

Lecture no.45

Study of Flowers

Definition

The part of a seed plant comprising the reproductive organs and their envelopes if any, especially when such envelopes are more or less conspicuous in form and color.

Physiological Function

A flower, sometimes known as a bloom or blossom, is the reproductive structure found in plants that are floral (plants of the division Magnoliophyta, also called angiosperms). The biological function of a flower is to effect reproduction, usually by providing a mechanism for the union of sperm with eggs.



Composing of Flower

The essential parts of a flower can be considered in two parts: the vegetative part, consisting of petals and associated structures in the perianth, and the reproductive or sexual parts. A stereotypical flower consists of four kinds of structures attached to the tip of a short stalk. Each of these kinds of parts is arranged in a whorl on the receptacle.

Vegetative (Perianth)

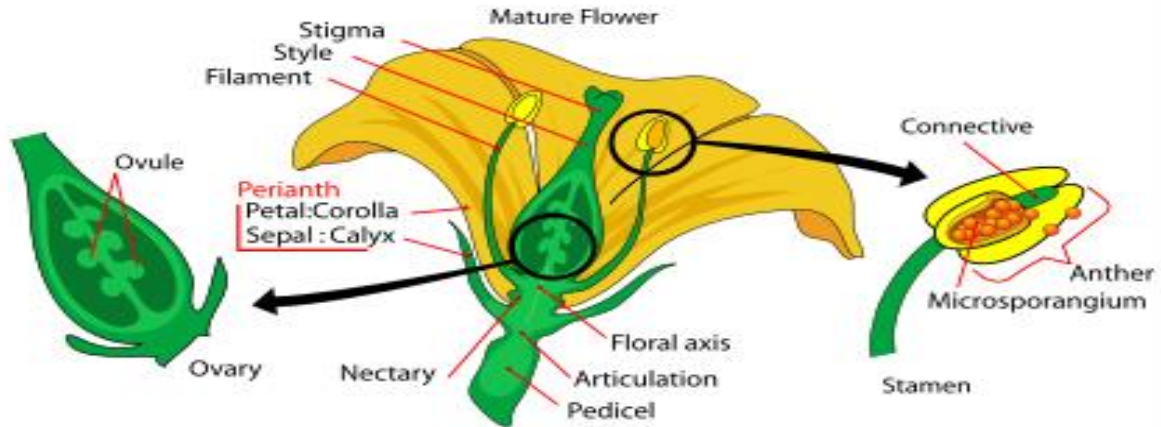
Collectively the calyx and corolla form the perianth.

Calyx

The outermost whorl consisting of units called sepals these are typically green and enclose the rest of the flower in the bud stage; however, they can be absent or prominent and petal-like in some species.

Corolla

The next whorl toward the apex, composed of units called petals, which are typically thin, soft and colored to attract animals that help the process of pollination.



Reproductive

Androecium

The next whorl (sometimes multiplied into several whorls), consisting of units called stamens. Stamens consist of two parts: a stalk called a filament, topped by an anther where pollen is produced by meiosis and eventually dispersed.

Type of Stamen

1. Monadelphous stamen
2. Diadelphous stamen
3. Didynamous stamen
4. Tetradynamous stamen
5. Polyadelphous stamen
6. Syngenesious stamen

1. Monadelphous

Fused into a single, compound structure

2. Diadelphous

Joined partially into two androecial structures.

3. Didynamous

Occurring in two pairs, a long pair and a shorter pair

4. Tetradynamous

Occurring as a set of six stamens with four long and two shorter ones

5. Polyadelphous

Having united filaments so that they are arranging in three or more groups.

6. Syngenesious

Having the stamens united by the anthers; of or pertaining to the Syngenes



Gynoecium

The innermost whorl of a flower, consisting of one or more units called carpels. The carpel or multiple fused carpels form a hollow structure called an ovary, which produces ovules internally. Ovules are megasporangia and they in turn produce megaspores by meiosis which develops into female gametophytes. These give rise to egg cells. The gynoecium of a flower is also described using an alternative terminology wherein the structure one sees in the innermost whorl (consisting of an ovary, style and stigma) is called a pistil. A pistil may consist of a single carpel or a number of carpels fused together.

Types of pistil

1. Simple pistil

The female ovule-bearing part of a flower composed of ovary and style and stigma.



2. Syncarpous pistil

Syncarpous (fruit or pistil), composed of several carpels consolidated into one.

3. Apocarpous pistil

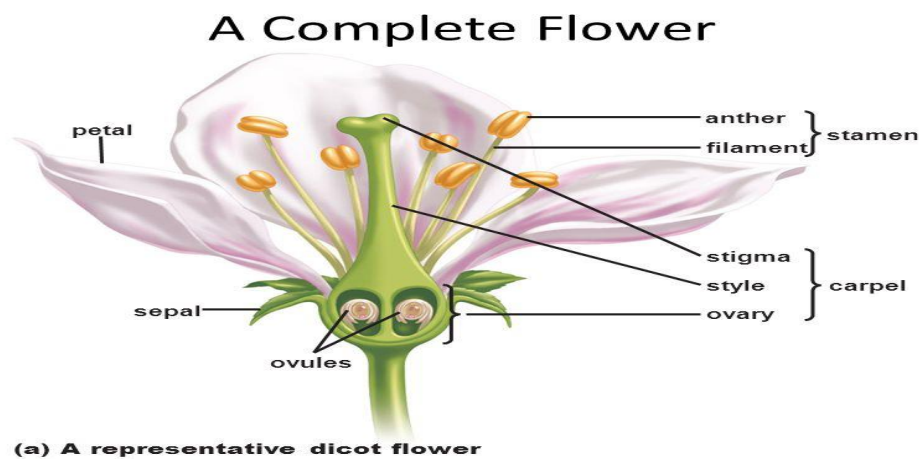
Having carpels that are free from one another. Used of a single flower with two or more separate pistils as in roses.



Type of Flower

Complete flower

A flower having all four floral parts: sepals, petals, stamens, and carpels.



2. Incomplete flower

A flower without one or more of the normal parts, as carpels, sepals, petals, pistils, or stamens.

Incomplete flower



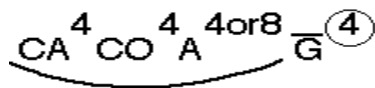
Tulip



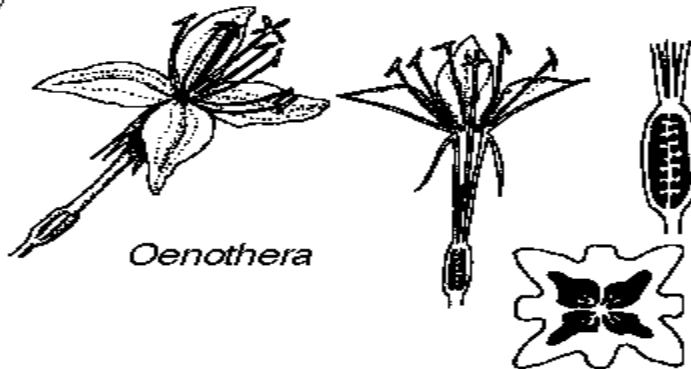
Raspberry

Flower Formula

Flower Formula is a means to represent the structure of a flower using numbers, letters and various symbols, presenting substantial information about the flower in a compact form. It can represent particular species, or can be generalized to characterize higher taxa, usually giving ranges of organ numbers.



4 sepals, 4 petals,
4 or 8 stamens, all
fused below, inferior
ovary of 4 fused
carpels



Oenothera

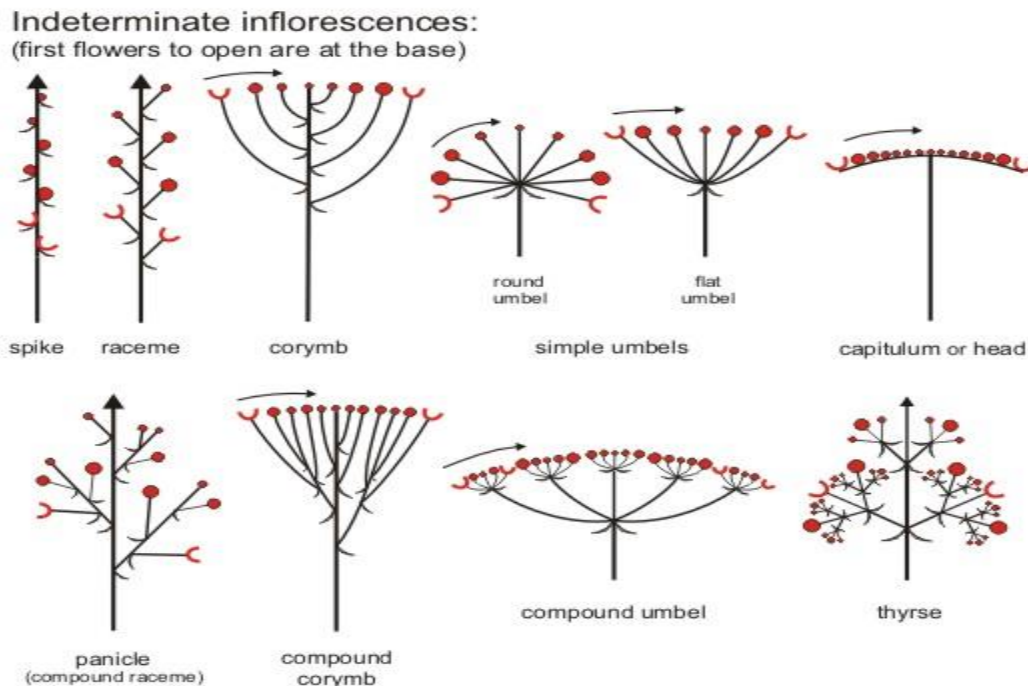
Inflorescence

An inflorescence is a group or cluster of flowers arranged on a stem that is composed of a main branch or a complicated arrangement of branches. Morphologically, it is the part of the shoot of seed plants where flowers are formed and which is accordingly modified. The modifications can involve the length and the nature of the internodes and the phyllotaxis, as well as variations in the proportions, compressions, swellings, adnations, connations and reduction of main and secondary axes.

Type of Inflorescence

1. **Spike** - an elongate, unbranched, indeterminate inflorescence with sessile flowers.
2. **Spikelet** - a small spike, characteristic of grasses and sedges.

3. **Raceme** - an elongate, unbranched, indeterminate inflorescence with pedicelled flowers.
4. **Panicle** - a branched raceme.
5. **Corymb** - a flat-topped raceme with elongate pedicels reaching the same level.
6. **Compound Corymb** - a branched corymb.
7. **Umbel** - a flat-topped or rounded inflorescence with the pedicels originating from a common point. Umbels can be determinate or indeterminate.
8. **Compound Umbel** - a branched umbel, with primary rays arising from a common point, and secondary umbels arising from the tip of the primary rays.
9. **Capitulum** (or head) - a dense vertically compressed inflorescence with sessile flowers on a receptacle and subtended by an involucre of phyllaries, characteristic of the Asteraceae. Heads can be determinate or indeterminate.
10. **Thyrse** - a many-flowered inflorescence with an indeterminate central axis and many opposite, lateral dichasia; a mixed inflorescence, with determinate and indeterminate shoots.



Definite inflorescence

A type of flowering shoot) in which the first-formed flower develops from the growing region at the top of the flower stalk. Thus no new flower buds can be produced at the tip and other flowers are produced from lateral buds beneath.

Type of Definite Inflorescence

1. Solitary cyme

When the apical or the axillary bud forms a single flower it does not form a real ‘inflorescence’ but this type is better included within the ‘definite’ group as further development is limited.

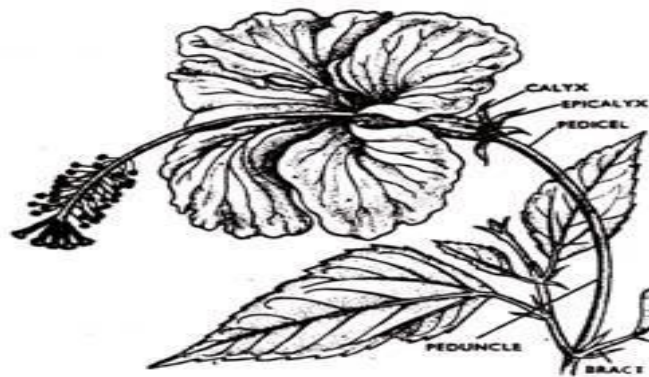


FIG. 283. Solitary flower of *Hibiscus rosa-sinensis*.

2. Cyathium cyme

The common garden Poinsettia (*Euphorbia*) pulcherrima shows this specialized cymose inflorescence which is covered by a cup-shaped green involucre formed by the union of bracts. The extremely reduced florets are placed on a convex receptacle.

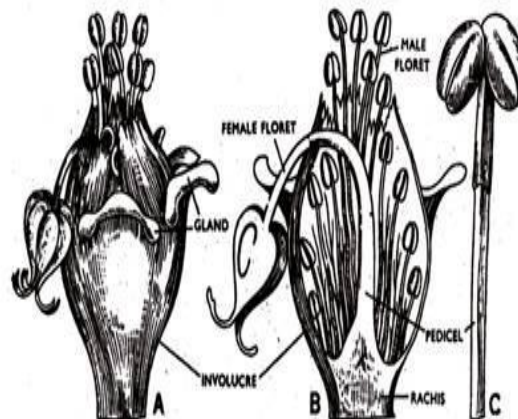


FIG. 290. Cyathium of *Poinsettia (Euphorbia) pulcherrima*. A. External view. B. L.S. showing male and female florets with bracteoles in between. C. A male floret formed of a single stamen.

3. Dichasium

This is the more normal cymose type where- two lateral branches develop on the two sides of the terminal apical (oldest) flower. The lateral branches may again branch similarly after the manner of biparous cymose branching

4. Polychasium

These branches as in the multiparous cyme, there being more than two lateral branches from the base of the apical flower. An example may be found in *Calotropis* of Asclepiadaceae of *Caprifoliaceae*.



FIG. 286. Dichasium of *Dianthus chinensis*. FIG. 287. Polychasium of *Viburnum tinus*.

References

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