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Kingdom of Bahrain
WELCOME!
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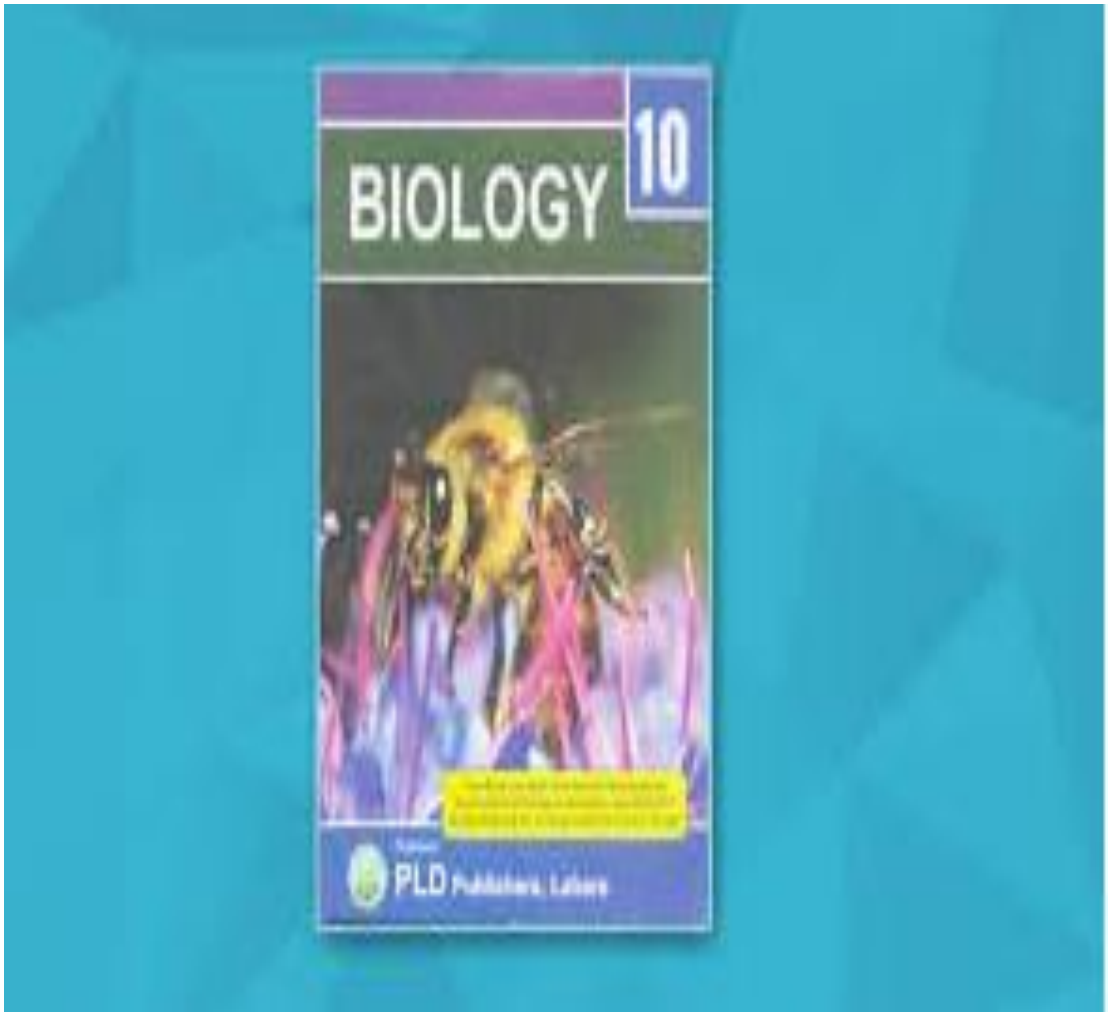

BIOLOGY
10
PLD Publishers, Lahore

Ch.2. Homeostasis

Topic. **Homeostasis**

In

Plants

Introduction

- **Homeostasis** may be defined as the maintenance of the internal conditions of body at equilibrium, despite changes in the external environment.

For example, the human body temperature remains at about 37°C despite fluctuations in the surrounding air temperature.

Examples of Homeostasis

- The following are some **examples** of homeostasis.

i. **Osmoregulation**. It is maintenance of the amounts of water and salts in body fluids.

ii. **Thermoregulation.** The maintenance of internal body temperature is called thermoregulation.

iii. **Excretion.** In this process the metabolic wastes are eliminated from body to maintain the internal conditions at equilibrium.

Objectives of the lesson

- At the end of this lesson students will be able to

- **Describe the process of homeostasis in plants**.

Homeostasis in Plants

- Osmoregulation
- Excretion

Mechanism of homeostasis in plants

Plants respond to environmental changes and keep their internal conditions constant i.e. homeostasis. They apply different mechanisms for the homeostasis of water and other chemicals (oxygen, carbon dioxide, nitrogenous maternal etc.)

Removal of extra Carbon dioxide and Oxygen

In daytime, the carbon dioxide produced during cellular respiration is utilized in photosynthesis and hence it is not a waste product.

At night, it is surplus because there is no utilization of carbon d oxide. It is removed from the tissue cells by diffusion.

In leaves and young stems, carbon dioxide escapes out through stomata.

In young roots, carbon dioxide diffuses through the general root surface especially through root hairs.

Oxygen is produced in mesophyll cells only during daytime, as a by-product of photosynthesis. After its utilization in cellular respiration, the mesophyll cells remove the extra amount of oxygen through stomata.

Removal of Extra Water

Plants obtain water from soil and it is also produced in the body during cellular respiration. Plants store large amount of water in their cells for transport. Extra water is removed from plant body by transpiration.

At night, transpiration usually does not occur because most plants have their stomata closed. If there is a high water content in soil, water enters the roots and is accumulated in xylem vessels. Some plants such as grasses force this water through special pores, present at leaf tips or edges, and form drops.

Guttation:

The appearance of drop of water on the tips or edges of leaves is called guttation,

Guttation is the exudation of drops of xylem sap on the tips or edges of leaves of some vascular plants, such as grasses, and a number of fungi. Guttation is not to be confused with dew, which condenses from the atmosphere onto the plant surface. Guttation generally happens during the night time. Wikipedia

Removal of other Metabolic Wastes

Plants deposit many metabolic wastes in their bodies as harmless insoluble maternal. For example, calcium oxalate is deposited in the form of crystals in the leaves and stems of many plants e.g. tomato

i. **Removal of Metabolic waste by leaf fall:**

In trees which shed their leaves yearly, the excretory products are removed from body during leaf fall

ii. **Removal of** Resins

Other waste materials that are removed by some plants are resins (by coniferous trees)

iii. **Removal of Gums:**

Gums (by keekar)

iv. **Removal of Latex:**

Latex (by rubber plant)

v. **Removal of Mucilage:**

Mucilage (by carnivorous plants and ladyfinger)

Osmoregulation

It is the process of maintaining suitable concentration of solutes and amount of water in body fluid

For this purpose plants in different habitats possess different adaptations:

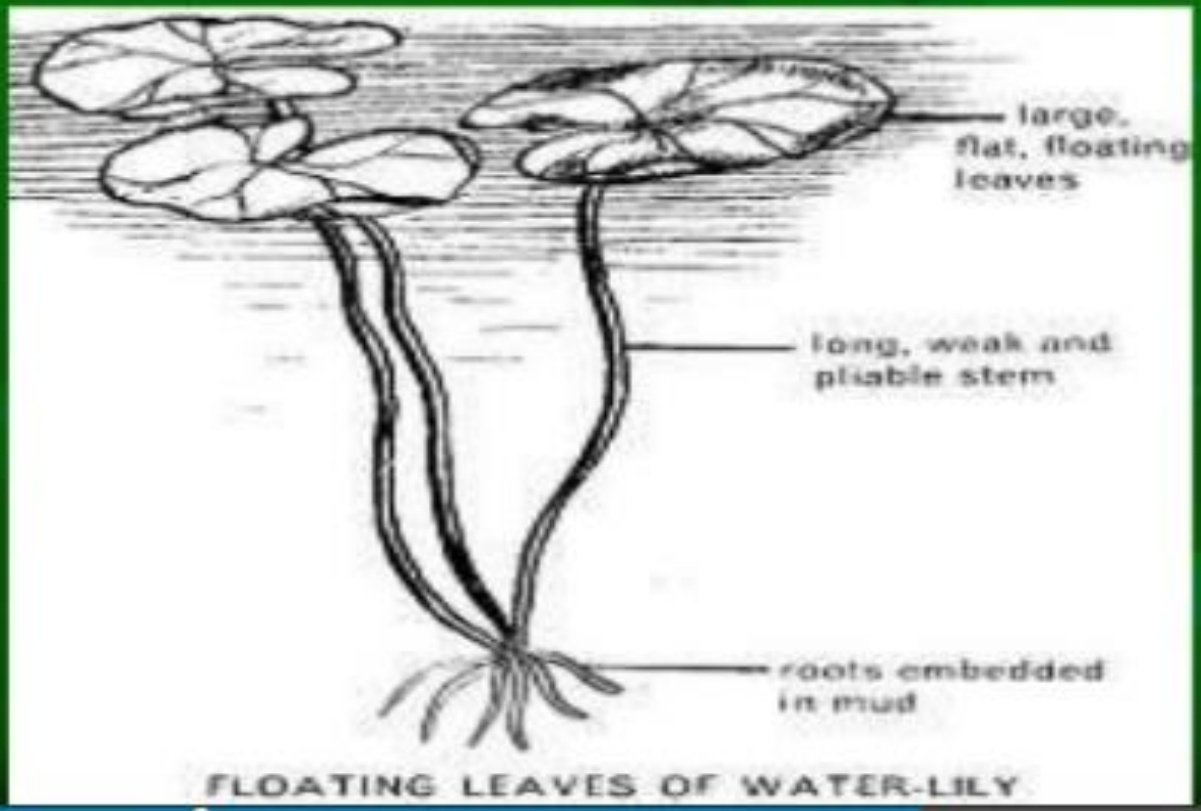
Mesophytes: Plants adapted to a habitat with adequate water

Xerophytes: **P**lants adapted to a dry habitat

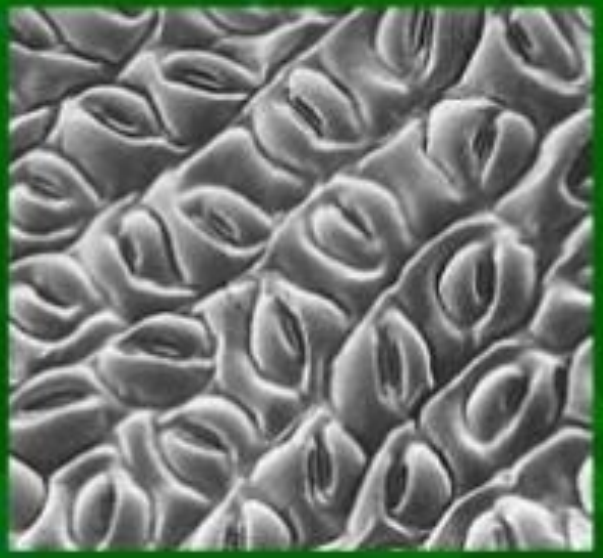
Hydrophytes: Plants adapted to a freshwater habitat

Hydrophytes:

Extremely high number of stomata per unit in a species living in tropic cloud forests where there is very moist.



FLOATING LEAVES OF WATER-LILY



Water Lily

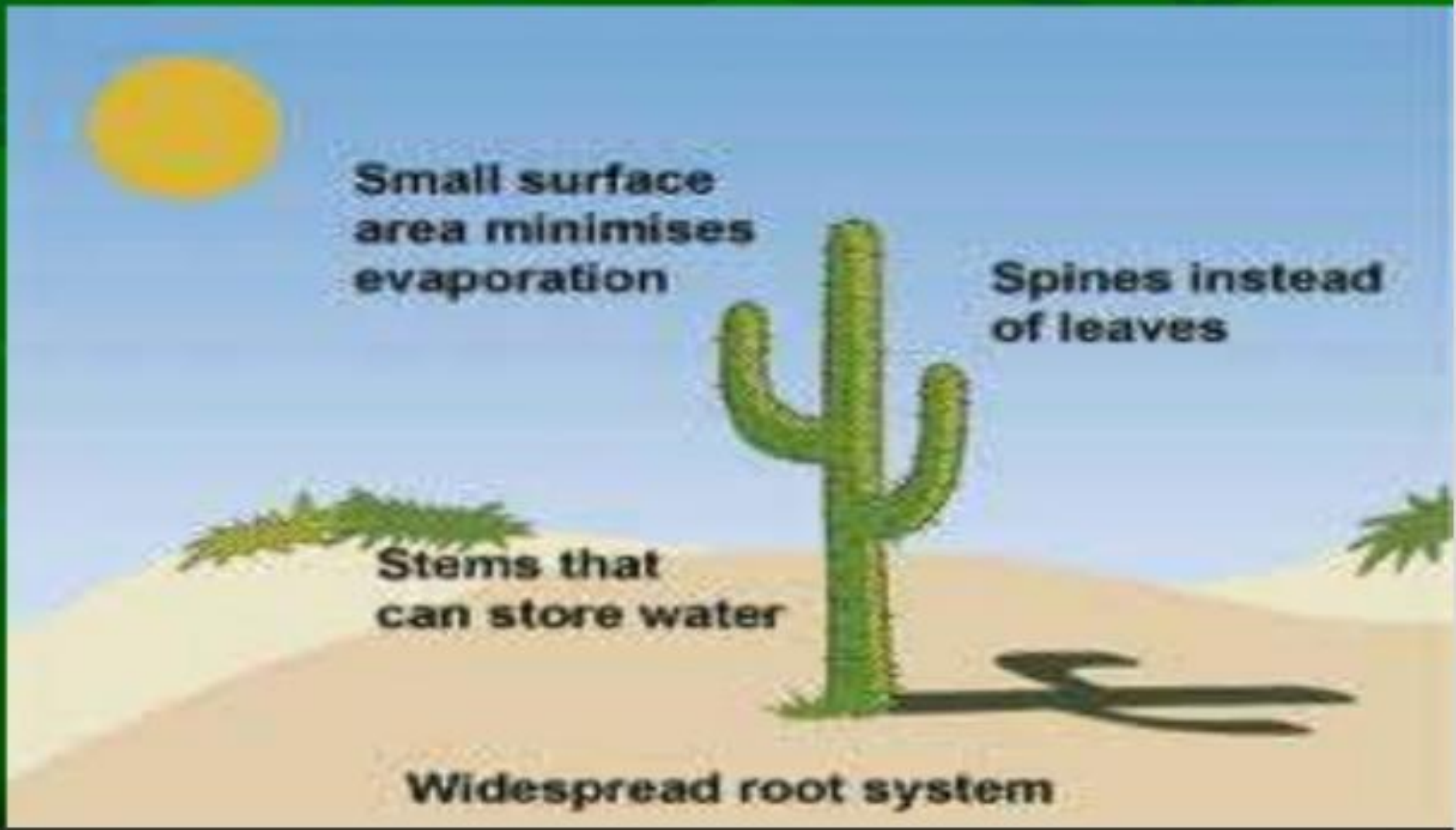
Mesophytes

Increase their rate of transpiration during hot condition.

Rate of transpiration > rate of water absoprtion, during dry condition.
–mesophytes respond to water stress by closing their stomata

Plants that live on land with an adequate water supply.

Xerophytes


Small surface area minimises evaporation
Spines instead of leaves
Stems that can store water
Widespread root system

Cactus

Halophytes

A **halophyte** is a salt-tolerant plant that grows in soil or waters of high salinity, coming into contact with saline water through its roots or by salt spray, such as in saline semi-deserts, mangrove swamps, marshes and sloughs and seashores.

Activity.1.

- **Give short answers of the following**.

i. Define homeostasis.

ii. What is guttation?

iii. Differentiate between hydrophytes and halophytes.

Activity. 2.

- **Fill in the blanks.**

i. **La**tex is obtained from ----------plant.

ii. **P**lants living in sea water are called----------.

iii. **C**actus is an example of----------plants.

Closure

- Today we have done the topic----------.
- Maintenance of the amount of water and salts in the body is called----------.
- Water lily is an example of----------.

Home Work

- State the mechanism of excretion in plants.

- Explain the characteristics of different groups of plants on the basis of available amount of water and salts.


THE END


THANK
YOU!