

Reading

Plant Life in the Taklimakan Desert

The Taklimakan Desert, second in size only to Africa's Sahara Desert, occupies some 337,600 square kilometers¹ (130,300 square miles) of northwestern China—an area about the size of Finland. Sparse rainfall, daily temperature swings of up to 20°C (68°F), and violent sandstorms make it one of the most extreme environments on Earth.

Eighty-five percent² of the Taklimakan Desert consists of shifting sand dunes, some up to 250 meters³ tall, that are largely free of vegetation. Yet, transitional areas between the open desert and oases on the desert fringe support diverse plant forms that not only have adapted to the harsh conditions but actually thrive there.

Successful desert plants are resilient to scorching summers and frigid winters, drought, and high-salt conditions. The plants' principal defense⁴ against these environmental stressors consists of drawing in as much water as possible while minimizing moisture loss. Three Taklimakan plants—*Populus euphratica*, *Tamarix ramosissima*, and *Alhagi sparsifolia*—represent some of the most diverse, prolific vegetation in the area; although they share many survival strategies, each has developed unique coping mechanisms of its own.

The Euphrates poplar, *Populus euphratica*, the only tall tree in the Taklimakan ecosystem, has an extensive root system that allows it to absorb water far from the standing tree. *P. euphratica* controls evaporation by opening and closing the stomata, or tiny pores, on the leaf surface in response to the amount of moisture being lost through the leaves to the surrounding air. These stomata generally remain open during the day while the plant conducts photosynthesis.

P. euphratica can endure high-salt concentrations in the soil. It takes in unlimited amounts of salt through the roots, up the stem, and into leaves, where it dilutes the normally toxic salt by increasing the number and volume of its cells.

Tamarix ramosissima, a small tree with needlelike leaves commonly known as tamarisk or salt cedar, takes in enormous amounts of water via a far-reaching root system many times the size of the plant above ground. Like *P. euphratica*, tamarisk can naturally determine when to close stomata to inhibit evaporation and regulate photosynthesis.

¹BrE: kilometres

²BrE: per cent

³BrE: metres

⁴BrE: defence

Tamarisk has a high tolerance for salty conditions and even produces its own salt, which it **accumulates** in special glands between the leaves and then releases onto leaf surfaces. Leaves dropping to the ground make the soil more saline, or salty, giving tamarisk a competitive advantage over less salt-tolerant plants.

Alhagi sparsifolia, a spiny shrub, thrives in the Taklimakan Desert even though it uses large amounts of water, especially during the summer months. With only a few wispy roots in the upper soil, it is unaffected by occasional flooding. Most of its roots reach down deep, where they take up water from as far as sixteen meters below ground. Unlike *P. euphratica* and *T. ramosissima*, which open and close stomata according to conditions on the leaf surface, *A. sparsifolia* does so according to hydraulic conductance—that is, the ease with which it takes up groundwater.

Although desert plants have adapted for their own survival, they also help protect their ecosystem by stabilizing sand dunes, preventing erosion, presenting a barrier to sandstorms, and conserving biodiversity.

Answer the questions about **Plant Life in the Taklimakan Desert**.

Questions 1–3

Choose the correct letter, **A**, **B**, **C**, or **D**.

- Most of the Taklimakan Desert is covered with
 - tamarisk.
 - spiny plants.
 - sand dunes.
 - diverse plant life.
- Plants in the Taklimakan Desert
 - grow only in areas above 250 meters high.
 - thrive in extreme conditions.
 - are not very hardy.
 - are mostly tall trees.
- Environmental stressors in the Taklimakan Desert include
 - sparse sunlight.
 - lack of salt in the soil.
 - extreme temperatures.
 - periods of heavy rainfall.

Questions 4–7

*Which of the following mechanisms used by plants to survive in the desert environment are mentioned in the passage? Choose **four** answers from the list below.*

- A** Having strong roots that can hold on during violent sandstorms
- B** Closing pores to minimize loss of moisture
- C** Occupying a place in the shade of a larger plant to avoid the scorching desert sun
- D** Diluting the salt that the plant takes in
- E** Having large root systems that can reach water far from the plant
- F** Adding salt to the soil to minimize competition from other plants
- G** Accumulating water in the leaves of the plant

My Words

Write the words that are new to you. Look them up in the dictionary and write their definitions.

Words	Definitions
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Word Families

noun	adaptation	Plants in the Taklimakan Desert have adaptations that allow them to live in the dry, salty conditions.
verb	adapt	One way that plants adapt to the dry desert is by developing deep root systems.
adjective	adaptable	Most plant species are not adaptable to a desert environment.

noun	diversity	There is a great diversity of plant life on the fringe of the Taklimakan Desert.
noun	diversification	Change in climate can result in species diversification.
verb	diversify	As climate changes, plant species in an area may diversify if conditions improve.
adjective	diverse	The diverse ways that plants adapt to desert conditions makes a fascinating study.

noun	extreme	Temperatures in the Taklimakan Desert reach an extreme during hot summer days.
adjective	extreme	Many plants cannot endure the extreme heat of the desert.
adverb	extremely	The weather in a desert is usually extremely dry.

ESSENTIAL WORDS FOR THE IELTS

noun	resilience	The resilience of certain plants allows them to thrive in the desert.
adjective	resilient	Desert plants are resilient to heat and dryness.
adverb	resiliently	Desert plants grow resiliently in the heat.

noun	stress	A long period of dryness causes a lot of stress to plants.
noun	stressor	The main stressor in a desert is lack of rain.
verb	stress	Heat and drought both stress plants.
adverb	stressful	Certain plants thrive in the desert despite the stressful conditions.

noun	violence	The violence of sandstorms keeps many plants from thriving in the desert.
adjective	violent	Violent winds tear up many plants or cover them with sand.
adverb	violently	The winds blow violently during a sandstorm.

Word Family Practice

Choose the correct word family member from the list below to complete each blank.

Desert plants have a variety of **1**..... that allow them to endure the desert environment. Because a desert is **2**..... dry, plants need to be able to take in as much water as possible when it rains and to store the water for a long time. Special root systems and types of leaves enable them to do this. Another source of **3**..... in a desert is the high temperature, so desert plants need to have **4**..... . **5**..... storms can occur in a desert, and plants with strong roots will be able to endure the storms. Considering the difficult conditions in a desert, the **6**..... of plants that can be found there is truly amazing.

- | | | |
|----------------|-----------|-------------|
| 1. adaptations | adapts | adapted |
| 2. extreme | extremes | extremely |
| 3. stressor | stress | stressful |
| 4. resilience | resilient | resiliently |
| 5. Violence | Violent | Violently |
| 6. diversity | diversify | diverse |

Dictionary Skill

Different Meanings

Many words have more than one meaning.

Read the definitions below. Then read the sentences and write the letter of the correct definition for each sentence.

swing [SWING]

A noun. a sudden or big change

B noun. back-and-forth movement

C noun. a hanging seat that moves back and forth

- _____ 1. The children played on the *swing* all afternoon.
- _____ 2. After a rainstorm in the desert, there is a noticeable *swing* back to life.
- _____ 3. The *swing* of the branches in the breeze made a creaking noise.

Listening

CD 1
Track
4

Listen to the discussion. Complete the notes below.
Write **NO MORE THAN ONE WORD** for each answer.

Taklimakan Desert Plants

Many plants live in the **1** areas.

Stressors:

little rain

2 temperatures

rapid **3**

Adaptations:

ability to close pores

large root systems to **4** water