

# LIFE SCIENCE

## CLASS - IX

**Theme: Physiological Processes of Life**

**Sub-theme: Plant Physiology**

### **Topic : Mineral Nutrition, Transpiration**

#### **1. Mention any three general functions of essential elements in plants.**

**Ans.** The elements collected by plants from their environment which help in growth, metabolic activities, reproduction are called essential elements. Three general functions of essential elements in plants are :

- (i) **Structure of enzymes:** Most enzymes are protein in nature. Proteins are made of C, H, O, N and sometimes sulphur. So without these elements, enzymes cannot be formed. Only when plants take up these essential elements, they can synthesize enzymes in their cells.
- (ii) **Formation of chlorophyll:** Chlorophyll is a very important substance present in plant body, because without it photosynthesis will never occur. Chlorophyll is made up of C, H, O, N, and Mg. So without these macronutrients chlorophyll will not be synthesized. Besides these, certain micronutrients like Iron (Fe), Zinc (Zn), Molybdenum (Mo) play an important role in chlorophyll formation too. So essential elements play a significant role in the synthesis of an important compound like chlorophyll.
- (iii) **Oxidation-reduction reaction:** Several reactions take place in the cells of plants like photosynthesis and respiration. These are oxidation-reduction reactions. Some compounds like NADP, NAD accept hydrogen from other compounds and thus help in oxidation, again they may add hydrogen to other compounds to reduce them. Also, there are several elements which show different valencies, like iron ( $\text{Fe}^{+++}$ ,  $\text{Fe}^{++}$ ), copper ( $\text{Cu}^{++}$ ,  $\text{Cu}^{+}$ ). They help in the reduction and oxidation of other compounds by donating or accepting electrons. So it can be concluded that essential elements play a very important role in oxidation-reduction reactions.

#### **2. Where does transpiration take place in plants?**

**Ans.** Transpiration takes place in the following parts of plants:

- (i) **Stomata:** Stomata are present in the dorsal and ventral sides of isobilateral leaves and in the ventral side of dorsiventral leaves. Each stoma is surrounded by two crescent-shaped guard cells. In daylight, 85-90% transpiration occurs through the stomata of plants.
- (ii) **Cuticle:** Cuticle is a covering made of wax-like material named cutin present on the lower and upper epidermis of leaves. Some cracks that are present in the cuticle are responsible for about 5-10% of transpiration from plants during day and night.
- (iii) **Lenticel:** Lenticels are lens-like pores present in the matured stems and branches of woody plants. A very little amount of water (0.1%) can be released through the lenticels as water vapour from the plant body during day and night.

