

Interactive Example Candidate Responses

Paper 2 (May/June 2016), Question 3

Cambridge International AS & A Level

Biology 9700

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- 2 Marram grass, *Ammophila arenaria*, is an important plant of sand dunes. Leaves of marram grass are well adapted to reduce water loss by transpiration.

Fig. 2.1 is a photomicrograph of a section through the leaf of marram grass.

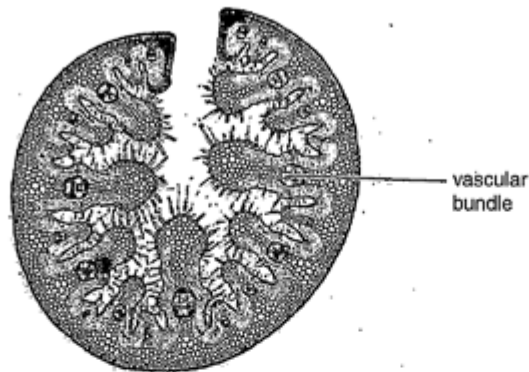


Fig. 2.1

- (a) Examples of adaptations to reduce water loss by transpiration include a thick cuticle and no stomata on the outer surface; and stomata in pits on the inner surface.

- (i) State **one** other adaptation, visible in Fig. 2.1, which reduces water loss by transpiration.

Hairs on inner surface [1]

- (ii) Explain how this adaptation reduces water loss.

Water vapour leaving stomata is trapped by these hairs
making the area outside of stomata very humid, steepness
of water potential gradient is reduced and rate of
diffusion of water vapour from inside leaf to outside
is reduced.

[2]

- (b) State the term used to describe a plant type that has adaptations to reduce water loss by transpiration.

Xerophyte [1]

[Total: 4]

Your
Mark

(a)(i)

(a)(ii)

(b)

Q2	Mark scheme
(a)(i)	<p>curled / rolled, leaf ; R curly / curved / folded or trichomes / hairs ; A hair / hairy-like structures R cilia / spines / needles [1]</p>
(a)(ii)	<p>allow explanations for stomata in pits, thick cuticle and no stomata on outer surface as ecf from (i) curled leaf / trichomes / stomata in pits ref. to (creates) still / non-moving, air ; (in enclosed area) humid / moist ; AW, e.g. traps water vapour / maintains humidity water potential gradient less steep or decreased rate of diffusion of water vapour (out) ; A (water) vapour pressure gradient for water potential gradient I decreased concentration gradient of water vapour assume in context of between substomatal air space and enclosed area unless stated otherwise thick cuticle greater layer impermeable wax / AW ; A thicker waterproof layer increases distance for diffusion ; of water vapour ; no stomata on outer surface most water lost via (open) stomata ; cuticular transpiration only ; ref. to where most exposure to, light / air currents / wind ; [max 2]</p>
((b)	<p>xerophytic / xerophyte ; [1] [Total: 4]</p>

- 2 Marram grass, *Ammophila arenaria*, is an important plant of sand dunes. Leaves of marram grass are well adapted to reduce water loss by transpiration.

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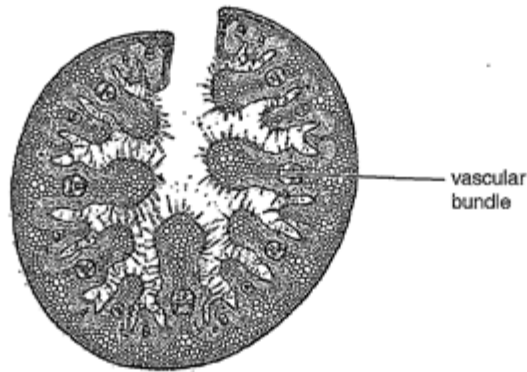


Fig. 2.1

- (a) Examples of adaptations to reduce water loss by transpiration include a thick cuticle and no stomata on the outer surface, and stomata in pits on the inner surface.

(i) State **one** other adaptation, visible in Fig. 2.1, which reduces water loss by transpiration.
like structures
Hair-like structures on the surfaces to reduce water loss. [1]

- (ii) Explain how this adaptation reduces water loss.

structures
The hairs act like a barrier between the leaf and outer areas. They may trap the water there, thus lowering the water potential gradient between inside and outside, so less water moves outwards.

- (b) State the term used to describe a plant type that has adaptations to reduce water loss by transpiration.

xerophyte [1]

[Total: 4]

Your
Mark

(a)(i)

(a)(ii)

(b)

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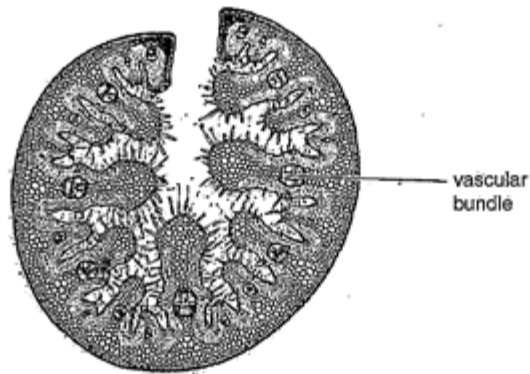


Fig. 2.1

- (a) Examples of adaptations to reduce water loss by transpiration include a thick cuticle and no stomata on the outer surface, and stomata in pits on the inner surface.

- (i) State **one** other adaptation, visible in Fig. 2.1, which reduces water loss by transpiration.

Waxy Cuticle [1]

- (ii) Explain how this adaptation reduces water loss.

The layer of wax on the cuticle is impermeable to water, hence it acts as a barrier that does not allow water to pass through. This reduces the amount of water that has been lost by the enzyme. [2]

- (b) State the term used to describe a plant type that has adaptations to reduce water loss by transpiration.

Xerophyte [1]

[Total: 4]

Your
Mark

(a)(i)

(a)(ii)

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