# TOPIC: MORPHOLOGY OF FLOWERING PLANTS-ROOTS

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## MORPHOLOGY OF FLOWERING PLANTS

- Angiosperms are characterized by presence of roots, stems, leaves, flowers and fruits.
- The underground part of the flowering plant is the root system while the portion above the ground forms the shoot system.

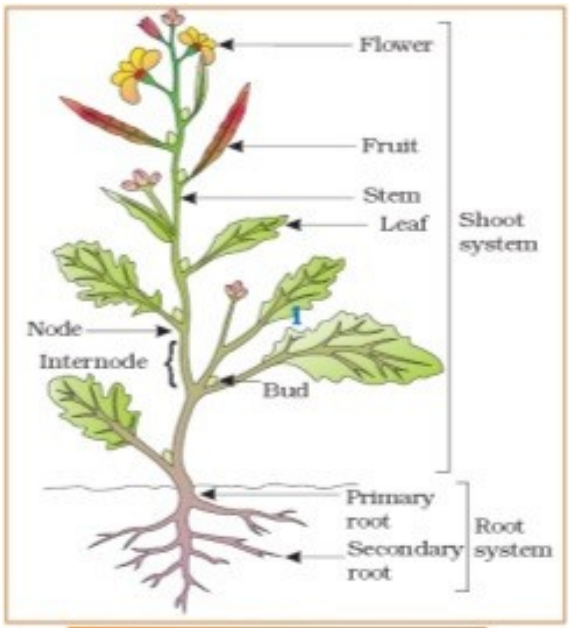


**Fig:** Structure of typical plant

## THE ROOT

- Roots are developed from Radicle of the embryo of a germinating seed.
- In majority of the dicotyledonous plants, the direct elongation of the radicle leads to the formation of primary root which grows inside the soil. It bears lateral roots of several orders that are referred to as secondary, tertiary, etc. roots. The primary roots and its branches constitute the **tap root system**.

  e.g., mustard plant.

- In monocotyledonous plants, the primary root is short lived and is replaced by a large number of roots. These roots originate from the base of the stem and constitute the **fibrous root system**.

  e.g., wheat plant.

- In some plants, like grass, Monstera and the banyan tree, roots arise from parts of the plant other than the radicle and are called adventitious roots.

- The main functions of the root system are –
  - Absorption of water and minerals from the soil,
  - providing a proper anchorage to the plant parts,
  - storing reserve food material and
  - synthesis of plant growth regulators.

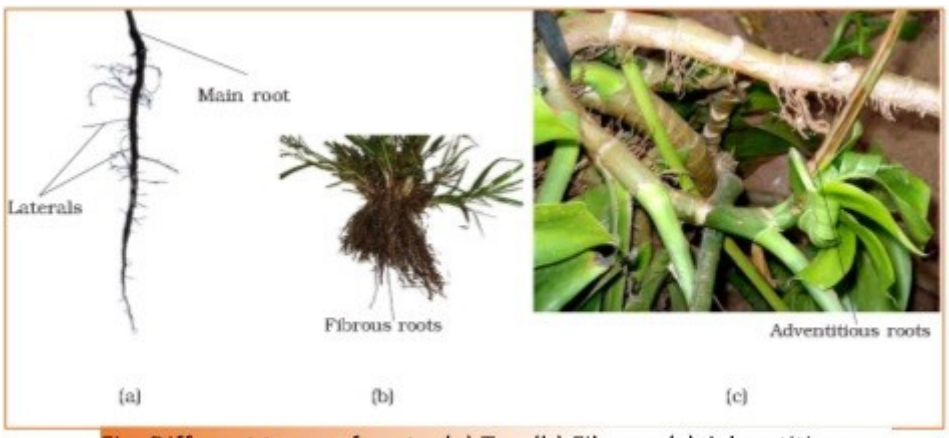


Fig: Different types of roots: (a) Tap (b) Fibrous (c) Adventitious.

**Regions of the Root**

1. **Root cap –** The root apex is covered by a thimble-like structure called the root cap. It protects the tender apex of the root as it makes its way through the soil.
2. **Region of meristematic tissue –** it is present a few millimeters above the root cap. The cells of this region are very small, thin-walled and with dense protoplasm. They divide repeatedly.
3. **Region of root elongation –** The cells of this region undergo rapid elongation and enlargement and are responsible for the growth of the root in length.
4. **Region of maturation –** The cells of this zone gradually differentiate and mature. From this region some of the epidermal cells form very fine and delicate, thread-like structures called root hairs. These root hairs absorb water and minerals from the soil.

➢ **<u>Modifications of Root</u>**

Roots in some plants change their shape and structure and become modified to perform functions other than absorption and conduction of water and minerals.

- **Modification for food storage –**

Tap roots of carrot, turnips and adventitious roots of sweet potato, get swollen and store food.

- **Modification for support –**

**Prop roots –** vertically downward roots originates from heavy branches to support them.

e.g., banyan tree.

**Stilt roots –** oblique downward roots coming out of the lower nodes of the stem to support weak stem.

**e.**g., Maize, sugarcane.

- **Modification for respiration –**

In some plants growing in swampy areas, many roots come out of the ground and grow vertically upwards. Such roots, called **pneumatophores**, help to get oxygen for respiration.

e.g, Rhizophora.

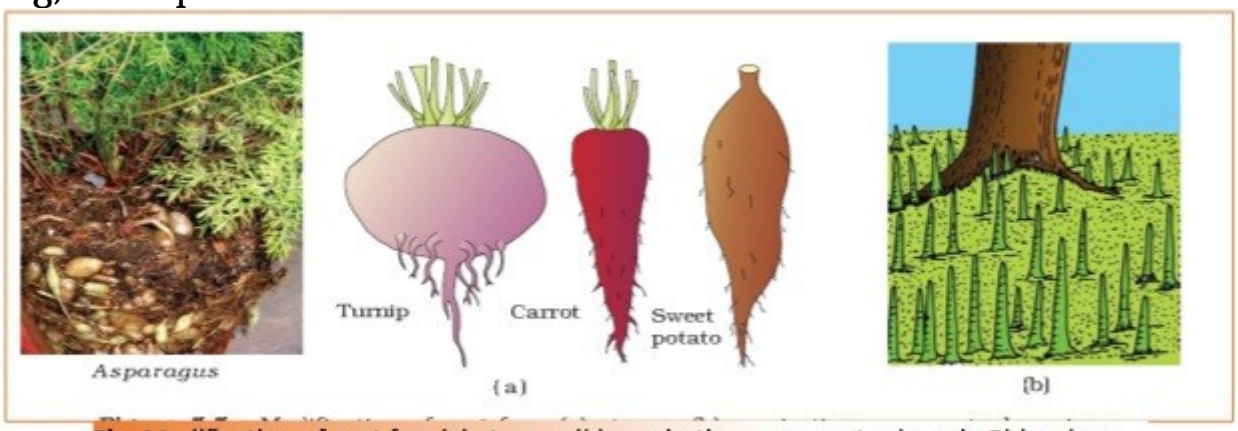


**Fig:** Modification of root for: (a) storage (b) respiration: pneumatophore in Rhizophora