

8.3 Transpiration

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS humidity 湿度 • transpiration 蒸腾作用 • temperature 温度 • air spaces 气腔 • transpiration pull 蒸腾拉力

Objective

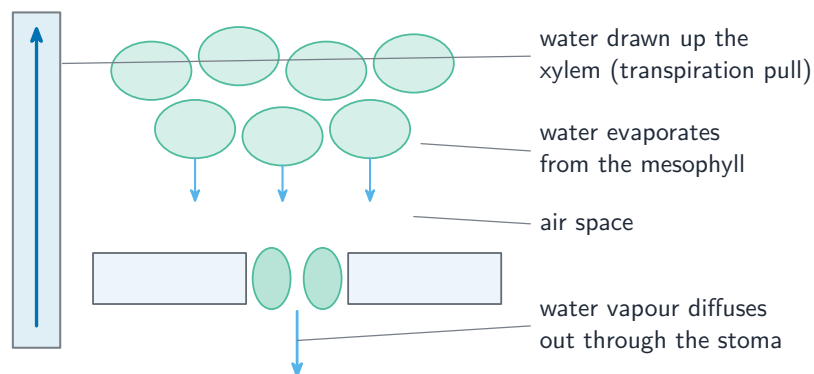
Build the skills to answer exam questions on **transpiration** 蒸腾作用 — what it is, the factors affecting its rate, and the **transpiration pull** 蒸腾拉力.

You must be able to:

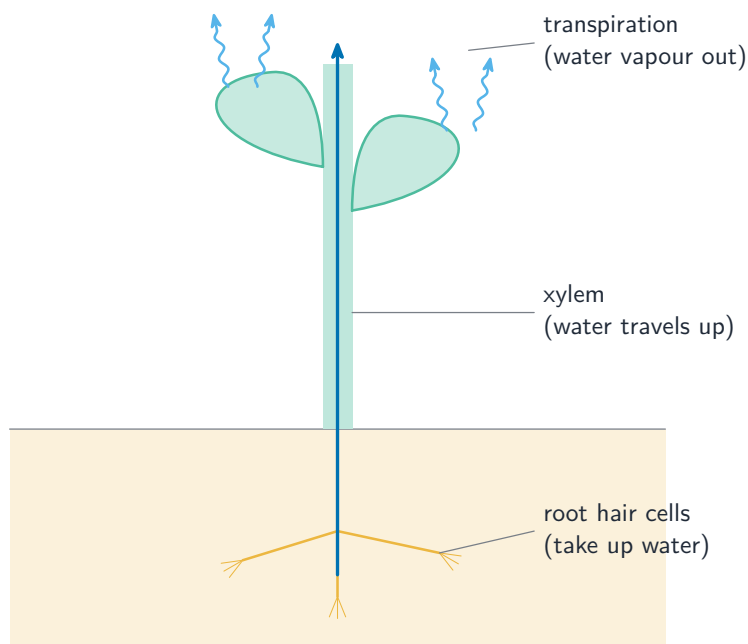
- describe transpiration (evaporation then diffusion out of the stomata)
- explain how temperature, wind and humidity affect the rate
- describe how the transpiration pull moves water up the xylem

1 Worked examples

■ Transpiration



Water evaporates from the wet mesophyll into the air spaces, then diffuses out of the stomata



Transpiration pulls water up the xylem pathway

- **faster when:** hotter (more evaporation), windier (vapour carried away), drier air.
- **transpiration pull:** water leaving the leaf pulls a column of water up the xylem.

2 Practice

2.1 Define transpiration.

[1]

2.2 State the effect of higher wind speed on transpiration rate.

[1]

3 Exam-style questions

3.1 Transpiration is fastest in conditions that are:

[1]

- A cold, still and humid
- B hot, windy and dry
- C cold and dark
- D warm and very humid

3.2 Water vapour is lost from the leaves.

(a) Describe the two steps by which water leaves the leaf. [2]

(b) Explain why a higher temperature increases the rate of transpiration. [2]

3.3 Explain how the transpiration pull moves water up the xylem. [2]

Solutions

2.1 the loss of water vapour from the leaves (of a plant).

2.2 it increases the rate.

3.1 B. Hot, windy and dry conditions give the fastest transpiration.

3.2 (a) water evaporates from the wet mesophyll cells into the air spaces; the water vapour diffuses out through the stomata.

(b) higher temperature makes water evaporate faster from the mesophyll, so more diffuses out.

3.3 as water leaves the leaf it pulls more water up behind it; the water molecules stick together and are drawn up the xylem as a column.