

Australian Plant Adaptations

Cite this lesson 

In this lesson, we'll be looking at different Australian plants and the adaptations they have to survive. We'll specifically look at different adaptations that prevent water loss in the Australian desert.

What Are Adaptations?

Picture a snake slithering around the desert sands. What physical traits do you notice? You might see shiny scales, a muscular body, or even poisonous fangs. Why do snakes have these traits? Although the appearance of animals might seem random, all traits have a purpose. Over time, traits that help organisms survive allow them to reproduce more than organisms without those traits. Consequently, the next generation also has the traits. These traits are called **adaptations**. Whatever traits help it survive best in its home are going to be the ones that are passed on, making all animals uniquely adapted to their environment.

Although we normally think of adaptations as a characteristic of animals, plants have adaptations too. For example, trees are tall and have broad leaves, two traits that help them absorb sunlight. Today, we're going to look specifically at adaptations of plants in the Australian desert. The climate is extremely hot and dry, and so one of the most important adaptations of these organisms is to conserve water.

Plant Adaptations

Although plants may seem completely passive, they have many strategies for survival. Desert plants have evolved unique characteristics, including leaf size, shape and physiology, specialized root systems, and specific reproductive strategies. Plants are continuously evolving. As their habitat changes, such as due to global warming, their adaptations change also to help them survive. Here, we will look at some common adaptations for preserving water.

Leaf Size and Shape

In many parts of North America, large, broad leaf trees dominate the scene. However, in the scorching, dry deserts of Australia, plants look quite different to survive the heat. Eucalyptus is a common plant in Australia and is a favorite food of many animals. The leaves are thin and long, unlike lush broad leaves. Their shape prevents water loss due to exposure to the environment. Less surface area means less contact with the air, and thus less water loss.

Other desert plants also employ this strategy, such as the hopbush. Some desert plants reduce their leaves even further. Cacti, while not native to continent, are adapted to thrive in the harsh Australian desert. Their leaves are modified into spines to prevent water loss and deter predators. The small leaves on **succulents**, like the saltbush, are adapted to store water as well.

The leaves may also have a waxy cuticle to prevent water loss. Wax doesn't mix well with water, so it prevents water from seeping out of the plant's leaves. Leaves are also angled downward to prevent exposure to the sun, and plants even curl their leaves in, creating even less surface area during the heat of the day. The leaves uncurl when temperatures drop at night and in the morning to perform gas exchange and take in carbon dioxide for photosynthesis.

Plants in the desert not only minimize water loss, but also actively try to gain water from their environment. One strategy, used by the Australian mulga, is to angle their leaves so that water runs directly to the ground, where it can be absorbed by the roots.

Stomata in Australian Plants

Like humans, plants need to exchange gases with their environment. They release oxygen and bring in carbon dioxide to do photosynthesis, the opposite of how we breathe in oxygen and out carbon dioxide. But instead of a mouth or nose, plants have tiny openings on their leaves called **stomata**. Although plants need stomata, these small pores also allow for evaporation during the day.

Plants control the time of day the stomata are open to prevent water loss. During the heat of the day, stomata stay closed, and then open at night when temperatures are cooler, much like how animals might hide in the shade during the day and come out at night to hunt.

The eucalyptus plant has its stomata in a different location than other plants. Stomata in this plant are located underneath the leaves where tiny hairs decrease air movement. Less air movement means less evaporation and more water for the plant.

Root Systems

A desert is a dry place. Soil is nutrient poor, dry and sandy for quite a ways into the ground. Luckily, desert plants have evolved a way around these problems. Instead of shallow root systems, desert plants extend their roots deep into the ground, tapping into deep water tables, like a water well does for humans. One such plant is *Spinifex* grass. This desert grass has a long, central root, called a **taproot**, that extend up to nine feet below the ground, taller than any human! The Australian mulga also utilizes a deep taproot to extract groundwater. Even small, newly germinated plants can have taproots of over nine feet, like *Spinifex* grass.

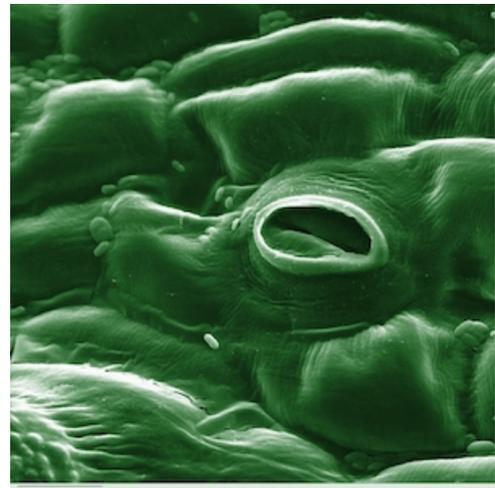


Spinifex grass uses taproots to get water from deep in the ground

likelihood of at least one seed finding suitable growing conditions. Not only do these seeds have structural adaptations, but they also have specially built in sensors to detect the right conditions in terms of temperature, light and water availability. Only when the conditions are right for germination will the seeds finally sprout.

Lesson Summary

Adaptations are physical traits that help organisms survive. In the desert, plants have modified their leaves to be smaller, with a waxy coating. Some may have water storage abilities, such as **succulents**. Many also have changes in the location and physiology of **stomata**. Long **taproots** access deep stores of water underground, even when surface water is unavailable. Seeds are also modified to regulate germination based on environmental conditions, with a thick outer coatings to prevent desiccation.



Scanning electron micrograph of stomata in a plant leaf

Reproduction

Reproduction can be hard in a desert. With little rain to help seeds germinate, seeds can dry out before they even get the chance to germinate. The iconic Sturt's desert pea plant has evolved adaptations to get around this problem.

First, it's seeds have a very tough outer coating. This prevents desiccation in the harsh conditions. The seeds also have tiny parachute-like structures that help them drift far away from the parent plant. This increases the



Desert pea plants have special seeds to aid in desert life