Transportation and Excretion in Plants

Introduction

In this chapter we will study the transportation system in plants and animals.

Living organisms need various materials for their survival.

These are used to keep them alive. Also, some materials are produced in their body that have to be removed, otherwise they will become harmful to the organism.

In plants, it is xylem and phloem and in animals, it is **circulatory system**. This is known as **circulation and excretion.**

Transportation in Plants

Plants need water for photosynthesis and maintenance of their body.

There are three categories of plants on the basis of their size or height such as:

1. Herbs: Herbs are small plants. These plants are usually green and have delicate and tender stems. They may or may not have branches.

These plants can be uprooted easily because the roots of such plants are not very deep. These plants need less water. Some herbs are grasses, crops, plants, etc.

2. Shrubs: Shrubs are big plants. These plants are with branches arising from the base, hence these plants give a bushy appearance.

These plants cannot be uprooted easily because the roots of such plants are deeper than the roots of herbs. Also, they need water.

Some shrubs are hedge plant, rose, hibiscus, mehndi, pomegranate, etc.

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3. Trees: Trees are very big or huge plants. These plants are with thick stems and deep roots. All trees do not have branches. The roots of trees are very deep.

Trees cannot be uprooted easily. Some trees are coconut, palm, guava, neem, peeple, banyan, etc.

Roots and Stems

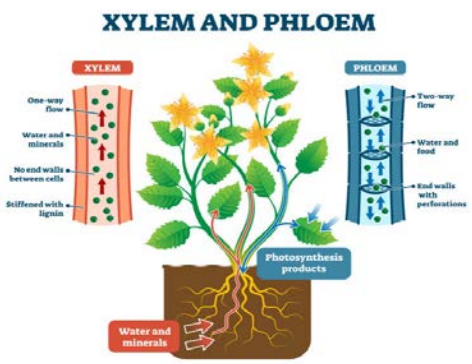
Root is the part of the plant that usually remains inside the soil. It has two main functions:

- It fixes the plant to the soil (anchorage or fixation).
- It helps in absorption of water and mineral salts from soil and passes it to the stem of the plant.

Stem is the part of the plant that usually remains above the soil. It has following main functions:

- Its supports the leaves, buds, flowers and fruits.
- Leaves are arranged on the stem.
- It conducts water and minerals from roots to leaves and other parts attached to it. Also conducts food from leaves to roots and other parts.

Plants have a well-developed transport system called **vascular system**. It consists of pipe- like vessels arranged from the tip of the roots to the tip of the leaves passing through the stem.



Transportation and Excretion in Plants

There are two types of cells commonly known as vessels in the system.

1. Xylem vessels

- This tissue has four components. It transports water and minerals.
- The roots absorb it and transport it to lease and other plant parts.

2. Phloem vessels

- This tissue also has four elements. It transports food from leaves to other parts of the plant where it is to be stored.
- This is called **translocation**. They are present as bundles in plants.

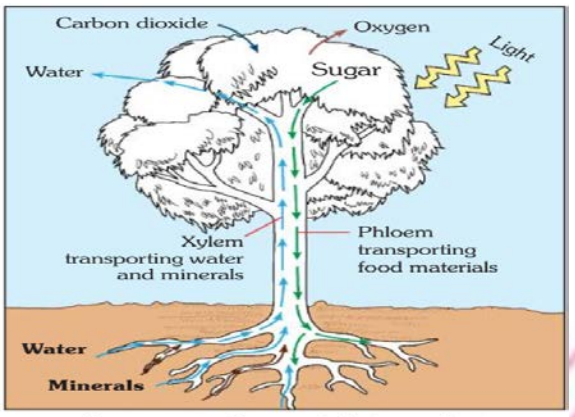
Transport of Water and Minerals in Plants

Water is absorbed from the soil by the root hair. The root hairs are in close contact with water surrounding the soil particles.

Water moves from **root hair** to the **root tissues** and then to the **xylem** in the root. The absorbed water then moves up the stem through the xylem.

Minerals are taken up by the plants from the soil (as solution in water) through root hair, root cortex, endothermis and reach the root xylem.

Then the water containing minerals enters the interconnected xylem in the stem and finally into the leaf.



Transport of materials in a plant

Transportation and Excretion in Plants

Translocation of Food

Translocation is the transport of food from leaves the site of food synthesis to other parts of the plant

The **carbohydrates** synthesized in leaves and **hormones** synthesized at the **shoot** and the **root tips** are transported to other parts of the plant through phloem.

Food molecules enter the phloem cells from mesophyll cells of the leaf. After entering phloem the food molecules may move upwards or downwards in the plant.

Transpiration

The excess of water absorbed by the plant is removed from the plant.

It takes place through aerial part of the plant. Leaves play an active part in this process.

The leaves have stomata through which the water vapour escapes out when it is open during day time. This is called **transpiration.**

Importance of Transpiration

- It produces cooling effect. Dear bye saving the delicate cells from the heat of the sunlight.
- Transpiration helps in the moment of water from roots upwards.

Transportation and Excretion in Plants

Excretion in Plants

Plant excretory products are removed from the plant body by a variety of methods. The carbon dioxide created during respiration is used up during photosynthesis, and oxygen gas produced as a by-product of photosynthesis is used up during respiration.

Excretion through leaves

The process of excretion in plants occurs in the following ways:

- Through the stomata of leaves and lenticels of stems, oxygen, carbon dioxide, and water vapour are expelled as gaseous wastes.
- Some waste materials gather in tree bark and leaves. The wastes are removed when the leaves and bark are shed.
- Some waste materials are made harmless before being stored inside the body of the plant as solid objects. These wastes include raffia, tannins, resins, gum, rubber, and essential oils.
- Different types of stored waste products include oil made from eucalyptus, and jasmine trees, latex from rubber trees, papaya trees, and acacia gums. Even excretion of these compounds into the soil occurs occasionally.