Life Processes

Transportation in Plants

✤ TRANSPORTATION IN HIGHER PLANTS

The higher plants have specialized system for the transportation of materials inside the body.

This system is called vascular system or vascular tissues of the plants.

Vascular tissue:

The vascular tissue consists of xylem and phloem.

Xylem contains four types of cells: -

- (I) Xylem tracheid's
- (II) Xylem vessels
- (III) Xylem parenchyma
- (IV) Xylem sclerenchyma
- Function: It helps in transportation of water and minerals which is called "ascent of sap". It helps in providing mechanical support.

Transportation of water-

The evaporation of water from the leaves of a plant is called transpiration. The continuous evaporation of water (or transpiration) from the cells of a leaf creates a kind of suction which pulls up water through the xylem vessels. Transpiration is the loss of water from the living tissues of the aerial parts of the plant in the form of water vapours.

There are three types of transpiration:

- (i) Cuticular transpiration (through cuticle) 3-9% of total transpiration.
- (ii) Lenticular transpiration (through lenticels) 0.1% of total transpiration.
- (iii) Stomatal transpiration (through stomata) 80-90% of total transpiration.

Importance of transpiration:

- It helps in absorption of water & minerals from the soil.
- It regulates the temperature of the plant.
- Mostly water absorbed by roots is lost by transpiration without serving any purpose. the energy spent by the plants in transpiration is wasted. So, transpiration is a necessary evil.

Class-X

Transpiration cohesion Theory:

Most accepted theory of ascent of sap is cohesion tension theory.



Dixon and **Jolly** proposed that water is pulled up in plant by tension (negative pressure) from above. This suction pressure is created by **transpiration**

Water is continually being lost from leaves by transpiration.

Loss of water in the leaves exerts a pull on the water in the xylem ducts and draws more water in to the leaf.

A water molecule clings to each other by hydrogen bond **(cohesion)** which maintains strength in column.

Because of the critical role of cohesion, the transpiration-pull theory is also called the cohesion theory. The rate of ascent of water is 10 - 75 cm/min.