

# 125 Adaptations of Xerophytes

**Key Idea:** Xerophytes are plants with adaptations that allow them to conserve water and survive in dry environments. Plants adapted to dry conditions are called **xerophytes**. Xerophytes are found in a number of environments, but all

show adaptations to conserve water. These adaptations include small, hard leaves, an epidermis with a thick cuticle, sunken stomata, succulence, and permanent or temporary absence of leaves.

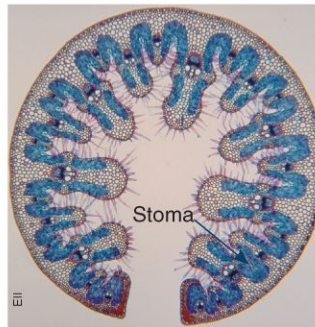
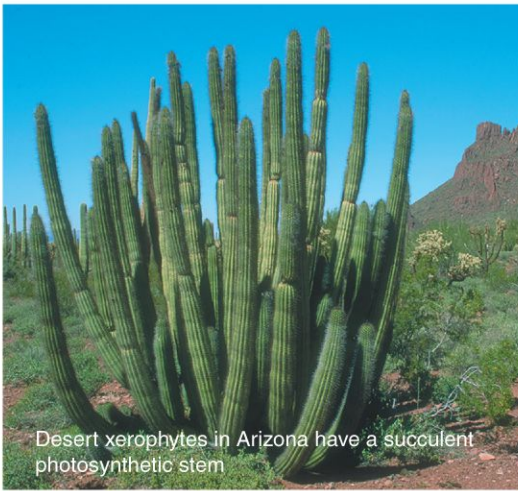
- ▶ Most xerophytes are found in deserts, but they may be found in humid environments, provided that their roots are in dry micro-environments (e.g. the roots of epiphytic plants that grow on tree trunks or branches).
- ▶ Many xerophytes have a succulent morphology. Their stems are often thickened and retain a large amount of water in the tissues, e.g. *Aloe*.
- ▶ Many xerophytes have a low surface area to volume ratio, reducing the amount of water lost through transpiration.
- ▶ Salt tolerant plants and many alpine species may show xeromorphic features in response to the lack of free water and high transpirational losses in these often windy, exposed environments.



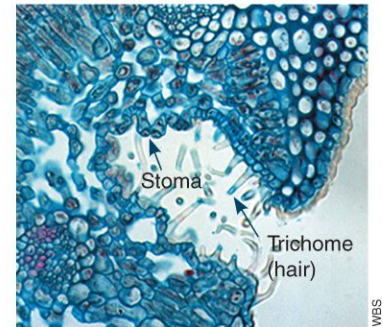
Acacia trees have deep root systems, allowing them to draw water from sources deep underground.



An outer surface coated in fine hairs traps air close to the surface and reduces the transpiration rate.



Grasses on coastal sand dunes (e.g. marram grass, above) curl their leaves. Stomata are sunken in pits, creating a moist microclimate around the pore, which reduces transpiration rate.



Oleander has a thick multi-layered epidermis and the stomata are sunken in trichome-filled pits on the leaf underside which restrict water loss. Trichomes (leaf "hairs") maintain a layer of still air at the leaf surface.

1. What is a xeromorphic adaptation? \_\_\_\_\_  
\_\_\_\_\_
2. Describe three xeromorphic adaptations of plants that reduce water loss:
  - (a) \_\_\_\_\_
  - (b) \_\_\_\_\_
  - (c) \_\_\_\_\_
3. How does creating a moist microclimate around the areas of water loss reduce the transpiration rate? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. How does a low surface area to volume ratio in a plant such as a cactus reduce water loss? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. How does a cactus photosynthesise given it has no leaves? \_\_\_\_\_  
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\_\_\_\_\_