

Lecture: 5

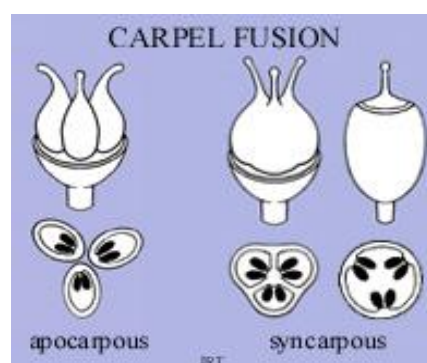
*****Gynoecium :**

It refers to all female organs of a flower, the unit of the gynoecium is carpel. The carpel is defined as modified, conduplicate megasporophyll that encloses one or more ovules.

****Gynoecial fusion :**

Fusion of carpels is a very important systematic character which are:-

- 1- Apocarpous : Carpels are distinct and free, this type is thought to be the ancestral condition in angiosperm as in *Rosa*.
- 2- Syncarpous : Carpels are connate and is the most common type in flowering plants as in *Tropaeolum*.
- 3- Unicarpellous : The gynoecium is composed of single carpel (in which the fusion is really inapplicable)as in Fabaceae.



*****Gynoecium component :** A pistil is that part of the gynoecium composed of :-

A/ Ovary : It is the part of the pistil containing the ovules.

B/ Style : It is the stalk like, non- ovule bearing portion of the pistil between the stigma and ovary. Style may be absent as in *Papaver*.

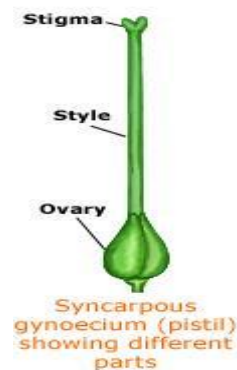
*****Heterostyly** : The length of stigma versus anther vary among different flowers, so two types of flowers will appear :

1- Pin flower : with long style and short stamens.

2- Thrum flower : with short style and long stamens.

In this syndrome an insect visiting a pin flower is likely to have pollen deposited on its body in allocation that would affect pollination of a thrum flower rather than pin flower and vice versa, this increase the probability of pollination between flowers rather than within flowers.

C/ Stigma : It is the pollen receptive portion of the pistil.



*****Ovary attachment** :

1- A stipitate : ovary is having a stipe or Gynophore(Gynophore is the basal stalk of pistil) as in *Typha* and is relatively rare.

2- A sessile : ovary is lacking a stipe and is the most common situation.

*****Ovary position** :

1- **Superior** : ovary position has sepals, petals and stamens attached at the base of it while flower is termed **Hypogynous** as in *Convolvulus*.

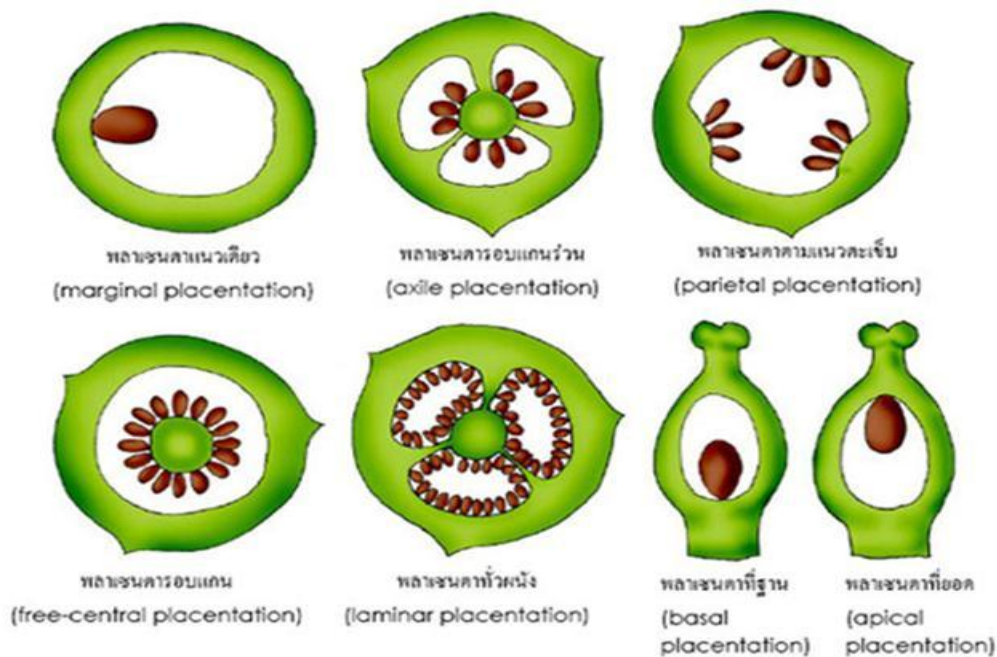
2- **Inferior** : ovary position has sepals, petals and stamens attached at the ovary apex while flower is termed **Epigynous** as in *Malus*.

3- **Half inferior** : ovary position has sepals, petals and stamens attached near the middle of the ovary flower is termed **Epihypogynous**.

***Placentation:

It refers to the distribution of placentae on the ovary wall and the arrangement of ovules, the major types of placentation are:-

- 1- **Marginal** : simple chambered ovary with single placental line as in legumes (*ex: Vicia*).
- 2- **Parietal** : single chambered ovary with more than one placental line as in *Cucumis*.
- 3- **Axile** : ovary more than one chambered and placentae along the axis as in *Hibiscus*.
- 4- **Free-central**: ovary single chambered, ovules borne along the central column.
- 5- **Basal** : ovary single chambered, with single ovule at the base as in disk flower of *Helianthus* plant.
- 6- **Superficial** : multilocular ovary with whole inner wall of ovary lined with placentae as in *Nymphaea*.
- 7- **Apical** : ovary single chambered, with single ovule at the apex.



***Inflorescence :

Is a collection or aggregation of flowers on an individual plant, its function is to enhance reproduction.

Inflorescence parts : several terms deal with parts of the Inflorescence:-

1- Inflorescence bract: is one that subtends not an individual flower but an group of flowers.

**involucre: a group of bracts subtending an entire inflorescence.

**spathe: enlarged, sometimes colored bract enclosing an inflorescence.

2- Peduncle: is the stalk of an entire inflorescence.

3- compound receptacle(torus): is a mass of tissue at the apex of a peduncle that bears more than one flower.

4- Rachis: is a major, central axis within an inflorescence.

****Inflorescence development**: is a major aspect of defining inflorescence type:-

A/ Determinate inf.: it's the inf. In which the apical meristem of the primary inf. axis terminates in a flower (typically, the terminal flower matures first), with subsequent maturation occurring from apex to base, determinate inf. generally termed **cyme**. Types of determinate inf.:-

1- Dichasium: one that develops along two axes, forming one or more pairs of opposite, lateral axes:-

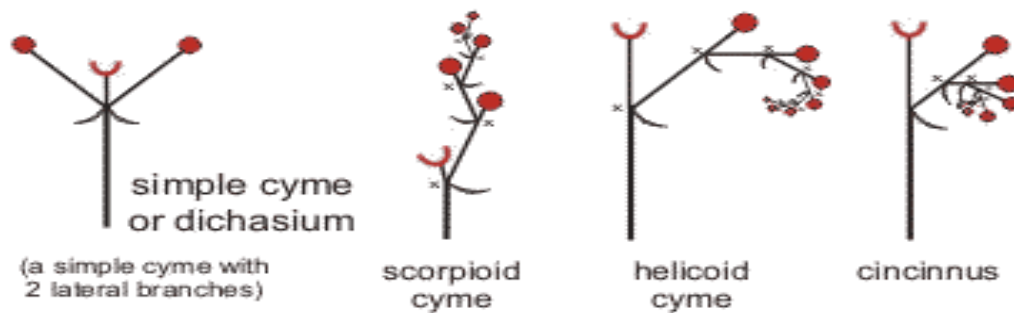
A/ simple dichasium : is a three –flowered cyme, having single terminal flower and two opposite lateral flowers as in *Convolvulus*.

B/ Compound dichasium: is a many flowered cyme of repeatedly branching simple dichasia units.

2-Monochasium: is a cyme that develops along one axis only :-

A/ Helicoid cyme: the axis develop on only one side of each sequential axis, appearing coiled .

B/ Scorpioid cyme: the branches develop on alternating sides of each sequential axis, typically resulting in a zig-zag structure.



B/ Indeterminate inf.: which the apical meristem of the primary inf. axis dose not develop into a flower, typically , the basal flower matures first, with maturation occurring from base to apex:-

1- Spike: it consist of a single axis bearing sessile flowers as in *Plantago*.

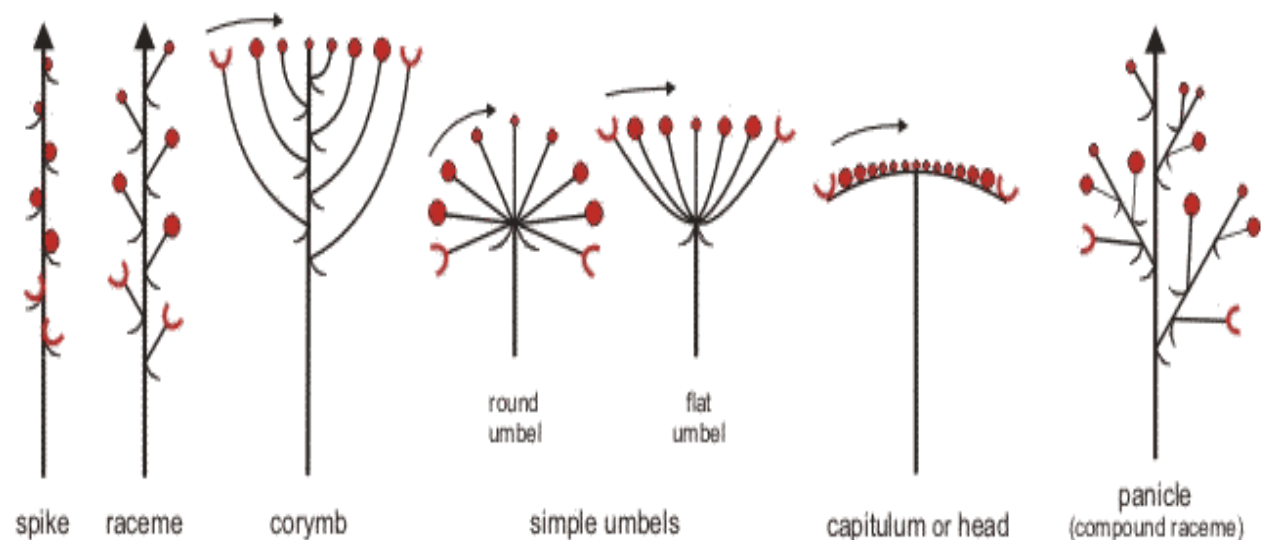
2- Raceme: a single axis bears pedicellate flowers as in *Antirrhinum*.

3- Panicle: is like a branched raceme as in *Vitis*.

4- Corymb: a single axis with lateral axes and/or pedicels bearing flat-topped or convex flowers, its either :

a// simple corymb: un branched, consist of a central axis bearing pedicellate flowers as in *Cardaria*.

b// compound corymb: is branched, consisting of two or more axes bearing flat-topped flowers as in *Brassica*.



C/ Determinate or indeterminate inf.:

1- **simple umbel** :it flat-topped inf. with pedicels attached at one point to a peduncle as in *Allium cepa*.

2- **fascicle**: is a raceme like or panicle like inf., with pedicellate flowers in which internodes between flowers are very short.

3- **glomerule** : is an inf. of sessile or sub sessile flowers in which the internodes between flowers are very short.

D/Specialized inf.: some inf. are quite specialized and often restricted to certain taxonomic groups:-

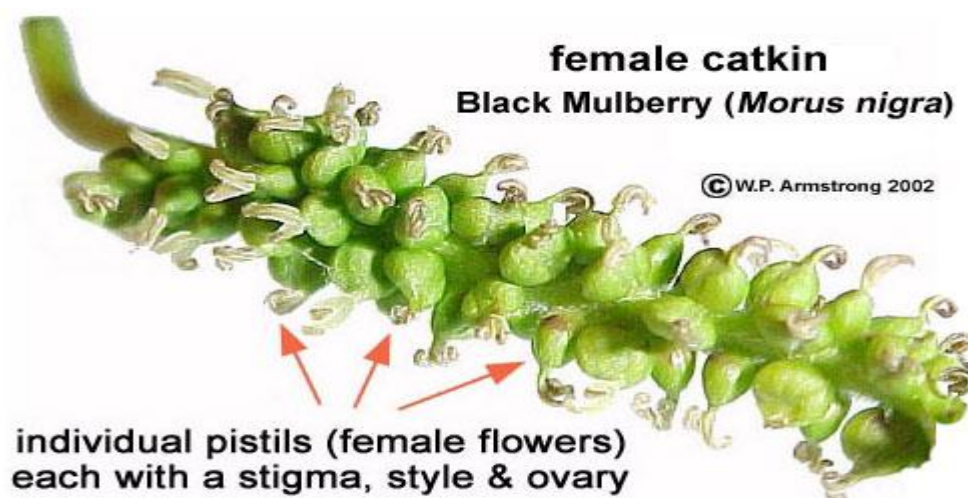
1- **Catkin**: is a unisexual, typically male spike or elongate axis that falls as a unit often flowering or fruiting as in *Salix*.

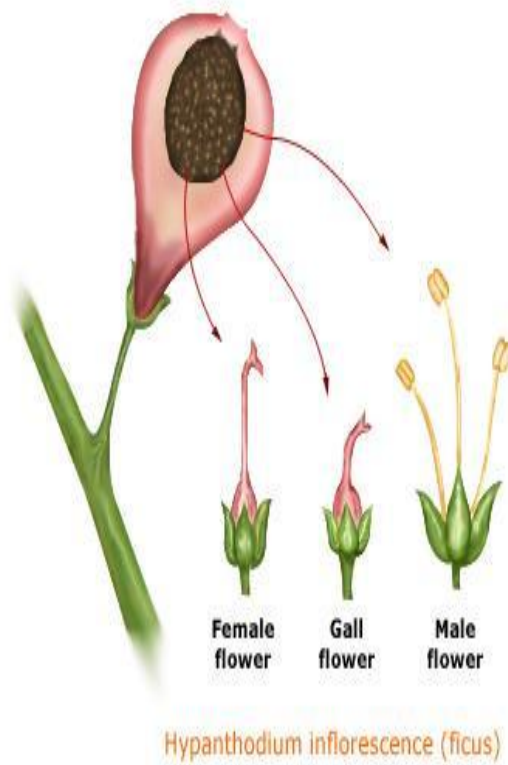
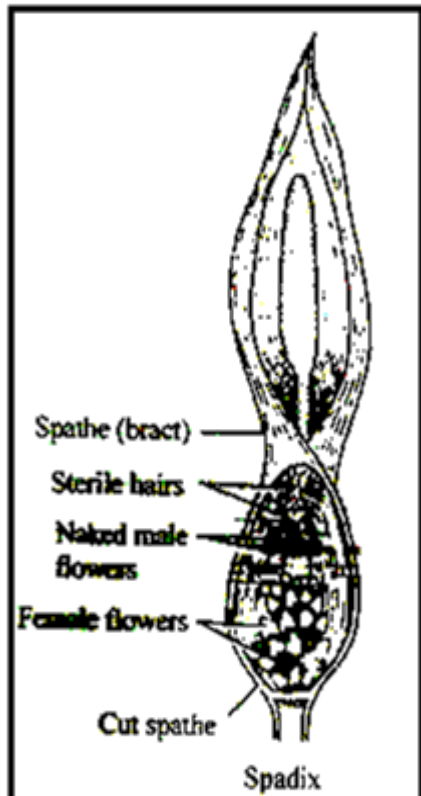
2- **Cyathium**: is an inf. bearing small, unisexual flowers and subtended by an involucre as in *Euphorbia*.

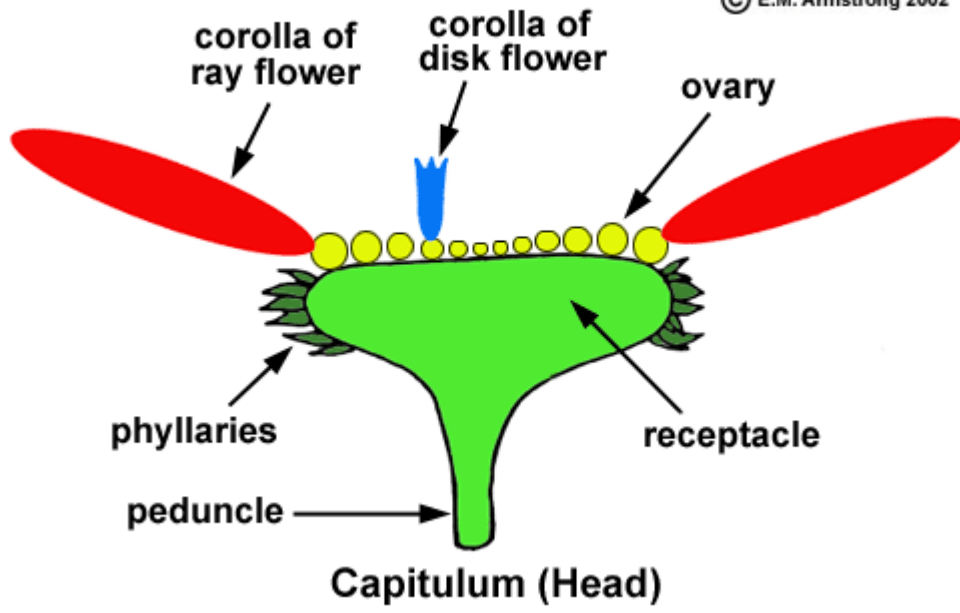
3- **Head or Capitulum**: is a determinate or indeterminate, crowded group of sessile flowers on a compound receptacle as in Asteraceae family.

4- **Hypanthodium**: is an inf. bearing numerous flowers on the inside of a convex or involuted compound receptacle as in *Ficus*.

5- **Spadix**: a spike with a thickened or fleshy central axis, typically with congested flowers and usually subtended by a spathe, as in Araceae.







Cyathium of *Euphorbia pepplus*. Artificially coloured SEM with involucre (green), nectaries (red), male flowers (yellow), and a single female flower (blue) hanging out of the involucre.