

## EXPERIMENT NO: 07

### MEASUREMENT OF ROOT PRESSURE

#### PRINCIPLE

Root pressure is the transverse osmotic pressure within the cells of a root system that causes sap to rise through a plant stem to the leaves.

Root pressure occurs in the xylem of some vascular plants when the soil moisture level is high either at night or when transpiration is low during the day. When transpiration is high, xylem sap is usually under tension, rather than under pressure, due to transpirational pull. At night in some plants, root pressure causes guttation or exudation of drops of xylem sap from the tips or edges of leaves. Root pressure is studied by removing the shoot of a plant near the soil level. Xylem sap will exude from the cut stem for hours or days due to root pressure. If a pressure gauge is attached to the cut stem, the root pressure can be measured.

Root pressure is caused by active distribution of mineral nutrient ions into the root xylem. In the absence of transpiration ions accumulate in the root xylem and lower the water potential. Water then diffuses from the soil into the root xylem due to osmosis. Root pressure is caused by this accumulation of water in the xylem pushing on the rigid cells. Root pressure provides a force, which pushes water up the stem, but it is not enough to account for the movement of water to leaves at the top of the tallest trees. The maximum root pressure measured in some plants can raise water only to 6.87 meters, and the tallest trees are over 100 meters tall.

#### MATERIALS REQUIRED

Potted plant with stem cut, rubber tube, glass tube, clamp.

#### PROCEDURE

1. Take a regularly watered potted plant and cut the stem portion 1 cm above the ground level.
2. Then connect a glass tube by means of a strong rubber tube.
3. The size of glass tube should be equal to the size of the stem.
4. Take care while joining tube and stem being bound tightly, water cannot escape the tube.
5. Now pour some water in the glass tube until water level can be seen above the rubber tube.
6. Mark the level of water (M1) in tube.
7. Keep your arrangement aside for 2 to 3 hours.
8. Then observe and mark the water level (M2) in the tube.

9. The difference between M2 and M1 indicates the level of water raised.

**OBSERVATION**

**RESULT**

**CONCLUSION**