



DEPARTMENT OF BOTANY

BY : DR RANJANA

D.B. COLLEGE, JAYNAGAR

ASSISTANT PROFESSOR (GUEST)

LALIT NARAYAN MITHILA UNIVERSITY, DARBHANGA (BIHAR)

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SUBSIDIARY PART - II

GROUP C - PLANT PHYSIOLOGY

ASCENT OF SAP - III

Root Pressure theory :

The term root pressure was coined by Stephen Hales 1727 when he observed that if a stem is cut near its base and joined to a glass tube by a rubber band, the sap is seen to move up in the tube. The phenomenon of loss of water from injured parts of the plants is called exudation or bleeding.

Root pressure is defined as the hydrostatic pressure developed due to accumulation of water absorbed by the cells of the root.

Actually the root pressure theory of ascent of sap was first introduced by Priestley and later on supported by White 1936 and Stocking 1956. Priestley suggested that as a result of the pressure exerted by the cortical cells of the root upon their liquid contents under fully turgid condition, a quantity of water is forced into the xylem vessels and through them upwards.

No doubt, root pressure (RP) is a dynamic process, still it has its limitations.e.g.

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The magnitude of RP is below 2 atms while a pressure of nearly 20 atms is needed to raise water in a tall tree.

It is largely an osmotic phenomenon depending upon the living cells of the plant.

Many plants do not show RP, so it is not an universal phenomenon and

Even RP show seasonal fluctuations i.e. more in spring and less in summer.

Thus RP can at best be taken as a successful force in ascent of sap but only amongst the herbaceous plants, as also confirmed by Russell and Barber 1960.

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