TENDER HEART HIGH SCHOOL

CLASS – 9 BIOLOGY

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CHAPTER 4 ABSORPTION BY ROOTS

This lesson is for Class 9 for the subject of Biology Topic - Experiments on absorption and conduction of water in plants which is covered in Chapter 4 Absorption by Roots starting on Page No 37 of your text book titled Concise Biology Selina Publications and is being submitted to you on 28.10.2024

Dear children so far we have learnt that **ABSORPTION OF WATER BY ROOTS** occur through the root hairs which contain cell sap of higher concentration of salts as compared to the outside soil water which results in osmosis and the outside water enters into the root hairs. From the cell bearing root hair the water continues to pass to the adjoining cells and one after the other finally enters the xylem vessels

ABSORPTION OF MINERALS BY ROOTS occurs through process of active transport by root cells Root cells take in the minerals ions from the soil [where their concentration is less as compared to root cells] by using energy [ATP] from the root cells. Thus the minerals move against the concentration gradient [ie. from lower to higher concentration] by using energy from the cell.

Now children let us learn about some experiments based on absorption and conduction of water in the plants.

Experiment I [Fig 4.15]

AIM. To show that roots absorb water

PROCEDURE Take 2 test tubes A and B

filled with water Pull out a young leafy plant [Eg balsam] from soil with its roots intact Insert the plant with roots into the test tube [A] soon. Put a few drops of oil in test tub A and test tube B which has no plant Leave the test tubes undisturbed for a day

OBSERVATION The level of water in test tube A falls but not in test tube B proving that water lost in test tube A was absorbed by roots of the plant.

NOTE Layer of oil is preventing the loss of water by evaporation

Experiment 2 [Fig 4.16]

AIM To show that water is conducted upwards through the xylem

PROCEDURE Take a medium sized balsam plant with roots intact from the garden. Wash the plant and its roots to remove dirt and soil Take a big beaker with water Mix 4-5 drops of eosin solution [stain] to make it coloured [Red]. Now place the plant in the beaker Its roots should be completely submerged in coloured water Keep this set up aside for 4-5 hours. After 4-5 hours take out the plant from the beaker and wash its roots with water. Now take a Transverse section each from roots stem and leaves. and examine under microscope

OBSERVATION You will see same portion of the section red/pink in colour the coloured part is xylem Central part which is the position of xylem is stained red, not the other regions proving that xylem conducts water.

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Experiment 3 [Fig 4.17]

AIM To demonstrate conduction of water through xylem

PROCEDURE Take 2 balsam plants Cut them under water to prevent air bubbles getting in
Plant A - Remove 3-4 cm long outer ring of stem [phloem] keeping the central part intact. [called girdling]
Plant B - Remove 3-4 cm of central part [xylem] keeping the peripheral intact
Shoots are then fixed to the stands keeping their lower ends dipped in water. Keep this set up undisturbed for 2-3 days.

OBSERVATION
Plant A - Leaves remain turgid and appear normal
Plant B - Leaves wilt and droops down.
This proves that water moves upwards through xylem.

Experiment 4. [Fig 4.18]

AIM. To show that food from leaves is conducted downwards through phloem in the stem.

PROCEDURE - Cut a ring round the stem of a healthy potted plant deep enough to penetrate the phloem. and cambium.
Removal of phloem is called the girdling
Xylem is kept intact.

OBSERVATION - After few weeks the part of the stem above the cut ring will grow in diameter. and the stem below the girdle stops growing and even die. when the stored food in the

lower part is exhausted. Leaves remain fresh and turgid proving that entact xylem is conducting water.

Dear students with this I am ending todays discussion. With reference to the detailed explanation you are required to answer the following home assignment questions based on the experiments.

HOME ASSIGNMENT -

Answer the following experiment based questions

1 Experiment 1 [Fig 4.15 Page 48 of text book]
Q1 What is the aim of the experiment?
Q2 What is the result of the experiment?
Q3 What is the purpose of oil layer?
Q4 What is the control for the experiment?

2 Experiment 2 [Fig 4.16 Page 48 of text book]
Q1 What is the aim of the experiment?
Q2 What is the result of the experiment as observed?
Q3 Which dye is used in the experiment? Why?
Q4 Where is xylem located?

3 Experiment 3 [Fig 4.17 Page 49 of text book]
Q1 What is the aim of the experiment?
Q2 What is the result or difference in the twigs kept in beakers A and B after sometime. Why?
Q3 Which type of tissues are removed from twigs in beaker A and in beaker B?

4 Experiment 4 [Fig 4.18 Page 49 of text book]
Q1 What is the aim of the experiment?
Q2 Which type of tissues are removed from plant?
Q3 Why is the stem above girdled region becomes swollen?
Q4 What will happen to the plant after some time?
Q5 What is girdling?