

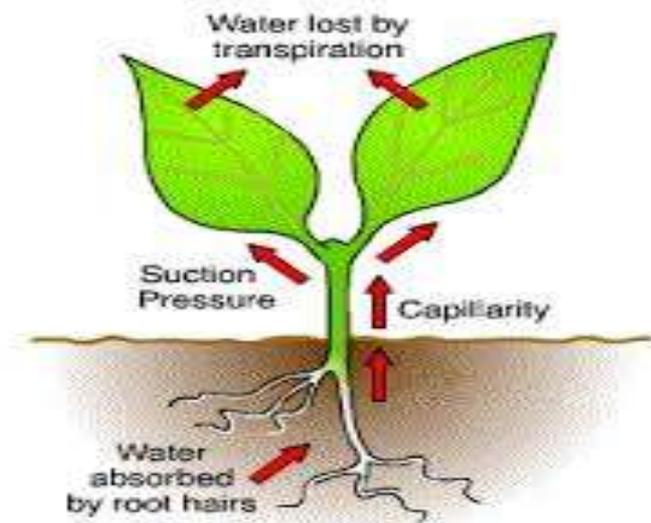
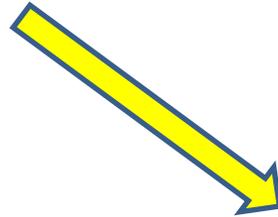
The objects are:

- ❖ **Definition of transpiration**
- ❖ **Understanding the process of transpiration**
- ❖ **Learning types of transpiration**
- ❖ **Advantages of transpiration to plant**

Definition of fruit

- **Transpiration or water cycle:** is the process of water movement through a plant and its evaporation from aerial parts especially from leaves but also from stems and flowers.

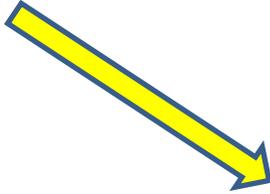
Transpiration



Types of transpiration

1. Cuticular Transpiration: the loss of water in the form of **water vapour** through the **cuticle** is known as **cuticular** transpiration.

Transpiration through cuticle



Types of transpiration

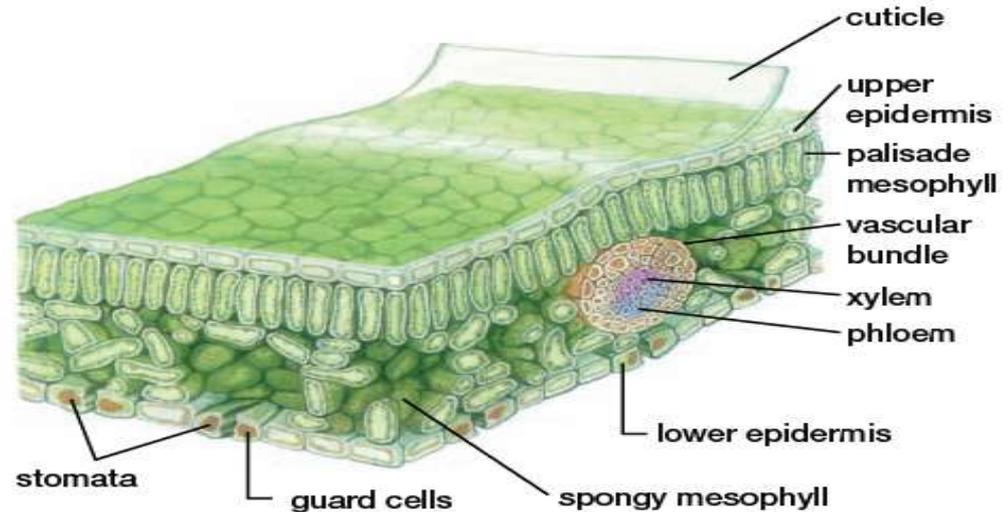
2. Lenticular transpiration: Loss of **water** in the form of water vapour taking place through the lenticels present in **woody stem** and **fruits** is called as **lenticular transpiration**. It amounts **1-5 percent** of the total **water loss** by the plant.



Types of transpiration

- 3. Stomatal transpiration:** Stomata are minute pores confined to **epidermis** of green shoot and leaves. Opening and closing of **stomata** are controlled by guard cells. Maximum loss (**80-90 percent of the total water loss**) of **water** from the plant tissues takes place through the **stomatal openings**.

Cross section of leaf



How much water do plants transpire?

🌱 During a **growing season**, a leaf will transpire many times more water than its own weight. An acre of **corn** gives off about **3,000-4,000 gallons (11,400-15,100 liters)** of water each day, and a large oak tree can transpire **40,000 gallons (151,000 liters)** per year.



Evaporation and transpiration

- **Evaporation:** occurs when water becomes **vapor** from bodies of water
- **Transpiration:** occurs when **water** leaves a plant as vapor
- **Evapotranspiration:** is the sum of both **evaporation** and transpiration - the way water moves from the **liquid state** to the gaseous state.

Internal factors affecting on transpiration

- 1. Number of leaves:** More leaves (or **spines**, or other **photosynthesizing organs**) means a bigger surface area and more stomata for **gaseous exchange**. This will result in greater water loss.
- 2. Number of stomata:** more stomata will provide more pores for **transpiration**.
- 3. Size of the leaf:** A leaf with a bigger **surface area** will transpire faster than a leaf with a smaller **surface area**.
- 4. Presence of plant cuticle:** A **waxy cuticle** is relatively impermeable to water and water vapour and reduces **evaporation** from the **plant surface** except via the **stomata**.

External factors affecting transpiration

 **Temperature: Transpiration** rates go up as the temperature goes up, especially during the growing season, related to open and closed the **stomata**.

 **Relative humidity:** As the relative humidity of the air surrounding the plant rises the **transpiration rate** falls. It is easier for water to evaporate into dryer air than into more saturated air.

External factors affecting transpiration

- ❖ **Wind and air movement:** Increased movement of the air around a plant will result in a higher transpiration rate. This is somewhat related to the relative **humidity of the air**.
- ❖ **Soil-moisture availability:** When moisture is lacking, plants can begin to senesce (premature ageing, which can result in leaf loss) and transpire less water.
- ❖ **Type of plant:** Plants transpire water at different rates. Some plants which grow in arid regions, such as cacti and succulents, conserve precious water by **transpiring less water** than other plants.

Antitranspirant

- **Antitranspirants** :are compounds applied to the leaves of plants to reduce transpiration. They are used on **Christmas trees**, on cut **flowers**, on newly transplanted **shrubs**, and in other applications to preserve and protect plants from **drying out** too quickly. They have also been used to protect leaves from **salt burn** and fungal diseases.

