MORPHOLOGY OF FLOWERING PLANTS

THE INFLORESCENCE

THE INFLORESCENCE

INTRODUCTION

- A flower is a modified shoot in which shoot apical meristem changes to floral meristem.
- Internodes do not elongate and axis gets condensed and at the node floral appendages are found instead of leaves.
- When a shoot tip transforms into a flower, it is always solitary..
- The arrangement of flowers on the floral axis is termed as inflorescence.
- The stalk of inflorescence is known as Peduncle.

Types of Inflorescence: Depending on whether the apex gets developed into a flower or continues to grow, two major types of inflorescences are defined – racemose and cymose

Fig : Racemose inflorescence

RACEMOSE:

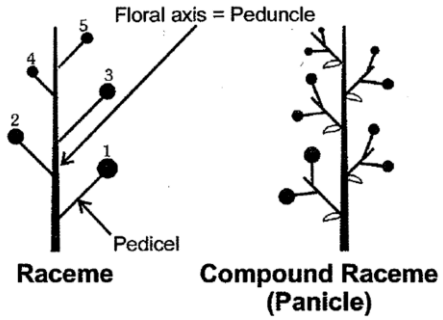
- **The main axis continues to grow, the flowers are borne laterally in an acropetal succession.**
- **It is of following types;** 1. Simple Recemose 2. Compound Racemose

1. **Simple Racemose:** In this type, the peduncle is unbranched.
2. **Compound Racemose inflorescence:** It is a kind of inflorescence in which peduncle is branched.

SIMPLE RACEMOSE IS OF FOLLOWING TYPES.

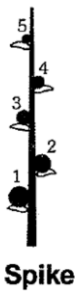
1. **Raceme -** In this type of inflorescence, peduncle (main axis or floral axis) is elongated and flowers are pedicellate.
   Eg. Radish, mustard

- When peduncle is branched and each branch bear pedicellated flowers like raceme and are arranged in acropetal manner then it is known as compound raceme or Raceme of racemes or panicle Eg. Gulmohar, Cassia.



2. **Spike -** In this type of inflorescence peduncle is elongated but flowers are sessile (without pedicel). Eg. Achyranthes.

- When peduncle is branched and each branch bears spike like infloresence then the small branch having flowers is called spikelet and this arrangement is called spike of spikelets.
  Eg. Grass family (Gramineae = Poaceae).



3. **Catkin/Amentum -** In this type of inflorescence peduncle is thin, long and weak, and flowers are sessile and unisexual unisexual flowers develop on separate catkin.

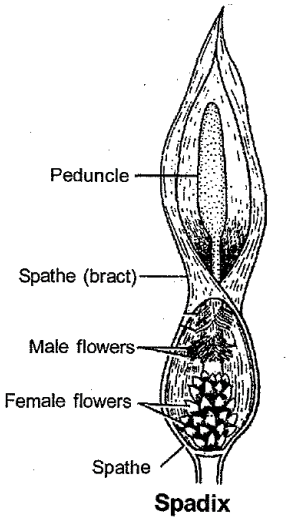
   Eg. Mulberry (Shahtoot).

Catkin

4. **Spadix -** In this type of inflorescence peduncle is thick, long and fleshy and it has small sessile and unisexual flowers covered with one or more large green or colourful bracts (spathe).

   Eg. Colocasia, maize, aroids. (palms- compound spadix)

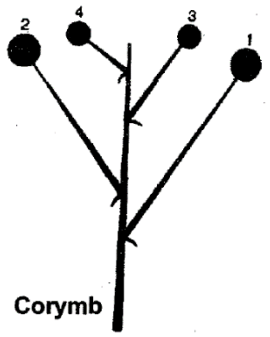
- Grain of maize is a fruit (caryopsis).
- Long filamentous threads (Silky hairs) protruding at the end of a young cob of maize are styles.
- Mixed spadix is found in banana .



Spadix

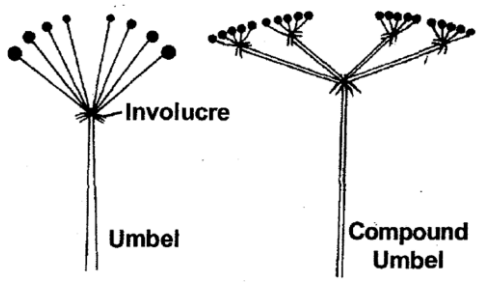
5. **Corymb -** In this type of inflorescence peduncle is short and all flowers are present at same level because the lower flower has much longer pedicel than the upper ones.
   eg. Candytuft (lberis amara) = chandani, Capsella.

- If peduncle is branched and each branch has flower cluster, then this type of inflorescence is called compound corymbs or corymbs of corymbs.
  eg Cauliflower



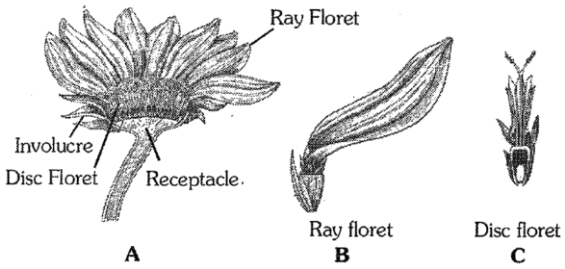
6. **Umbel -** An inflorescence in which the flower stalks (Pedicels) are of more or less equal in length, arise from the same point. At the base of flowers stalk, there is whorl of bracts forming the involucres.
   eg. CenteUa(brahmi)

- If peduncle is branched and each branch has flower cluster then this type of inflorescence is called compound umbel or umbel of umbels eg. Coriandrum (coriander or dhania), Foeniculum (fennel or saunph), Cuminum (cumin or jeera) (Umbelliferae or Apiaceae family).



7. **Capitulum/Racemose head (Anthodium) -** In this type of inflorescence tip of peduncle becomes broad, flattened concave or convex (receptacle). On it small sessile flowers are found.
   These flowers are called florets. The florets which are present in centre are small & called

disc florets and florets which are present at periphery are large & called ray florets, florets A are arranged in centripetal order.



In this type of inflorescence florets may be unisexual, bisexual and sterile. This inflorescence is surrounded by one or more involucre. It is most advanced type of inflorescence, because a single insect can easily pollinate innumerable florets within a very short time without having to fly from one flower to another. The ultimate advantage is that this mass pollination helps the setting of seeds in most heads for reproduction, multiplication in number and continuity of species. Eg. Composite/Asteraceae family [Sunflower, zinnia, marigold (Tagetes)].

IT IS OF TWO TYPES.

1. **Homogamous:** It is made up of only one type of florets, either all ray florets. **e.g. Chrysanthemum** or all disc florets. **e.g. Ageratum.**
2. **Heterogamous:** It consists of both disc florets and ray florets. **e.g. Sunflower.**

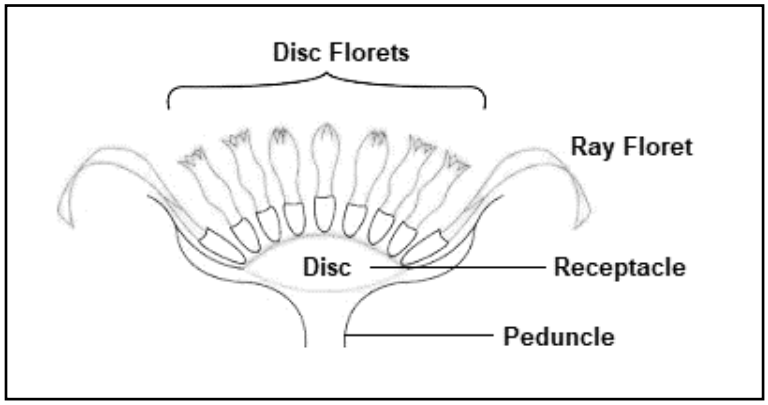


Fig.: Heterogamous capitulum

CYMOSE:

- The main axis terminates in a flower, hence is limited in growth.The flowers are borne in a basipetal order.

It is of following types –

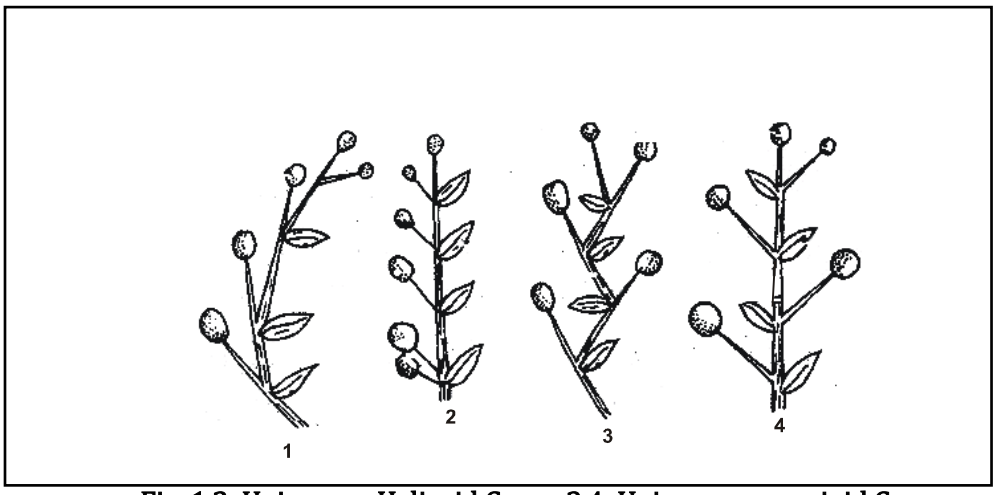


Fig. 1,2: Uniparous Helicoid Cyme, 3,4: Uniparous scorpioid Cyme

(a) **Monochasial or Uniparous cyme:** The main axis ends in flower. A single lateral branch pushes it to one side but also itself ends in a flower. It is of two types-

(i) **Helicoid:** All the flowers are borne on the same side forming a sort of helix. **e.g. Drosera, Bigonia, Heliotropium.**

(ii) **Scorpioid:** Flowers are alternately borne on both the sides. **e.g. Ranunculus bulbosus.**
Modification of scorpioid cyme is Rhipidium. Here all the flowers are borne in one plane. **e.g. Solanum nigrum.**

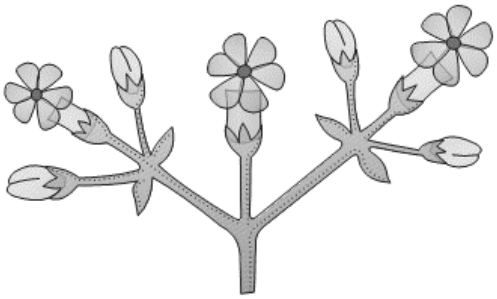


Fig.: Cymose inflorescence (Biparous Cyme)

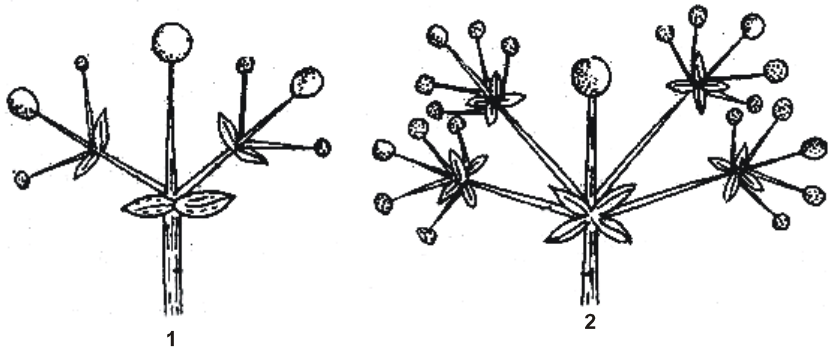


Fig :- 1- Biparous Cyme, 2- Multiparous Cyme

(b) **Dichasial or Biparous cyme:** A terminal flower is subtended by two lateral branches which also end in flowers. **e.g. Ixora, Mussaenda, Stellaria media.**

(c) **Multiparous or polychasial cyme:** More than two lateral branches continues the growth of the inflorescence when the parent axis ends in a flower. **e.g. Calotropis, Hamelia.**

Type of infloresence		
S.No.	**Racemose**	**Cymose**
1	Peduncle or floral axis is monopodial	Peduncle is multipodial or sympodial
2	Flower arises laterally on Peduncle	Flower originates on terminal part of peduncle
3	The formation of flowers is indefinite	A definite number of flowers is formed
4	The arrangement of flowers is acropetal	The arrangement is basipetal

SPECIAL TYPE OF INFLORESCENCE

1. **Cyathium -** The bracts or the involucres become fused to form a cup shaped structure, on the margin of it secretory gland is found. In the central part of cup shaped structure a female flower is found, which matures earlier. Due to the growth of pedicel this flower comes out from the cup shaped structure. Achlamydeous female flower is surrounded by small achlamydeous male flowers. The male flowers, which lie towards the centre mature earlier than the flowers which lie towards the periphery. Male flowers are represented by stamens

   This type of inflorescence is found in Euphorbiaceous family - Euphorbia, Poinsettia.

   Ratio of female & male flowers → One : many

2. **Verticillaster -** This type of inflorescence is found in Labiates/Lamiaceae family. In this type of inflorescence leaves are arranged in opposite manner on stem. From the axil of each leaf inflorescence develops. From the main axis, lateral axis arises, on which flowers are found. Now from these branches lateral branches develop also which bear flowers. In this type of inflorescence each dichasial cyme changes into monochasial (scorpioid) cyme.

   Eg. LabiataejLamiaceae family-Salvia, Ocimum (tulsi).

3. **Hypanthodium -** In this type of inflorescence upper part of peduncle is modified into a pear shaped structure having cavity with a pore (ostiole). At the base of cavity female flowers develop while towards the pore male flowers develop. All three types of flowers (male, female, sterile female) are present in this inflorescence. Eg. Ficus species - banyan, fig, peepal

   Note : Cyathium & hypanthodium inflorescence are similar in having unisexual flowers.