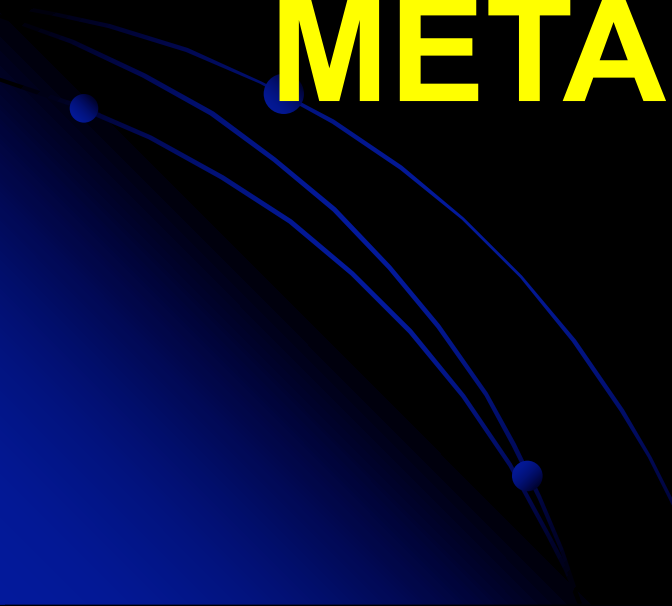


5. ROOT STRUCTURES (TYPES AND METAMORPHOSES)



Plants generally consist of two parts, structural and reproductive organs

1. Vegetative (**structural**) Organs

- 1- Root
- 2- Stem
- 3- Leaves

Generative (**reproductive**) Organs

- 1- Flower
- 2- Fruit
- 3- Seeds

1. ROOT STRUCTURE

A-GENERAL INFORMATIONS

The major organs of vascular plants are sporophytic roots and shoots.

Roots are found in all vascular plants except for the *Psilophytes* and relatives.

The roots have **four major** functions;

- 1) Absorption of water and inorganic nutrients,
- 2) Anchoring of the plant body to the ground, and supporting it,
- 3) Storage of food and nutrients
- 4) Vegetative reproduction and competition with other plants.

The first root to develop in a vascular plant is the **radicle** of the embryo.

If the radicle continues to develop after embryo growth, it is known as the “**primary root**”.

Roots that arise from other roots are called “**lateral roots**”.

Roots that arise from a non-root organ (stem or leaf) are “**adventitious roots**”.



A typical root have **five main** parts;

1. Root Cap

2. **Meristematic Zone (Growing Point)**

3. Elongation Zone

4. **Maturation Zone**

B- ROOT METAMORPHOSES

Roots that undertake other duties besides the main task and thus undergo morphological changes are called "**root metamorphosis**".

Root Metamorphose Types

1. Storage roots: These roots are modified for storage of food (e.g starch) or water, such as carrots, radish and beets. They include some taproots and tuberous roots.

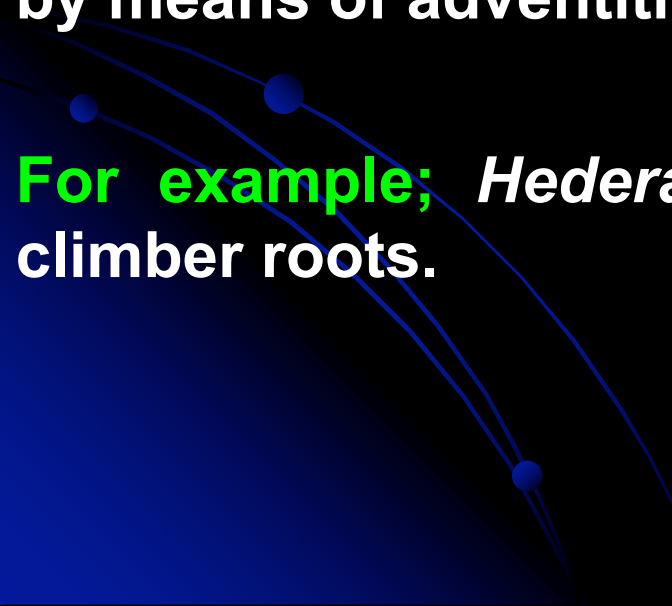
For example; *Raphanus sativus* (**radish**), *Daucus carota* (**carrot**), *Beta vulgaris* (**beet**), some *Orchidaceae* family members have a storage roots.

2. Assimilatory roots: These are green, aerial, adventitious roots which prepare food materials by photosynthesis are called photosynthetic roots or assimilatory roots.

For example; *Podostemonaceae* and some epiphytic *Orchidaceae* family member, *Trapa* and *Tinospora* have assimilatory roots.

3. Climber Roots: A plant that clings to a surface and climbs by means of adventitious roots.

For example; *Hedera helix* (**ivy**) has typical characteristic climber roots.



4. Haustorial roots: Roots of parasitic plants that can absorb water from another plant.

For example; *Viscum album* (mistletoe) and *Cuscuta sp.* (dodder).

5. Aerating roots: Roots rising above the ground, especially above water. In some plants like *Avicennia* the erect roots have a large number of breathing pores for exchange of gases.

For example; some mangrove genera (*Avicennia*, *Sonneratia*).



6. Stilt roots (Brace roots): The aerial, adventitious obliquely growing roots that develop from the lower nodes of the stem to give additional support are called **stilt roots**. These roots bear several large overlapping root caps called multiple root caps.

For example; *Saccharum officinarum* (**sugarcane**), *Zea mays* (**Maize**), *Ficus elastica* (**rubber**) and *Monstrea daliciosa* (**Swiss cheese plant**) have **stilt roots**.

7. Root-Thorns: In many palms, some aroids and others, adventitious roots from the base of the stem become hard pointed and thorn-like. These are called root-thorns. They are of indirect help as an Armature to the plants in driving out marauding animals.

For example; *Acanthorhiza sp.* and *Iriarteia sp.*



Thanks ...

