

CLASS NOTES

Class: X

Subject: Biology

Topic: Ch- 6 Life processes[Transportation in plants]

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TRANSPORTATION IN ORGANISMS

All the organisms need to transport water, food, minerals, oxygen to different parts of the body. They help in the growth and respiration of the cells. The waste products are transported to the excretory organs for elimination from the body. Plants and animals have different organs and processes for the transportation of substances. These functions are performed by a circulatory system or transport system.

Transportation in plants

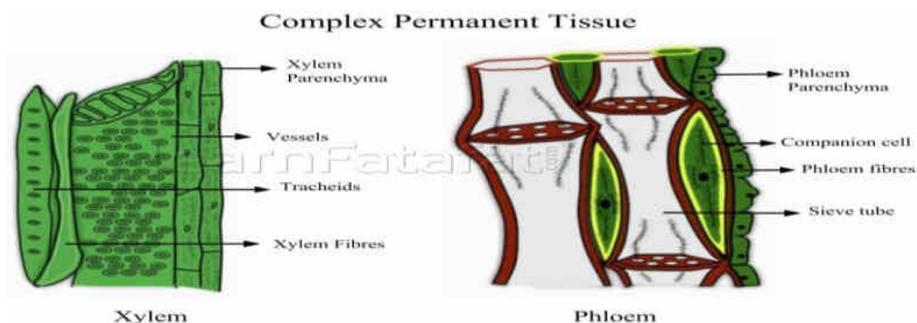
Plants have specialized vascular tissues for transportation of substances. There are two types of vascular tissues in plants.

Xylem: Xylem is responsible for transportation of water and minerals.

- It is composed of tracheids, xylem vessels, xylem parenchyma and xylem fibre. Tracheids and xylem vessels are the conducting elements.
- The xylem makes a continuous tube in plants which runs from roots to stem and right up to the veins of leaves.
- It carries water and minerals from the roots to leaves of the plant.

Phloem: Phloem is responsible for transportation of food.

- Phloem is composed of sieve tubes, companion cells, phloem parenchyma and bast fibers.
- Sieve tubes are the conducting elements in phloem.
- Phloem carries product of photosynthesis from leaves to other parts of the plant.



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Ascent of sap: The upward movement of water and minerals (collectively known as 'sap') from roots to different plant parts is called ascent of sap. Many factors play an important role in ascent of sap and it takes place in many steps. They are as follows :

- **Root pressure:** The walls of cells of root hairs are very thin. Water from soil enters the root hairs because of osmosis. Root pressure is responsible for movement of water up to the base of the stem.

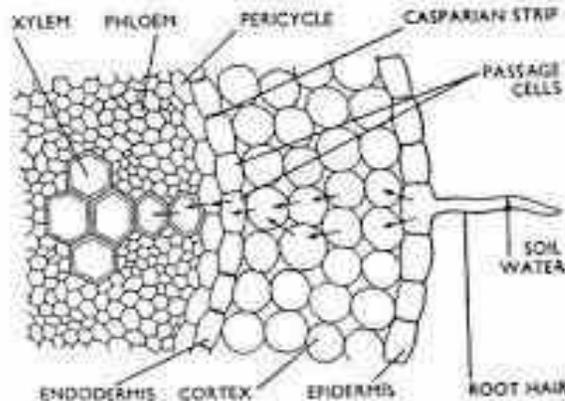
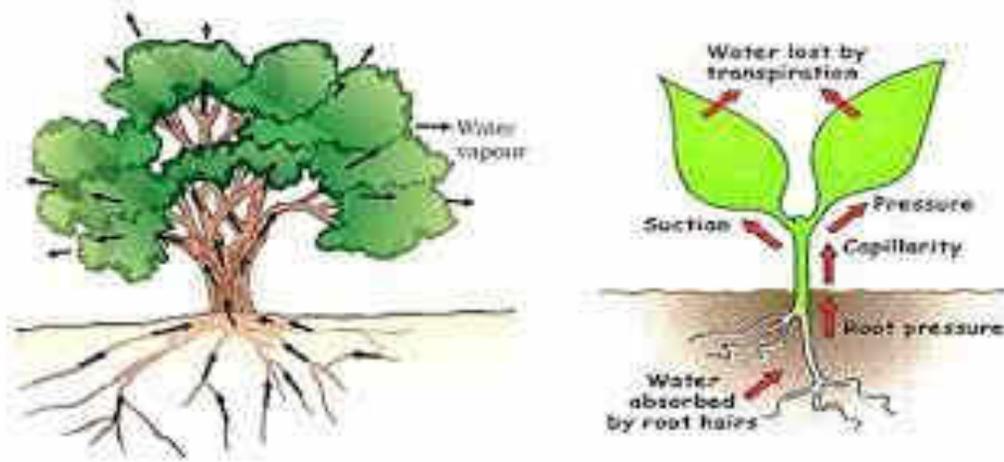


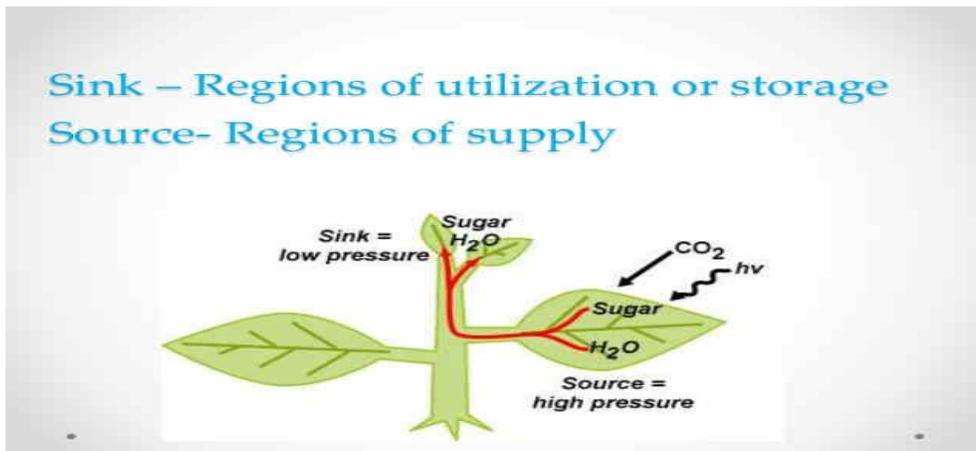
Fig. 4.2. A part of T.S. of typical dicot root. The arrows indicate the path of water.

- **Capillary action:** A very fine tube is called capillary. Water or any liquid rises in the capillary because of physical forces and this phenomenon is called capillary action. Water, in stem, rises up to some height because of capillary action.
- **Adhesion-cohesion of water molecules:** Water molecules make a continuous column in the xylem because of forces of adhesion and cohesion among the molecules.
- **Transpiration pull:** Loss of water vapour through stomata and lenticels, in plants, is called transpiration. Transpiration through stomata creates vacuum which creates suction, called transpiration pull. The transpiration pull sucks the water column from the xylem tubes and thus, water is able to rise to great heights in even the tallest plants.

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Transport of food: Transport of food in plants happens because of utilization of energy. Thus, unlike the transport through xylem, it is a form of active transport. Moreover, the flow of substances through phloem takes place in both directions, i.e., it is a two-way traffic in phloem. Transpiration is the process of loss of water as vapour from aerial parts of the plant.



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