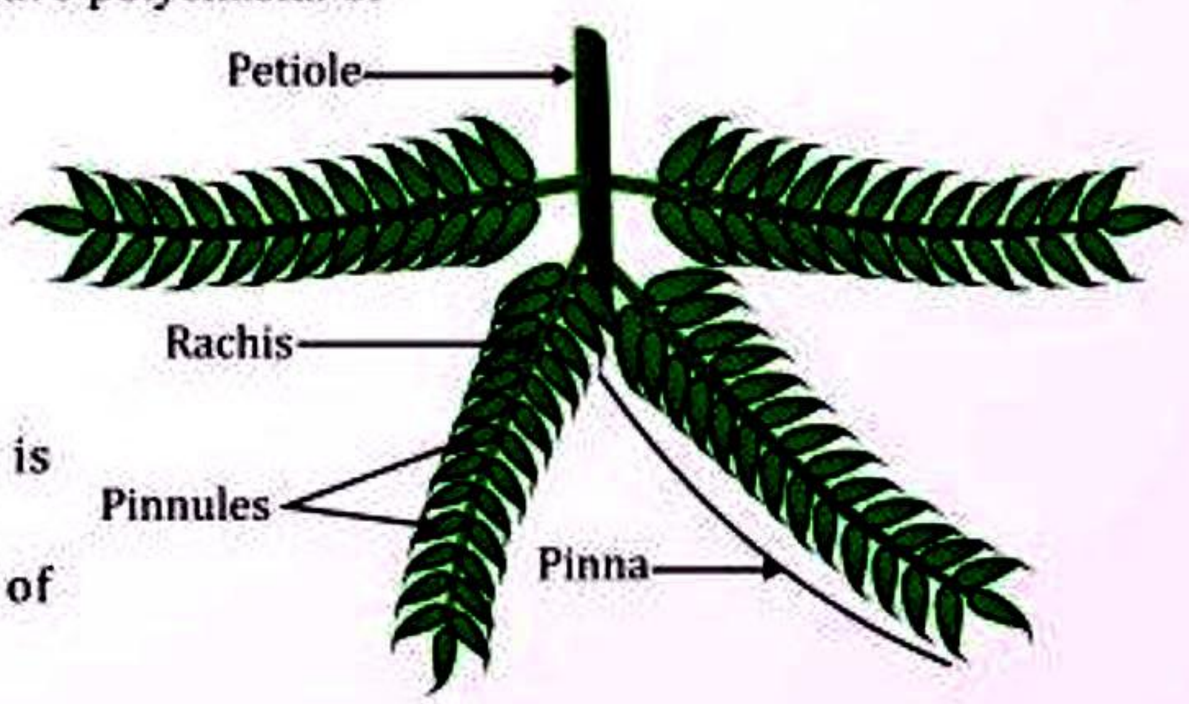
(d) Cymose Head: Acacia

Identification characteristic

Sessile/subsessile flowers are borne centrifugally around a receptacle.

General characteristics

1. In this type of inflorescence, the axis is reduced into a globular receptacle.
2. Acacia, Albizia are another examples of cymose head.



PRECAUTIONS

1. Handle the specimens carefully.
2. Observe the features minutely.

VIVA VOCE

Q1. Define the term 'inflorescence'.

Ans. The arrangement of flowers and mode of distribution of flowers on the shoot system of a plant is called inflorescence.

Q2. Flowers are borne in the form of inflorescence. Why?

Ans. The presence of flowers in the form of inflorescence makes them more prominent to the pollinators or pollinating agents.

Q3. Give the scientific term used for the stalk of a flower.

Ans. The stalk of a flower is called pedicel

Q4. List the main types of inflorescences that have been observed in plants.

Ans. Inflorescence are of following main types:

(i) Racemose

(ii) Cymose

(iii) Special inflorescence

Q5. What is the other name for racemose inflorescence? Also give a reason as a justification to this other name.

Ans. It is also called as the indefinite inflorescence, because floral axis grows continuously producing flowers in an acropetal manner.

Q6. Differentiate between racemose and cymose inflorescences.

Ans. In racemose inflorescence, the main axis is elongated and does not terminate into a flower. The flowers are arranged in acropetal succession.in cymose inflorescence, the growth of main axis is checked and it terminates into a flower. The flowers are arranged in basipetal succession.

Q7. Give one word for the following terms:

(i) Flower that occurs singly.

(ii) Whorl of bract.

(iii) A flattened peduncle.

Ans. (i) Flower that occurs singly - Solitary flower

(ii) Whorl of bract - Involucre

(iii) A flattened peduncle - Receptacle

Q8. Give one example of a flower which occurs singly on the axis.

Ans. Shoe flower (Hibiscus) is a solitary flower.

Q9. What is capitulum?

Ans. The inflorescence, where receptacle or main axis is flat and bears a number of sessile flowers with one or more whorls of bracts is called capitulum.

Q10. Give the advantage of capitulum.

Ans. In capitulum, the head as a whole becomes showier and more attractive as florets are close together. Therefore, these get pollinated by one or few insects within a short time.