Edexcel Biology IGCSE

2.58B: Transpiration

Practical notes

Transpiration

Aim

Investigate the role of environmental factors (temperature, humidity, wind speed, light intensity) in determining the rate of transpiration from a leafy shoot.

Equipment

- Potometer
- Leafy shoot
- Plastic bag
- Fan
- Water bath
- Lamp

Method

1. Set up a potometer.
2. Cut the leafy shoot underwater to prevent air bubbles from entering the vascular tissues and insert into the potometer.
3. Use vaseline to seal gaps in the potometer to make sure it is airtight.
4. Set up the necessary environmental factors

- Temperature: use a temperature-controlled room or immerse potometer in a thermostatically controlled water bath.
- Humidity: Wrap the shoot in a plastic bag with varying degrees of vapour.
- Wind speed: Set up a fan with different speeds.
- Light intensity: Set up a lamp at different distances from the shoot.

5. Allow time for the apparatus to equilibrate.
6. Record the starting position of the air bubble in the capillary tube.
7. Leave the apparatus for 1 hour.
8. Record the final position of the air bubble and calculate the distance moved, calculate the volume of water absorbed by the plant in the period of time.
9. Repeat steps 1-8, changing the factor at fixed intervals.
10. Plot a graph of the 'factor' (x- axis) against the volume of water taken up by the plant in 1 hour (y-axis).

Sources of error

- The plant is dying when the stem is cut, water uptake is different from normal.
- Not all of the water taken up is transpired, some is used for photosynthesis and to maintain cell turgidity.
- When changing light intensity, temperature may also change which will affect the results.

Potential Hazards

Be careful when cutting the leafy shoot underwater.
Keep water away from electrical power outlets and wiring.