Study no. – 06

Name of the Study: Study on determination of rate of ascent of sap with the help of *Vinca rosea* twig (Nayantara)

Transpiration: The loss of water from the aerial living parts of plant in the form of water vapors is termed as transpiration.

Usually the rate of ascent of sap is more or less equal to the rate of transpiration. The 99% of absorbed water is usually lost through transpiration. Remaining 1% is used for metabolic activities and remains fixed as the part of different molecules or organelles.

Requirements:

1. A fresh and healthy *Vinca rosea* twig (Nayantara)
2. Mercury
3. Water
4. Beaker
5. Stand and clamp
6. Pipette
7. Small dish
8. Scalpel
9. Vaseline

Procedure: A fresh, healthy and young *Vinca rosea* twig (Nayantara) was cut and kept in a beaker of water. A slant cut was made at the lower end of the twig keeping under water. A 1 ml size of pipette was taken and filled with water keeping a finger at lower end so that no water can escape or lost. After that the twig was entered at the upper end of the pipette and made air tight with the help of Vaseline. The pipette was fixed in stand with clamp. The lower end of the pipette was inserted into a small dish of mercury. The height of the mercury was recorded from initial time and with the intervals of 10 minutes intervals. Mean values were calculated to find out the rate of ascent of sap as per mentioned in the following table.

Observation No.	Time (Minutes)				Pipette reading (ml)				Rate of ascent of sap ml/hour
	Initial	Final	Differ-ence	Mean	Initial	Final	Differ-ence	Mean	
1	10.15	10.25	10	10	0.0	0.3	0.3	0.29	1.74
2	10.25	10.35	10		0.3	0.6	0.3		
3	10.35	10.45	10		0.6	0.87	0.27		

In 10 minutes mercury rises = 0.29 ml

"1 " " " = 0.29/10 ml

"60 " or 1 hour " " = (0.29X60)/10 ml

= 1.74 ml

Observation: The rise of mercury level was observed within some minutes with continued for sometimes.

Inference: From the calculation it was found that the rate of ascent of sap (water) was 1.74 ml/hr

Precautions:

1. The twig of *Vinca rosea* (Nayantara) should be fresh and healthy.
2. A slant end should be made at the lower end of the twig.
3. The twig should be fitted tightly so that no air can enter.
4. Raise of mercury should be recorded easily.
5. The experiment should be kept undisturbed.

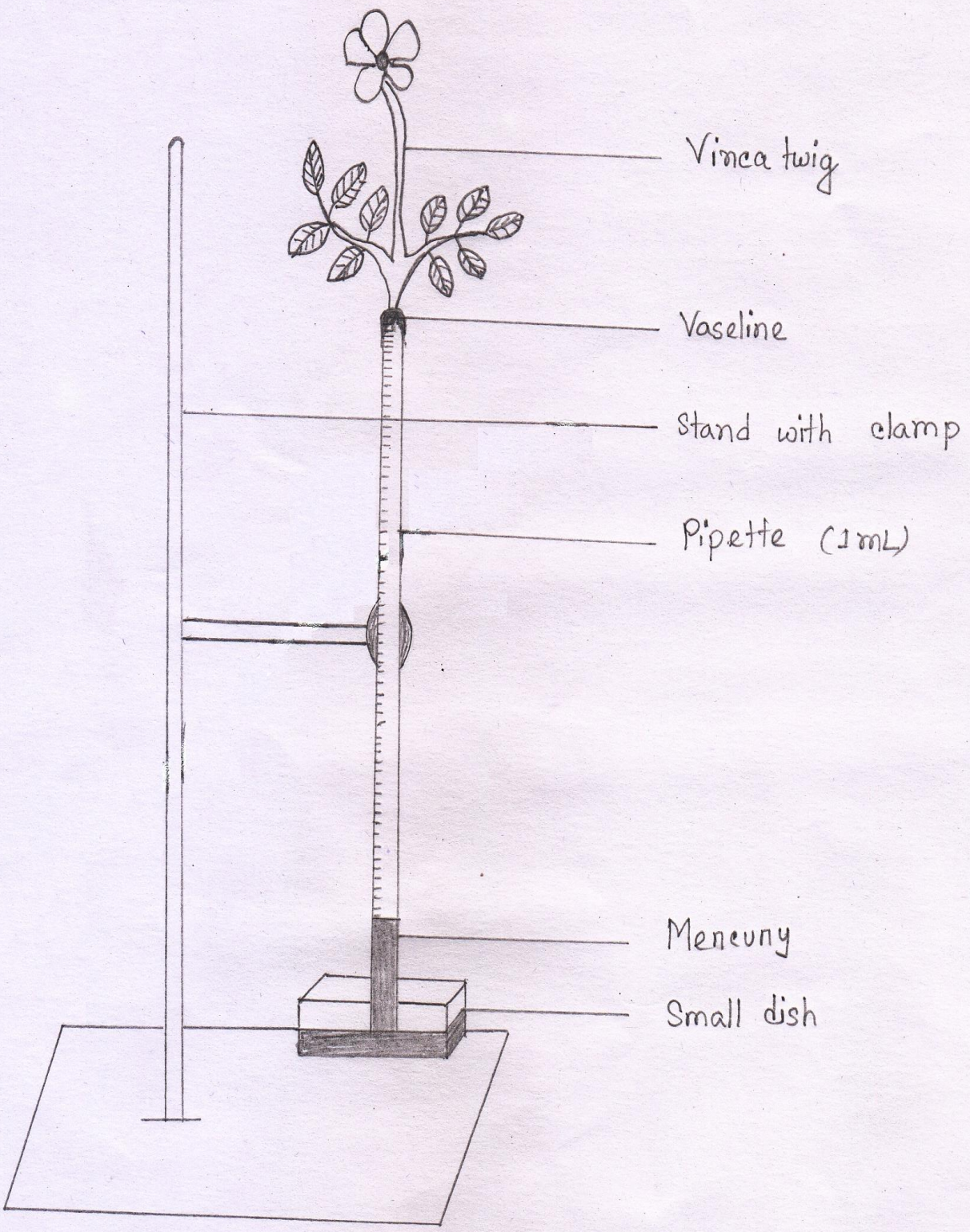

Fig: Demonstration of rate of ascent sap