

Class-6 (Science)

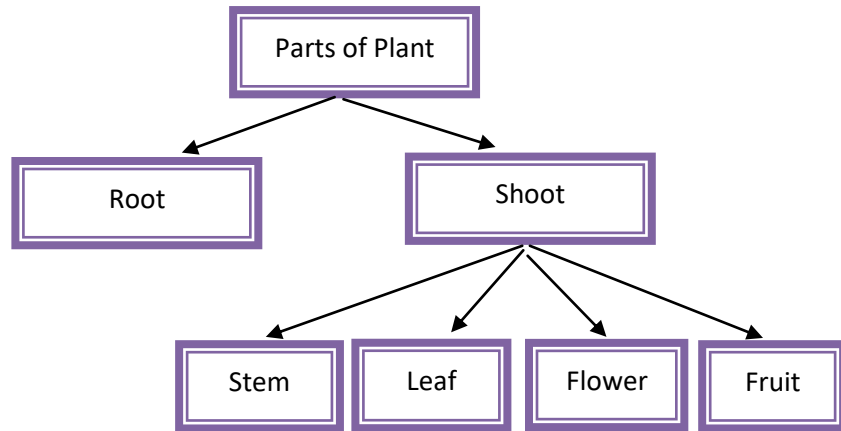
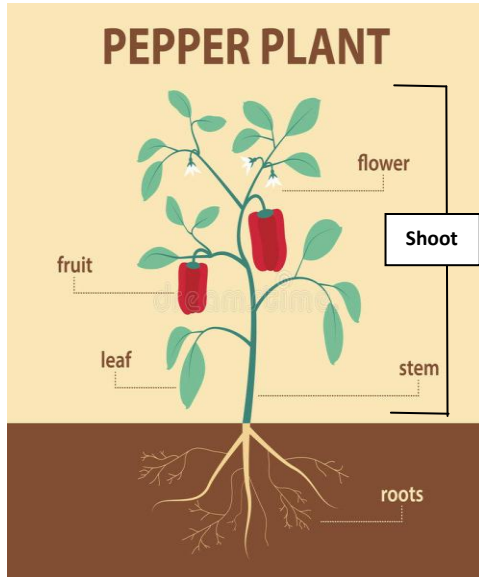
Chapter-4

Morphology of Plants

Lecture-1 Date-30.06.2020

Lesson: 1-4

Parts of a flowering plant:



Shoot: The part of the plant that remains above the soil is called shoot. Shoot consists of stem, leaves, flower and fruit.

Stem:

- It is the stalk of the plant.
- It helps the plant to stand upright.
- It is generally green when young and later often become dark brown.
- The stem has node, inter node and apical bud.
- Stem bears the weight of leaves and branches.
- The stem carries water and minerals from the roots to the leaves and carries food prepared by the leaves to the different parts of the plant.

Leaf:

- Leaves grow on the stem and branches.
- They are usually green due to the presence of chlorophyll which helps them to prepare their own food.

- Through stomata (small pores of leaves) plants take in and give out air.

Flower:

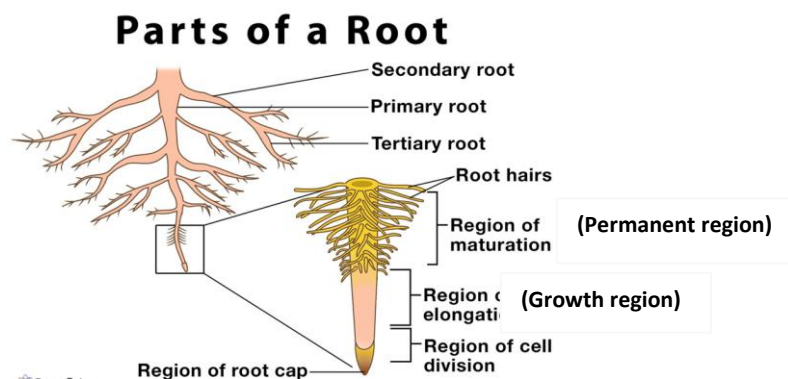
- Flowers are the most attractive and reproductive parts of the plant.
- They come in different shapes, sizes and colours.
- By the process of pollination, many flowers develop into delicious fruits, which are eaten by us.

Fruits:

- After maturity, ovary of flower turns into fruit and the ovule turns into seed. The remaining parts of flower falls off.

Roots:

- Roots are usually underground but can be above ground too.
- It has no nodes, internodes and apical bud.
- Roots grow in length only from their ends.
- Roots usually develop from radicle of the seed leaf.
- The radicle grows downward into the main root (primary root).
- Secondary root originates from primary root.
- Similarly, tertiary root originates from secondary roots.



Morphology of Root (different parts of a typical root):

Root cap: The very tip of the root is covered by a thimble-shaped root cap, which serves to protect the growing tip as it makes its way through the soil.

Growth region (region of elongation): Just behind the root cap lies the apical meristem, a tissue of actively dividing cells. Some of the cells produced by the apical meristem are added to the

root cap, but most of them are added to the region of elongation, which lies just above the apical meristem. The growth in length occurs in that region.

Root hair: The minute, hairy region at located the back of the growth region is root hair region. Plant absorbs water and minerals through it.

Permanent region (region of maturation): Above the elongation zone lies the region of maturation, where the primary tissues of the root mature, completing the process of cell differentiation that actually begins in the upper portion of the meristematic region.

Functions of root:

- Its primary functions are anchorage of the plant,
- absorption of water and dissolved minerals and conduction of these to the stem,
- and storage of reserve foods.

Differences between root and stem:

- The root differs from the stem mainly by lacking leaf scars and buds, having a root cap, and having branches that originate from internal tissue rather than from buds.
- Root has no nodes, internodes and apical bud but stem has.

Types of Roots:

Tap root:

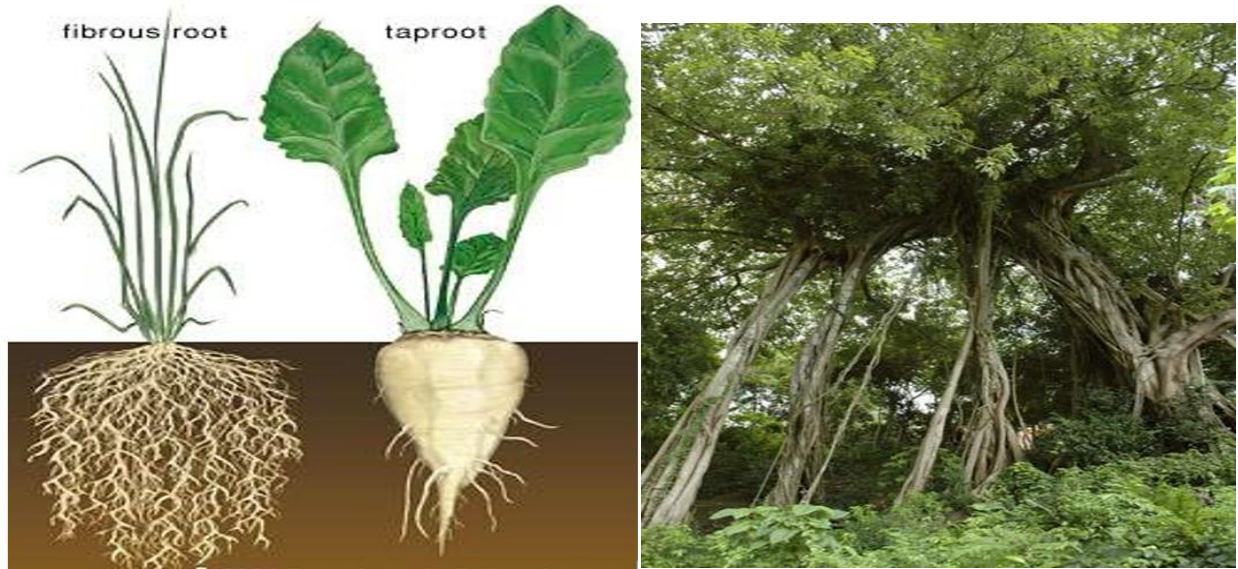
The main root (primary root) develops from the radicle of the seed leaf directly as it goes down the ground vertically and lateral branches grow out of it, is called tap root.

The primary root, or radicle, is the first organ to appear when a seed germinates. It grows downward into the soil, anchoring the seedling.

Example:In gymnosperms and dicotyledons (angiosperms with two seed leaves), the radicle becomes a taproot. It grows downward, and secondary roots grow laterally from it to form a taproot system. In some plants, such as carrots and turnips, the taproot also serves as food storage. Mango, black berry, chili, mustard and Nayantara trees have this type of root.

Adventitious root:

Some roots, called adventitious roots, arise from an organ other than the root—usually a stem, sometimes a leaf.



Two types of root system: (left) the fibrous roots of grass and (right) the fleshy taproot of a sugar beet.

Banyan tree with prop roots (aerial roots) emerging from the branches (non fibrous root).

Fibrous root: The adventitious root that grow in a cluster from the base of the stem.

Example: Grasses and other monocotyledons (angiosperms with a single seed leaf) have a fibrous root system, characterized by a mass of roots of about equal diameter. This network of roots does not arise as branches of the primary root but consists of many branching roots that emerge from the base of the stem.

Non fibrous root: The adventitious roots that do not grow in a cluster, rather develop separately from one another are non fibrous roots.

Example: Prop root of banyan tree originate from the branches and remain hanging in the air before reaching the soil to support the plant in the soil, stilt root of screw pine etc.

They are especially numerous on underground stems, such as rhizomes, corms, and tubers, and make it possible to vegetatively propagate many plants from stem or leaf cuttings.

Questions

1. Describe different parts of a flowering plant with a labeled picture.
2. Write down the major differences between stem and root.
3. What are meant by primary, secondary and tertiary root?
4. Describe different parts of a typical root with a labeled figure.
5. Mention the functions of root.
6. What is tap root?
7. What is adventitious root? Discuss the types of adventitious root with examples.