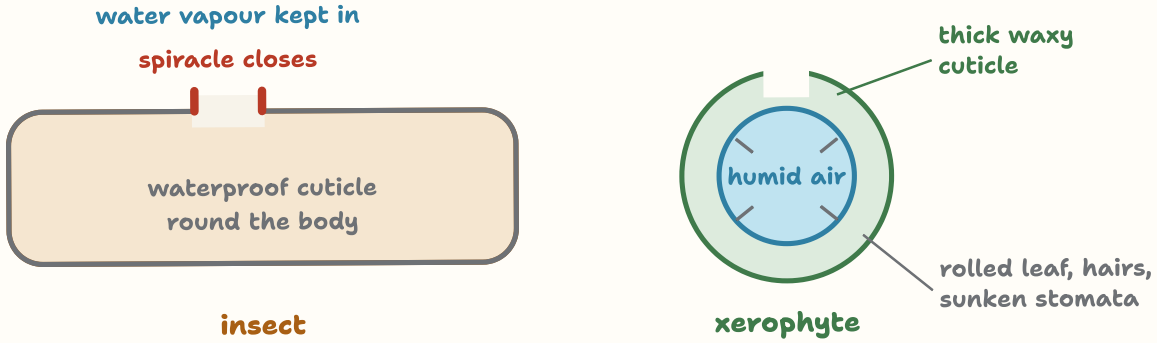
Gas Exchange vs Water Loss: Xerophytes

Terrestrial insects and xerophytes trade off gas exchange against water loss using closable spiracles, waterproof cuticles and features that trap humid air.

Insect: waterproof cuticle, closable spiracles. Xerophyte: traps humid air



Key terms

xerophyte	a plant adapted to dry conditions, with features that reduce water loss.
waterproof cuticle	a waxy layer that reduces evaporation from the body or leaf surface.
spiracle	a pore that insects open for gas exchange and close to reduce water loss.
rolled leaves / hairs	trap humid air and reduce air movement round the stomata.
sunken stomata	stomata in pits that trap humid air, reducing the water potential gradient.
water potential gradient	a smaller gradient between leaf and air means less water vapour diffuses out.

I can...

- [ ] Structural and functional compromises between efficient gas exchange and limitation of water loss in terrestrial insects and xerophytic plants

EXAM TRAP

Do not just write "reduces water loss". Explain how: humid air is trapped round the stomata, so the water potential gradient is smaller and less vapour diffuses out. Stomata are not closed; carbon dioxide must still enter.

4 marks: what earns them

1. Spiracles can close to reduce water loss, and open to allow gas exchange
   Not: spiracles are small holes alone; insects do not lose water
2. Insects have a waterproof cuticle, which reduces evaporation from the body surface
   Not: hard shell with no reference to water loss
3. Rolled leaves / hairs / sunken stomata trap humid air, so the water potential gradient is smaller and less water vapour diffuses out
   Not: reduces water loss with no mention of humid air or gradient; stomata are closed
4. Thick waxy cuticle reduces evaporation from the leaf surface (stomata stay open so carbon dioxide can still enter)
   Not: cuticle stops gas exchange; the plant does not photosynthesise

Remember

Gas exchange needs openings, openings lose water.

Trap humid air to flatten the gradient.

Waxy cuticle stops evaporation from the surface.

Independent revision resource, not endorsed by AQA. Practice question is original.
© 2026 Medservatory, a project of ADMR Solutions Ltd. Free to print and share for personal study.