Class : Botany
Class : XI

Kannada

Morphology of Flowering Plants

Table 1: Parts of a plant

Plant Organ	Part	Function
The Root	Root cap	Protects the apex of root and makes its way through the soil
	Region of meristematic activity	Repeated division
	Region of elongation	Growth of root in length due to repaid elongation and enlargement of cell
	Region of maturation	Differentiation and maturation of cell
The stem	Nodes- The region where leaves are born	Spreading out branches bearing leaves, flowers, and fruits.
	Internode- The region between two nodes	It conducts water, minerals, and photosynthates
The Leaf	Leaf base (leaf attached to the stem).	Hold the blade to light
	Petiole	
	Lamina or leaf blade (have veins and veinlets)	Veins provide rigidity to the leaf blade.

Venation

- The arrangement of veins and the veinlets in the lamina of leaf is termed as venation
- It is of two types:
  - Reticulate - Common in dicots
  - Parallel - Common in monocots

Types of Leaves

- A leaf could be simple or compound.
- Compound leaves are of two types i.e.,
  - Pinnately compound leaf - neem.
  - Palmately compound leaf - silk cotton.

Phyllotaxy

- Pattern of arrangement of leaves on the stem or branch.
- It is of three types:
  - Alternate - Chinarose, mustard and sunflower.
  - Opposite - Calotropis and guava
  - Whorled - Alstonia
  -

The Inflorescence

- The arrangement of flowers on the floral axis is termed as inflorescence.
- Depending on whether the apex gets developed into a flower or continuous to grow, two major types are:
  - Racemose and cymose.

Flower

- It is the reproductive unit in angiosperms. .
- Based on the position of floral parts on thalamus, flower, could be of 3 types.
  - Hypogynous - mustard, china rose and brinjal
  - Perigynous - Plum, rose, peach
  - Epigynous - Guava, cucumber, ray florets of sunflower
    (1) Actinomorphic & Zygomorphic (Based on symmetry)
    (2) Trimerous, tetramerous & pentamerous (Based on no. of floral parts)
    (3) Bracteate & ebracteate (Based on presence of bracts)
- SEPALS - Polysepalous & Gamosepalous
- PETALS - Polypetalous and gamopetalous

Aestivation

- The mode of arrangement of sepals or petals in floral bud with respect to the other members of the same whorl.
- The four types of aestivation in corolla are as follows:
  - Valvate - Calotropis.
  - Twisted - China rose, lady's finger and cotton
  - Imbricate - Cassia and gulmohar
  - Vexillary - Pea and beans.

ANDROECIUM

- Sterile stamen – Staminode
- Epipetalous - Attached to petals
- Epiphyllous - Attached to perianth
- 1 bundle – monnoadelphous
- 2 bundles – diadelphous
- > 2 bundles - polyadelphous

GYNOECIUM

- Carpel free - apocarpous
- Carpel fused – syncarpous
- On the basis of the arrangement of ovules within the ovary, placentation is of 5 types:
  - Marginal - Pea
  - Axile - China rose, tomato and lemon
  - Parietal - Mustard and Argemone
  - Free central - Dianthus and Primrose
  - Basal - sunflower, marigold

Fruit

- The fruit of mango and coconut is drupe.

Seed

- The dicot seed consist of embryonal axis and two cotyledons. At the ends of embryonal axis radicle and plumule are present.
- In monocots, seed have single shield shaped cotyledon known as scutellum.
- The outer covering of endosperm separates the embryo by aleurone layer.
- Plumule gives rise to coleoptile and radicle give rise to
- On the basis of presence or absence of endosperm seed is of two types i.e.,
  - Endospermic seed - Castor
  - Non-endospermic seed - Bean, gram, and pea

FLORAL FORMULA

- Represented by some symbols.

Symbol	Meaning	Symbol	Meaning	Symbol	Meaning
Br	Bracteate	P	Perianth	G	Gynoecium
Ebr	Ebracteate	P_n	Free tepals	G_n	Free carpels
K	Calyx	$P_{(n)}$	Fused tepals	$G_{(n)}$	Fused carpels
K_n	Free sepals	A	Androecium	$\underline{G}$	Superior ovary
$K_{(n)}$	Fused sepals	A_n	Free stamens	$\overline{G}$	Inferior ovary
C	Corolla	$A_{(n)}$	Fused stamens	⊕	Actinomorphic
C_n	Free petals	C A	Epipetalous	%	Zygomorphic
$C_{(n)}$	Fused petals	P A	Epiphyllous	⚥	Bisexual

FLORAL DIAGRAM

- Provides information about the
  - Number of parts of a flower
  - Their arrangement
  - Relation they have with one another
  - Cohesion and adhesion within parts of whorls and between whorls
- Position of mother axis is w.r.t. flower is represented by a dot on the top of the floral diagram.
- Calyx, corolla, androecium and gynoecium are drawn in successive whorls from outside to inside.

SOLANACEAE

- Also called Potato Family.
- Distribution -Widely distributed in tropics, subtropics and temperate zones.
- Habit - mostly small herbs and shrubs, rarely small trees.
- Root - Tap root system
- Stem - herbaceous, rarely woody, Aerial, erect, cylindrical, branched, solid or hollow, hairy or glabrous, underground stem in potato (Solanum tuberosum)
- Leaves – Alternate, mostly simple, rarely pinnately compound, Exstipulate, Venation reticulate
- Inflorescence - Solitary, axillary or cymose as in Solanum
- Flower - Bisexual, actinomorphic
- Calyx – sepals five, united, persistent, valvate aestivation
- Corolla – petals five, united, valvate aestivation
- Androecium – stamens five, epipetalous
- Gynoecium – bicarpellary obligately placed, syncarpous; ovary superior, bilocular, placenta swollen with many ovules, axile.
- Fruits – berry or capsule
- Seeds – many, endospermous
- Economic Importance
  - Food – Tomato, brinjal, potato
  - Spices – Chilli
  - Medicine – Belladonna, Ashwagandha
  - Fumigatory – Tobacco
  - Ornamentals – Petunia



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