

ACTIVITY 4.1

Studying the effects of root pressure on water transport

Problem statement

What are the effects of root pressure on water transport?

Hypothesis

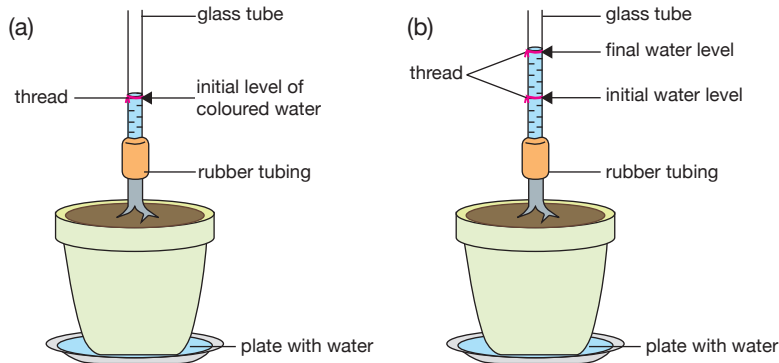
Root pressure helps in moving water from the soil to the shoots.

Materials

A healthy potted plant with a plate underneath and coloured water.

Apparatus

A glass tube (20 cm long), a rubber tubing, thread and a ruler.



The levels of coloured water (a) at the beginning of the experiment and (b) after three hours

Procedure

- 1 One shoot is cut off from a healthy potted plant, leaving a portion of the stem about 5 cm above the soil.
- 2 A glass tube is fitted into a rubber tubing. The other end of the rubber tubing is fitted firmly onto the cut end of the stem.
- 3 The glass tube is partially filled with coloured water and a ruler is tied to the glass tube.
- 4 The initial level of the coloured water in the glass tube is marked with a piece of thread.
- 5 The soil is watered well and water is added to the plate underneath the pot.
- 6 After three hours, the level of water in the glass tube is recorded.

Results

The height of the coloured water increased by 10 cm after three hours.

Discussion

- 1 The increase in height is caused by an upward force that pushes the water up the stem and into the glass tube.
- 2 The upward push is caused by **root pressure**. Therefore, this experiment demonstrates that the roots exert a pressure which forces the water up the tube.
- 3 Root pressure is important because it results in the upward push of water and mineral ions into the stem.

Conclusion

The increase in the level of coloured water in the capillary tube is caused by root pressure.