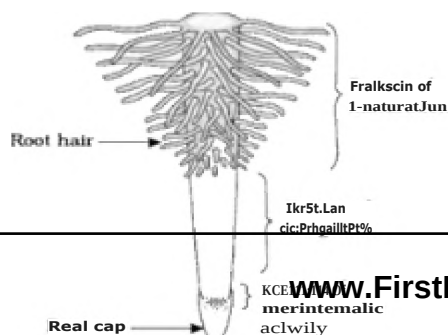


MORPHOLOGY OF FLOWERING PLANTS

The Root

- In Dicotyledons, elongation of radicle forms the primary roots which bears lateral roots of several orders called **secondary roots**, **tertiary roots** etc.
- Primary roots along with lateral roots forms the Tap root system. Mustard, Gram etc.**
- In monocotyledons, primary root is replaced by large number of roots at its base of stem to constitute the Fibrous root system. Wheat, rice etc.**
- The roots that arise from other parts of plant beside radicle are called **adventitious roots**. Example. Grass, Banyan tree Maize etc.

Regions of "Moil-



Modification of roots- Aoots are modified for storage, nitrogen fixation.. aeration and Sulppo rt.

- * Tap root of carrot (conical tap root), radish Ifusiforrm tap root), turnip (napiforri tap root) and adventitious mot of sweet potato get SINGliell to store food.
- Prop root Of Banyan and Stilt root of maize and sugarcane have supporting root corning out from lower node of stems.
- In Rhimphora, Prieurnatophores help to gat oxygen for respiration as It grows in swampy areas_

The Stern

- It develoot from Pi umule of tl.l. 'Embryo_
- Stem bears nodes and internodes. The region of stem where leaves are born called nodes and portion between two nodes are called internodes.

Modification of sterns-

- Underground stern modifications act as organ of perennation in unfavorable conditions.

Types are as follows:

Sucker: glint, Chrysanthemum

Rhizome: E in. ger

Corni: Colocasia

Tuber: Potato

BOO: Onions, Garlic

- * Stern tendril help plants to climb as in cucumber, pumpkins, and grapes.
- * Axillant buds of stem may modify Into woody, straight and pointed thorns as In Citrus and Bougainwillea..

The Leaf -

Lamina

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- Leaf is a .green, dissimilar exogenous lateral flattened outgrowth which is borne on the node of a stem or branches,

4f. Leaves originate from shoot apical meristem and are arranged in an acropetal order.

41. A typical leaf consists of three parts- Leaf base, Reticle, Lamina,

- Leaf Is attached with stern by Leaf Base which may bear two small leaf like structures called stipules.

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- * Middle prominent vein is called mid vein.
- The arrangement of vein and veinlets in the lamina is called venation.

Retikulate venation	Parallel venation
a. Veinlets form a net network.	a. A network is absent
b. Veins are irregularly distributed.	b. Veins are parallel to one another.
c. It is present in all Dicotyledons like Gram, Pea, Beans, and Mango etc.	c. It is present in Monocotyledons like Grass, Banana, Rice etc.

Types of Leaves

(a) Simple Leaves

{14 Compound leaves; Pinnately compound leaves and Palmately compound leaves}

- The pattern of arrangement of leaves on the stem or branch is called Phyllotaxy.
- In alternate type of phyllotaxy single leaf arises at each node as in China rose.
- In opposite type of phyllotaxy a pair of leaves arises from each node opposite to each other as in Guava.
- If more than two leaves arise at a node and form a whorl is called whorled type of phyllotaxy as in Alstonia.

Inflorescence

The arrangement of flowers on the floral axis is termed as inflorescence. TWO main types of inflorescence are racemose and cymose.

The flower

- A typical flower has four whorls arranged on a swollen end of stalk or pedicel called thalamus. They are Calyx, Corolla, Androecium and Gynoecium.
- When flower can be divided into two equal radial halves by any radii passing through the center the symmetry of flower is called actinomorphic.
- When flower can be divided into two similar parts only in one vertical plane it is zygomorphic.
- Floral appendages are in multiple of 3 or 5 they are called trimerous, tetramerous and pentamerous respectively. Flower with reduced small leaf at the base of pedicel are called bracteates and without it ebracteate.
- Based on the position of ovary with respect to other floral part on thalamus flowers are of following types:
 - (a). Hypogynous flower
 - Perigynous flowers
 - Epigynous flowers



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Calyx is the outermost whorl of the flower; its members are called sepals.

It may be gamosepalous (sepals united) or polysepalous (sepals free).

Corolla consists of petals, they may be gamopetalous or polypetalous.

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- The mode of arrangement of sepals or petals in floral bud with respect to the other members of same whorl is called aestivation.

- Types are: Vali/ate.. Twisted, Imbricate, and \taxiIlan/ aestivation.

The Andromecium

- Androtciurn represent the malt reproductive parts of flower. consists of stamens_ Each stamen consists of **filament and anther. Sterile stamen is called Stemandde_**
- When stamens are attached with petals it is called eoioetalous
- Stamen may be free {polyardrousi or may be united in one bundle (monadelphousl two bundles {tiadelphous). more than two (polyadelphousi.

The Glenottium

- Female reproductive part of flower consists of one Dr more carpels_ Each carpel is made up of stigma style and ovary,
- When more than one carpel Is present.. It may be free (arpotarpous) as In lotus and rose or fused together {syncarpousi as in mustard and tomato.

Platentation

- The arrangement of oodules within the ovary is called placentation_
- Types are:
 - a) Marginal fpea)
 - Wl Axle (china ro50
 - c) Parietal (rmustard)
 - di Free central (clianthes)
 -) Basal (sunflower)

The fruit

- Mature and ripened Diary developed after fertilization is fruit, If a fruit is formed without feitilizatiork of &wary It is called piarthenooarpic fruit.
- Fruit consists of seeds and pericarp. Thick and fleshy pericarp is three layered called epicarp, mesocarp and endocarp.

The Seed

- Dicotyledonous Seed is made up of a seed coat and an embryo. Embryo is made up of embryonal axis, ra^{te} tle and cotyledons.
- Seed coat has two layers outer testa and Inner tegmen. l-llu m is scar through which seed Is attached to 5e ovary. Small pore above the hilum is called rnicrome.
- In monocotyledonous seede, outer covering of endosperm separate the embryo by a prtiti nbut laytit Ilp aleUrgine layer.
- Single cotyledon is called as scutellum having a short axis bearing Plumule and radicle.
- Plu mule and radicle are closed Inside sheaths called as coleoptile and coleorhizae respectively.