



Life in the PLANT KINGDOM

— STRUGGLING TO SURVIVE



هيئة البيئة - أبوظبي
Environment Agency - ABU DHABI

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First published in 2014 by
The Energy and Resources Institute
TERI Press
Email: teripress@teri.res.in ■ Website: <http://bookstore.teriin.org>

For
Environment Agency – Abu Dhabi (EAD), United Arab Emirates
© Environment Agency - Abu Dhabi
PO Box 45553, Abu Dhabi, UAE
Website: www.ead.ae

ISBN 978-9948-20-720-7

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Printed and bound in India

This book is printed on recycled paper.



— **STRUGGLING TO SURVIVE**

Life in the PLANT KINGDOM

Dear Students,

I am sure, by now, you are familiar with the definition of biodiversity - it is all about the variety of life that exists on this Earth. But did you know that scientists estimate that around 5 to 100 million species of organisms call it home? From these, we have only identified 2 million species so far!

The United Arab Emirates is located in a hot arid desert - one of the most fragile ecosystems in the world. Here, the plants and animals are heroes. They are trying to survive against all odds. However, despite the harshest of conditions, the country still manages to support an impressive 800 species of plants, 64 species of terrestrial and marine mammals, 67 species of reptiles and 430 varieties of bird species.

However, as tough as these species are, they still face severe threats. Species extinction around the world is on the rise – 1 out of every 8 birds, 1 out of 4 mammals, 1 out of 3 amphibians, and 75 per cent of the world's fish are under threat. With 31 per cent of the world's forests gone, there is a scarcity of resources provided by forests, such as food and medicine. This also means that animals are losing a safe habitat.

Biodiversity is closely linked to what we breathe, eat, drink and even wear. It is so important to our existence that in fact that we cannot afford to sit around and watch as these species and habitats are being lost. They are vanishing because of many reasons such as pollution, contamination, introduction of alien species and climate change. WE humans played and continue to play a large part in the reasons behind these problems and so WE need to come up with the solution, without further delay.

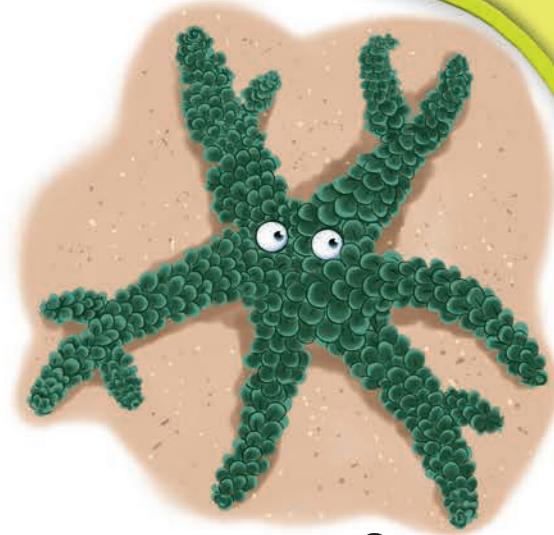
Protecting our natural heritage and conserving biodiversity is one of our priorities at the Environment Agency - Abu Dhabi. We strongly believe in raising environmental awareness and promoting environmental education. We have already reached out to hundreds of thousands of students, just like you, through our educational programmes. However, this series, developed jointly with TERI – The Energy and Resources Institute, will help us reach even more students to raise their awareness about species around the world, including in the UAE, whose lives are in danger.

I hope that you enjoy reading this series and it helps you to better understand what plants and animals are facing on Earth. Help spread the message far and wide, so that others can also start protecting and conserving our precious biodiversity.

Razan Khalifa Al Mubarak
Secretary General
Environment Agency - Abu Dhabi



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Introduction

Plants and their characteristics: Also called *Viridiplantae* (Vi-ri-di-plan-tae) in Latin, we plants belong to the kingdom, Plantae. This kingdom includes trees, herbs, bushes, grasses, vines, ferns, mosses, and green algae. But, then how do we describe ourselves, is what you might ask. Most of us are multicellular (mul-ti-cell-u-lar), meaning made up of many cells, living beings like humans and animals. But we do not have organs for movement like other living beings. You must have noticed that we are all green. This is because of a substance, called chlorophyll (chlo-ro-phyll), which gives us green colour. This chlorophyll catches sunlight for us and helps us make our food.

Why are we important: Oxygen is what you humans need to stay alive and this is what we give out in the environment while making our food. We also give you flowers, fruits, vegetables, and grains, besides giving you beautiful surroundings and home to many birds and animals. Many of us are also used to make medicines to cure or prevent a range of diseases, from headaches to cancer.

Threats to us: You may not be aware that some of us have become extinct, while many of us are endangered! Humans are cutting us down to build roads, buildings, and homes, and to carry out agricultural activities. The rise in global temperatures, as a result of the changing climate, is affecting us. For example, due to warmer temperatures, many of us have begun to grow and blossom earlier in the spring. We cannot migrate to other places to save ourselves, because we don't have feet or wings to walk or fly.

Plants in the United Arab Emirates (UAE): The UAE is home to around 678 known terrestrial plant species, including flowering plants, ferns, bryophytes, and mosses. The marine plant life of UAE boasts of a variety of seaweeds, three species of seagrasses, and aquatic microalgae. Many of us have, over a period of time, adapted to the harsh climate of the UAE.

Did you know?

- The tallest and largest living organisms in the world are the California Redwood. These trees existed before dinosaurs roamed the Earth.
- The largest single flower is the Rafflesia arnoldii, commonly called Corpse flower. They can grow to the size of an umbrella.
- The giant water lily grows almost a foot per day and it is the world's fastest growing plant.
- The Venus flytrap is a carnivorous plant that takes less than half a second to slam shut on an insect.
- The hurricane plant has holes in its leaves, which keep it from being destroyed by wind.
- Many cactus flowers bloom only during the night and are pollinated by bats and other nocturnal insects and animals.
- Some bamboo plants can grow almost a metre in just one day.
- During the 1600s, tulips were so valuable in Holland that their bulbs were worth more than gold.



Ghada shrub

Leaves are deceptive

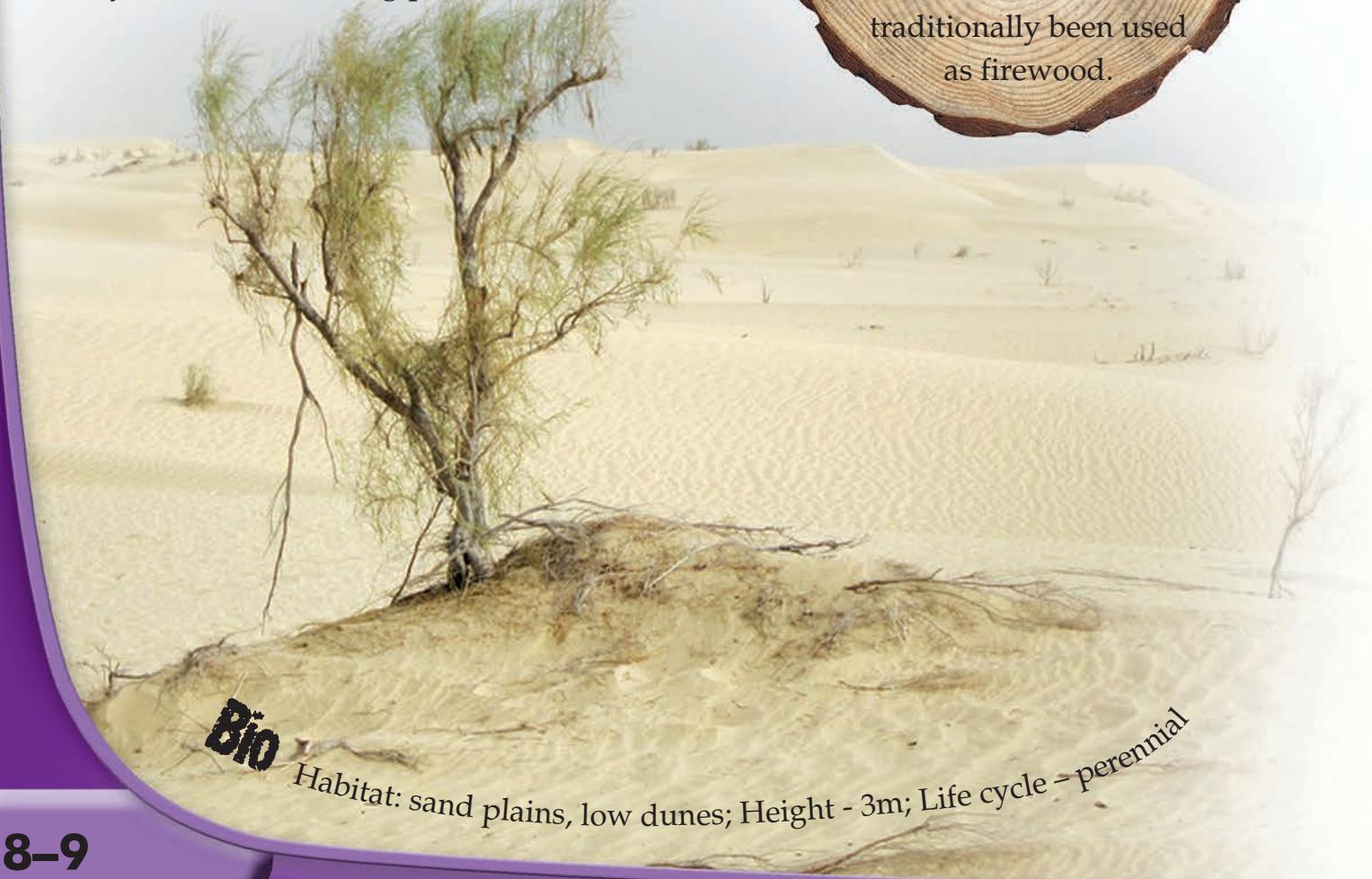
My wood is heavy and coarse, but my bark is spongy and water-soaked. I have leaves all year round. My leaves are so small that I seem to be bald, that is, without leaves. This gives me a dull and grey appearance. In my youth, my branches were vivid green and drooping.

Location

I live in the dew forests found in south of Abu Dhabi. The forest covers little less than 1 per cent (200,000 hectares) of total area of the UAE. Frequent fog in the forest region supports my growth as I am able to collect moisture from the atmosphere and water myself, an interesting phenomenon.

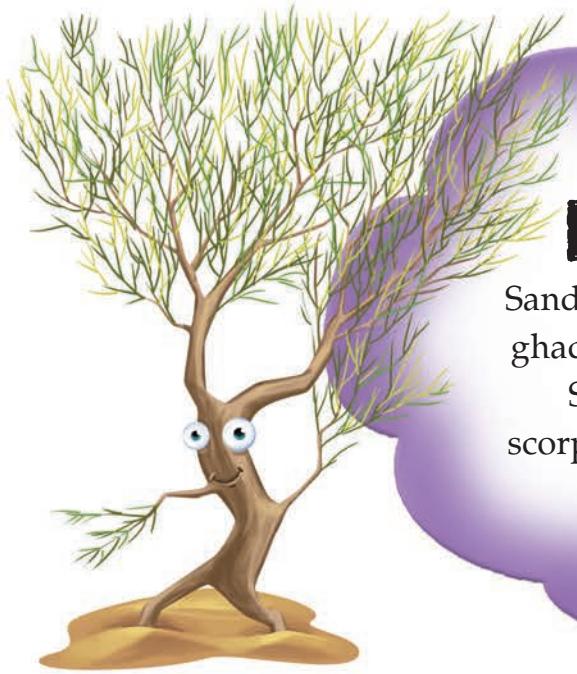
Blast from the past

The wood of Ghada shrub, or *Haloxylon Persicum*, has traditionally been used as firewood.

**Bio**

Habitat: sand plains, low dunes; Height - 3m; Life cycle – perennial

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Did you know?

Sand gathers around the bottom of ghada shrub, forming hummocks.

Small rodents, snakes, and scorpions love to make burrows in such sandy hummocks.

Auto-watering mechanism

The fine branches of my shrubs absorb droplets of water from the atmosphere. These droplets drip onto the ground around the bush and serve as an auto-watering mechanism. It is this process which has prompted the coining of the term “dew forest” for my woodlands. This moisture accumulates on the ground beneath the plants.



The summer flowers are produced in *Haloxylon persicum* in March every year.

My flowers

Majority of plants in my cluster produce perfect flowers from the previous year branches during October–November, but their usual flowering period is March–April. During early winter, after vernal flowering, the plant appears to be yellowish in colour and undergoes a somewhat dormant stage and later, by the end of December small shoots and leaves emerge. Flower buds are borne on these small shoots.

Conservation value

I am an important component of the desert vegetation in the UAE and in eastern Arabia, in general. I have an extensive root system, which helps stabilize sandy soil.

*Vulnerable VU B1 (a)

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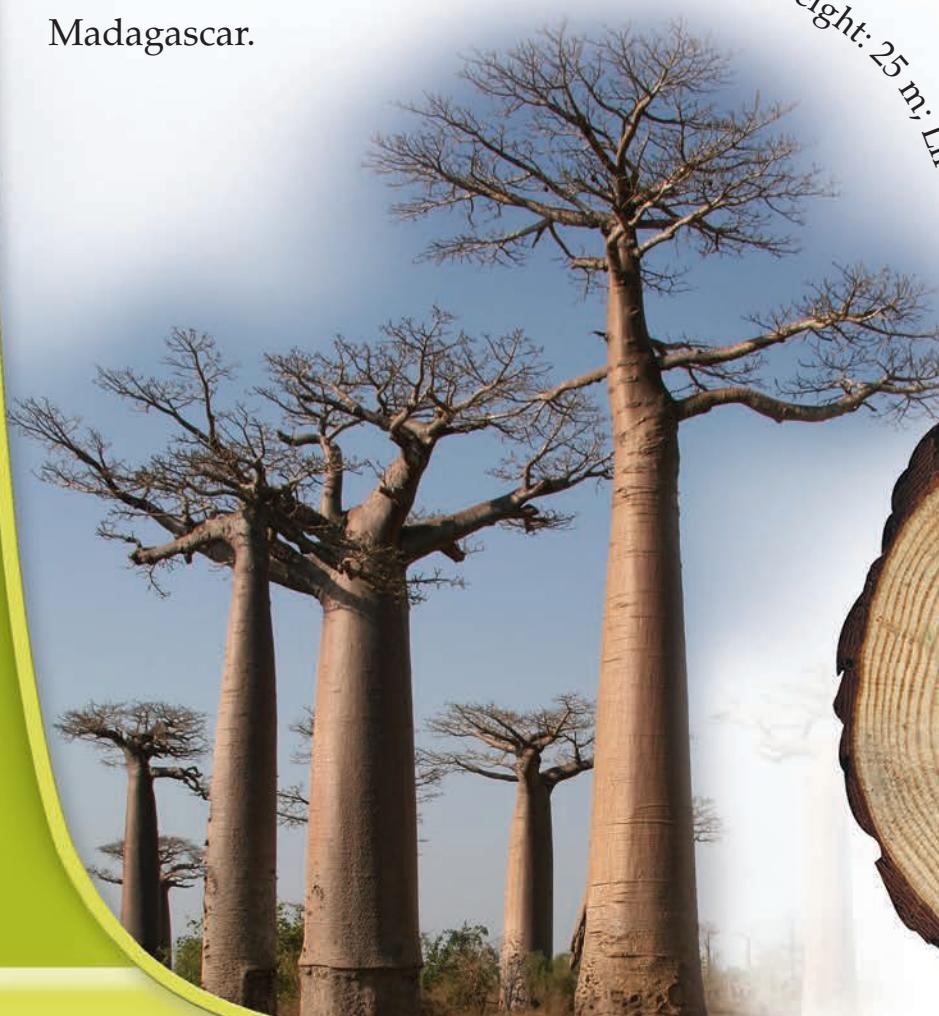
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Grandidier's baobab tree

Renala: mother of the forest

Renala is the name locals have given me out of respect. I have a huge trunk covered with smooth bark that can be up to three metres thick. My flattened top is covered with leaves, dark brown buds, and strikingly beautiful white flowers. We are eight brothers in our family and six of us live in Madagascar.

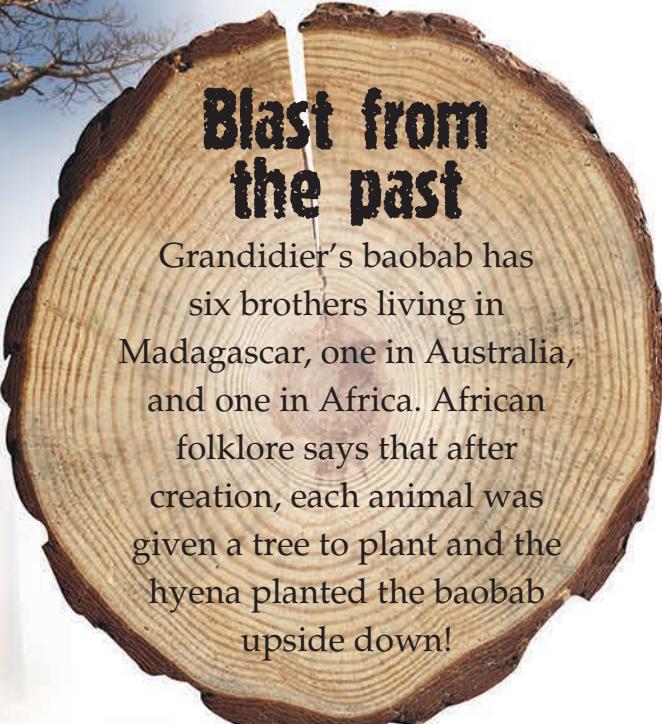


Height: 25 m; Life cycle: perennial

I am a strange-looking but fascinating tree and I live in Madagascar. I am named after the French botanist and explorer Alfred Grandidier. I am Grandidier's baobab.

Blast from the past

Grandidier's baobab has six brothers living in Madagascar, one in Australia, and one in Africa. African folklore says that after creation, each animal was given a tree to plant and the hyena planted the baobab upside down!



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Tree of life!

I can store up to a thousand gallons of drinkable water in the fibrous wood of my trunk and can be a source of water to humans and animals in need. I bear large fruits that smell like sour watermelon and contain a kidney-shaped seed inside, which has edible pulp. I am also a home for many birds, insects, snakes, and mammals.



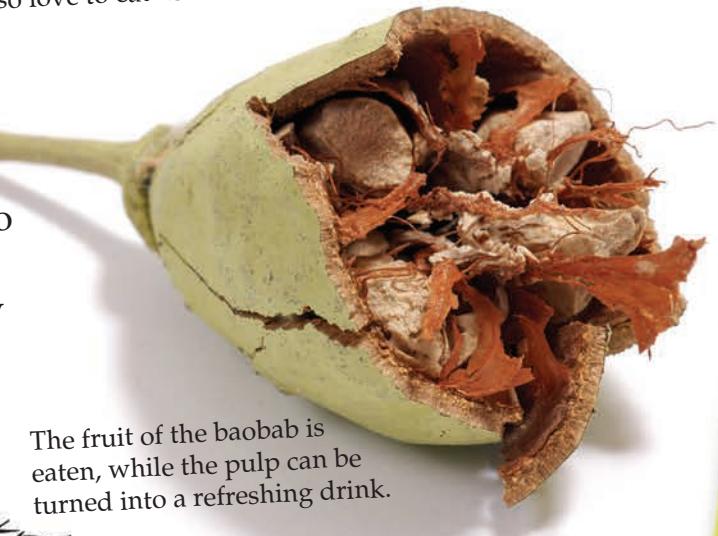
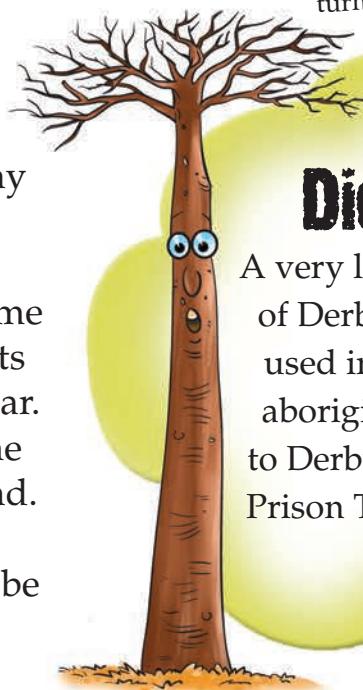
Elephants not only drink water stored in the trunk of the Grandidier's baobab tree, but also love to eat its leaves.

Endangered baobab

Humans make many things for their use from my seeds, flowers, bark, trunk, and so on, I don't mind that at all. What bothers me though is that they are taking away my already small home from me to use it for agriculture. The number of young trees in my family is decreasing.

Give me hope

The World Conservation Union has given me protection by declaring my family endangered. The Malagasy government is working towards saving me along with the other plants and animals of Madagascar. They also plan to triple the protected area of the island. However, I think more consistent efforts need to be made to save me.



The fruit of the baobab is eaten, while the pulp can be turned into a refreshing drink.

Did you know?

A very large, hollow baobab, south of Derby, western Australia, was used in the 1890s as a prison for aboriginal convicts on their way to Derby for sentencing. The Boab Prison Tree still stands and is now a tourist attraction.

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Wollemi pine tree

I live in the Blue Mountains of New South Wales, Australia. I was presumed extinct until a man called David Noble discovered me in 1994. My name is Wollemi pine.

Bio

Height: 25–40 m; Life cycle: perennial



Wollemi? A pine?

I am called a pine but I am a tall coniferous tree. I have many trunks and they bear numerous stems of different sizes. My bark has a bumpy surface, and I am told it looks like Coco Pops, the breakfast cereal. I have glossy, fine, and fern-like leaves.

Blast from the past

This living fossil is the sole surviving member of an ancient group called Wollemia dating back to the time of the dinosaurs, 150 million years ago.

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Dinosaur tree

My other name is dinosaur tree, since my family lived on the Earth even during the age of the dinosaurs. In winter and autumn, I develop a resin cap on my branches to protect myself from cold and dryness.

Since I am such an ancient tree, there is lot that humans can learn from me about ancient species of plants.

Dinosaur tree in danger

My family, once widespread, has undergone a natural decline over thousands of years. Today, only about forty of us live a secret, hidden life in Wollemi National Park. Due to our small number and that we are confined to a small area, we are at a greater risk of a natural or human-made disaster wiping us out altogether.

Did you know?

The oldest Wollemi pines today are estimated to be between five hundred and thousand years old.



Fossils resembling the Wollemi are found all over Australia, and also in New Zealand and Antarctica.



The Blue Mountains are home to one of the world's rarest tree, the Wollemi pine.

Adopt a Wollemi

I live in a protected area where visitors are only allowed if they have a special permit. Development of a recovery plan and strategies for management of my family are underway. Horticulturists believe that people should plant my family in pots and gardens as insurance against our disappearance in the wild and I think that's a brilliant idea.

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St Helena's ebony

My brother and I

Today, only two individuals from my family survive in the wild, my brother and I. Earlier, my family members grew up to five metres, but now we are shorter and have long branches spreading along the ground.

I have horizontal stems and heart-shaped, dark green leaves with soft, hairy undersides.

I am a shrub and I live with my brother near the rocks, called "Lot's Wife and Asses Ears". My name is St Helena's ebony and I live on St Helena Island, in the middle of the Atlantic Ocean.



Blast from the past

St Helena's ebony comes from the family Trochetiopsis, which according to evidence from fossil pollens, has lived on the island for 9.5 million years.

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My beautiful flowers!

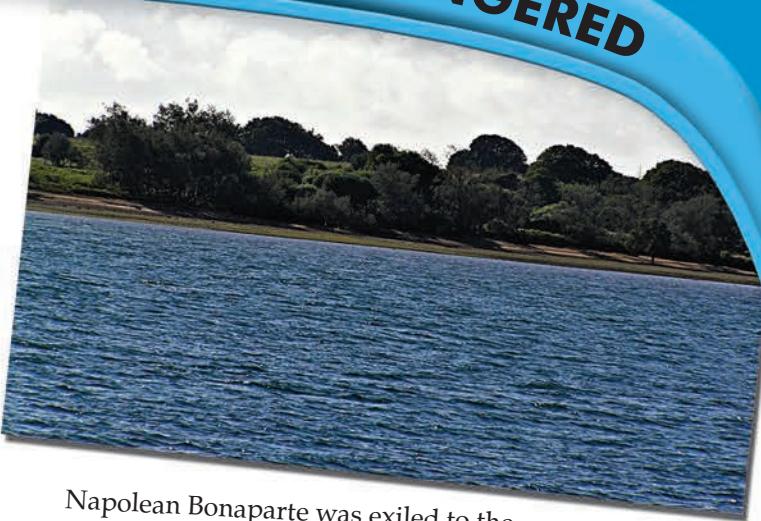
I bear large, white flowers with purple insides, which fade to pink with age before becoming seedpods. I mainly bloom in the summer but given enough rain, I can bloom all year round. My brother and I can protect ourselves from drought by shrivelling up our leaves in the dry season. As soon as it rains, our leaves become normal again.

Disappearing ebony

Our family started dying in the sixteenth century, because humans brought goats to the island, which started eating low-lying shrubs like us. Then humans also started clearing the island for agriculture, further disturbing our population. By 1850, we were considered extinct until my brother and I were found hiding on a remote cliff.

Did you know?

When St Helena's ebony was rediscovered on an inaccessible cliff, a volunteer was lowered down to the cliff to collect cuttings to be sent back to botanical gardens.



Napolean Bonaparte was exiled to the isolated St Helena's Island.



Wild goats have been almost removed from St Helena following a campaign in the 1960s.

Save me!

Humans realize how important it is to save us, so as soon as they found my brother and I, they started taking our cuttings and planting them. Soon, about a thousand new plants were introduced in six wild sites and in the botanical gardens on the island. It is crucial to multiply consistently or else all will be lost.

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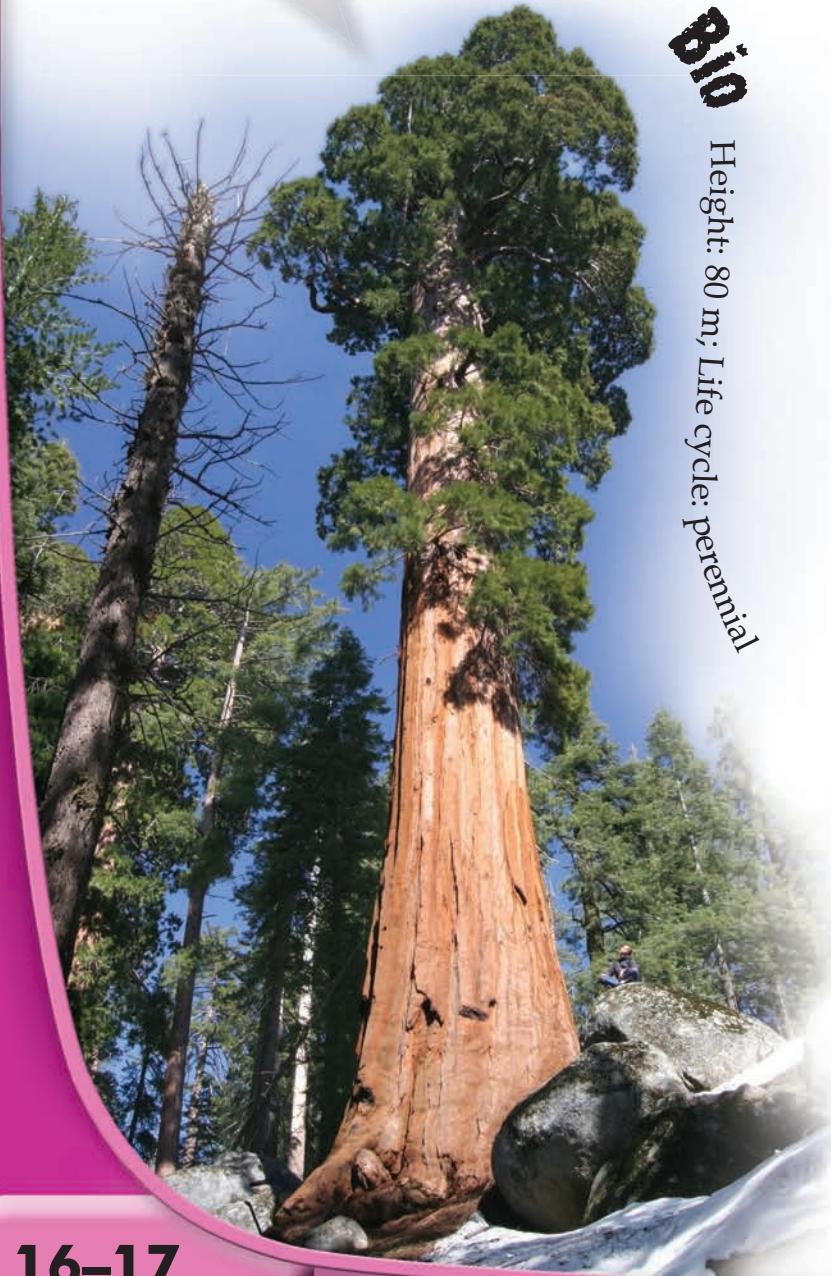
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Giant sequoia tree

My name is giant sequoia and my home is in western Sierra Nevada, California, United States. Some people call me the "largest living thing on the planet".



Bio

Height: 80 m; Life cycle: perennial

Big tree

I have a tapering trunk, reddish brown in colour, with a thick furrowed bark, up to 1.2 metres thick. As a grown-up, the lower half of my trunk is clear of branches. Towards the top, I have a rounded crown and my branches sweep downward with upturned ends. I have small and scale-like leaves.

Blast from the past

The giant sequoia is the sole member of the group Sequoiadendron. Its first written account was found in the diary of the European explorer JK Leonard.

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The seeds of the giant sequoia grow after a fire.

Sierra redwood

Sometimes called Sierra redwood, I am a coniferous, redwood tree from Sierra Nevada. I like it when my home is consumed by small fires because that kills all the plants trying to take my home from me and also helps me regenerate because the warmth dries and opens my cones helping release the seeds, which one day grow into trees.

Vulnerable sequoia

Humans discovered my family in the 1800s and started felling us in large numbers for wood. This continued until 1950s. Another factor that has reduced our population is the prevention of fires in my home, without which our regeneration has slowed down.

Saving Sierra Redwood

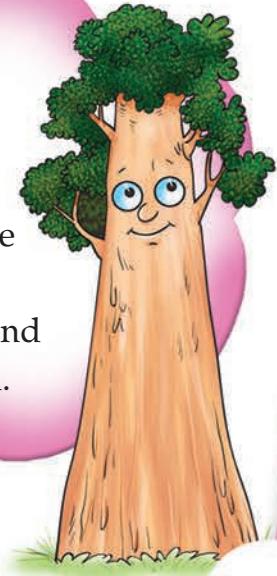
Today, my family is considered a national treasure and as much as 90 per cent of our population, strange but true, is protected in areas like the Kings Canyon National Park. Since the 1970s, these parks have been creating controlled fires in the areas where we live to help us make more trees. If these efforts are not continued, we will be in grave danger again.



The Kings Canyon National Park has mountains, canyons, caverns, and the world's largest trees!

Did you know?

The tallest giant sequoia tree in the world is called General Sherman and is 83.8 metres tall.



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Pitcher plant

I am the pitcher plant, and I am one of the most unusual amongst my family. I live in Kerinci and Tujuh mountains in Sumatra, Indonesia.

Height: 5 m; Life cycle: perennial
BIO



Mr Trap

I am a carnivore, which means I eat animals. I am a vine and my leaves are like pitchers in which insects get trapped. Once inside, the insects can't get out because the top of my pitcher is waxy, which makes it impossible for them to get a hold on the surface. Also, the mouth of my pitcher has teeth, which prevent the insects from escaping.

Blast from the past

The earliest known account of the pitcher plant family, *Nepenthes*, is from the work of Frenchman Etienne de Flacourt called *Histoire de la Grande Isle de Madagascar*, published in 1658.

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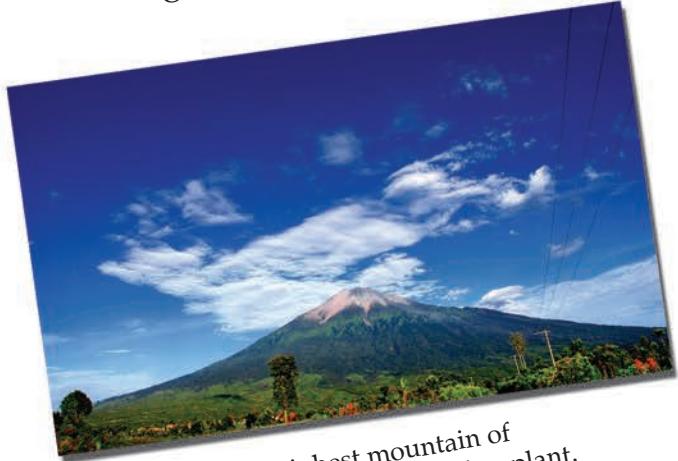
Insect eater

I get my nutrition from the soil in which I grow, from sunlight as well as from the insects I eat. I like eating ants, cockroaches, centipedes, flies, and beetles. Inside my pitcher, there are acidic fluids, which drown and digest the prey after it falls in.

Despite being carnivorous, many from my family give shelter to other animals like the red crab spider.

Pitcher in trouble

My family and I live in a very small area, which is why we are in constant danger of becoming extinct due to natural events. Moreover, since we are the most unusual family of an unusual group, humans like to collect us, because of which today our population is critically endangered.



Kerinci, the highest mountain of Sumatra, is home to the pitcher plant.

The red crab spider preys on other insects like mosquitoes in the pitcher plant.

Did you know?



Pitcher plants are also called "monkey cups" because it has been observed that monkeys drink rainwater collected in the pitchers.

Bring Pitcher back

On Mount Kerinci, my family and I live in the Seblat National Park. The Convention on International Trade in Endangered Species list protects us, which limits our international trade. It is crucial that humans stop collecting us as trophies or these measures won't help and soon my whole family will be gone.



Schweinfurthia imbricata A. Miller

Blast from the past

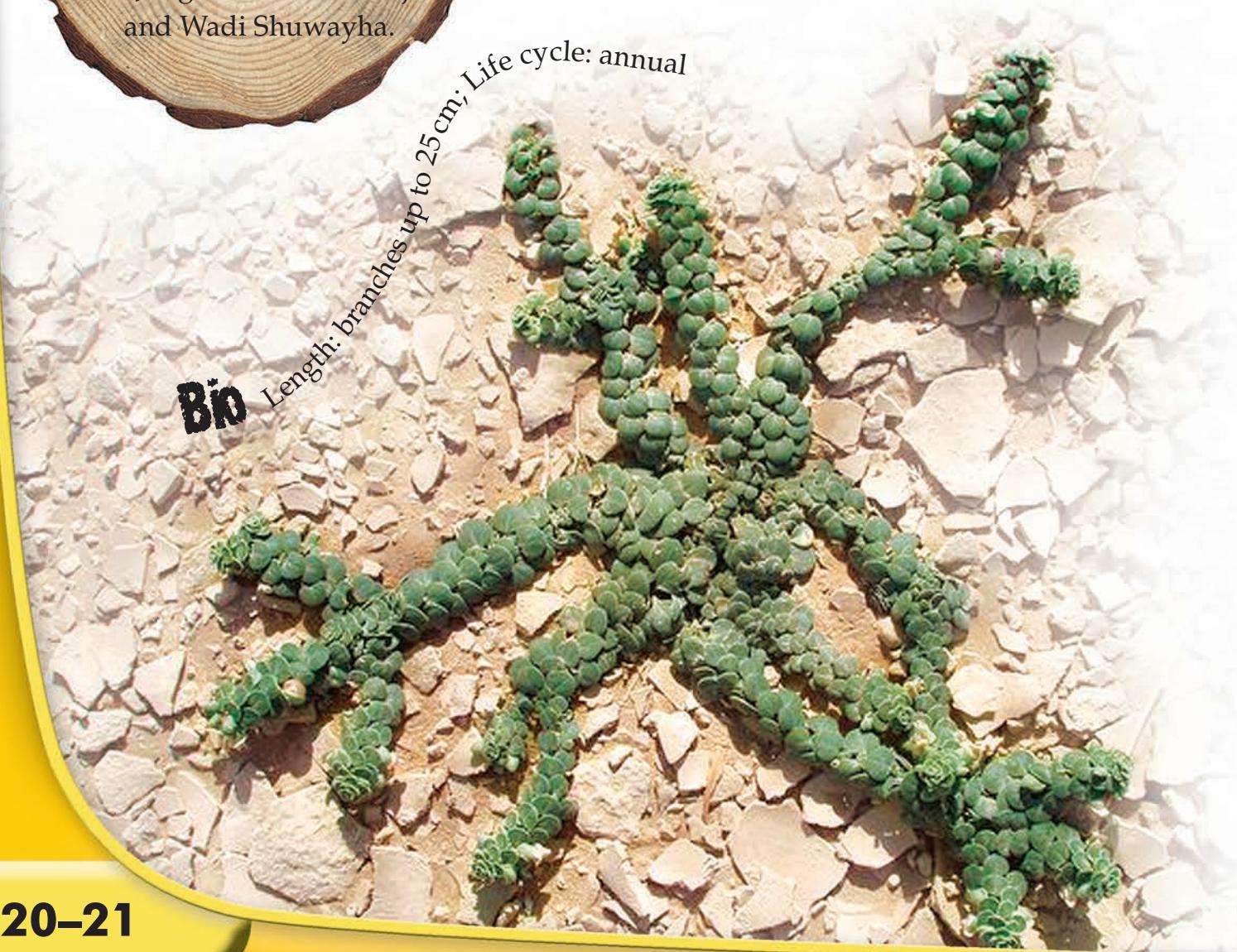
This rare plant was first sighted by M Jongbloed in Wadi Siji and Wadi Shuwayha.

Figwort family

My roots lie in the Figwort family Scrophulariaceae. I don't belong to the Arab region, but recently I have been found growing in the sandy plains of Jebel Hafit, which is a mountain on the outskirts of Al Ain in the Emirate of Abu Dhabi.

BIO

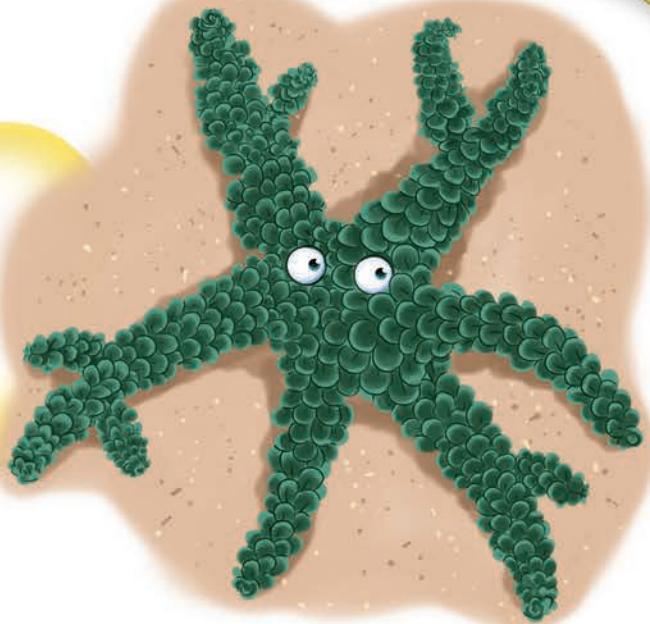
Length: branches up to 25 cm; Life cycle: annual



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Did you know?

Schweinfurthia imbricata is endemic to the Hajar Mountains, which are located alongside the east coast of the UAE.



A recent find

I am a flat, more compact annual herb with round, juicy, overlapping leaves. I am a rare species found at the foothills of the Hajar Mountains. I was first recorded during a survey on the plains of Jebel Hafit in early February 2008. I was found in flat, fenced sandy area with patches of fine gravel and silt in between. The area is approximately 500 m south of Mezyad Fort, which is in the eastern province of Abu Dhabi.



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Light pink bloom

My flowering season occurs during February-April. My flowers are light pink in colour with darker veins and yellow throat, on short stalk from leaf nodes.

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Capsule fruit!

My fruits look like a round capsule. They occur on curved stalks.

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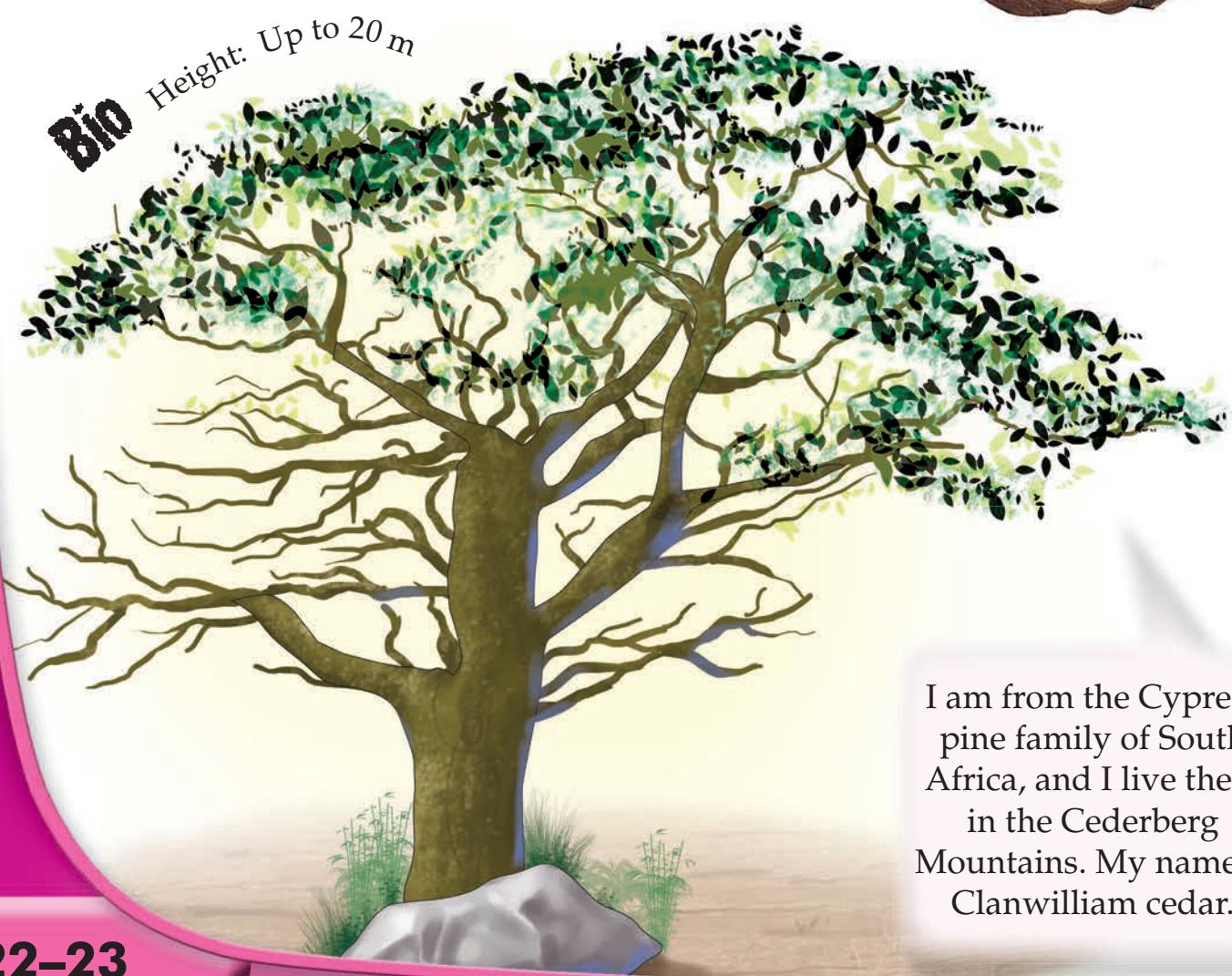
Clanwilliam cedar

His majesty

I am a tall, straight, evergreen tree, and I impress people with my personality. As a grown-up tree, I have a massive trunk and a wide spread of branches. Considering I live in a low-rainfall area, I have long roots spreading deep into the soil to reach groundwater.

Blast from the past

The Clanwilliam cedar is from a group of four cypresses that live in Africa, belonging to the large family Cupressaceae, which has been on the Earth since the time of the dinosaurs.



I am from the Cypress pine family of South Africa, and I live there in the Cederberg Mountains. My name is Clanwilliam cedar.

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Wonderful wood

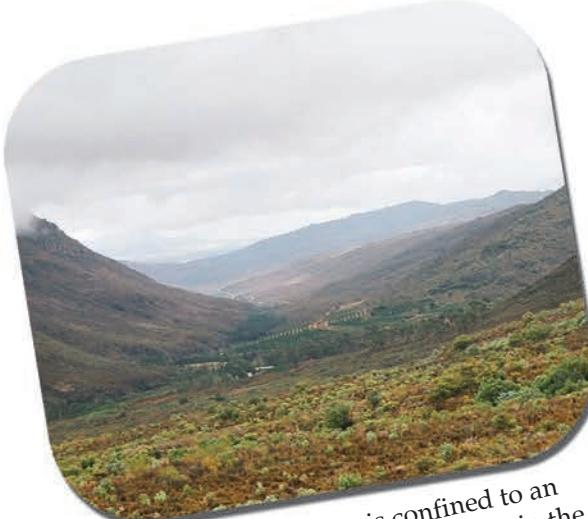
My wood is light yellow to whitish, durable, and smells wonderful. Like many other trees, I have male and female cones on my branches. The male cones are smaller than the female cones, while the female ones are much bigger. Together, they produce seeds, which live in the female cones on the tree for three years and are then dispersed in the nearby soil to grow into new trees.



The depletion of these rare and beautiful trees had begun at the turn of the twentieth century.

Fading glory

With human settlement came exploitation. When Europeans came, they started logging my family heavily to make furniture, ships, telegraph posts, and so on. To be able to regenerate, my family requires small fires, but high-intensity fires can kill us. Two such big fires – one in 1989 and another in 2002 – deeply reduced our numbers.



The Clanwilliam cedar is confined to an area of about 250 square kilometres in the Cedarberg Mountains, South Africa.

Did you know?

The Cederberg Mountains are named after the Clanwilliam cedar, as it was once abundant in the range.



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Don't let Clanwilliam die

Humans started making efforts to protect us as early as the beginning of the nineteenth century but heavy fires prevented our populations from recovering. In 1987, the Cape Nature Conservation created the Cedar Reserve to protect us by controlling the fires and growing seeds artificially and planting them. If this programme doesn't run successfully then my family is likely to become extinct.

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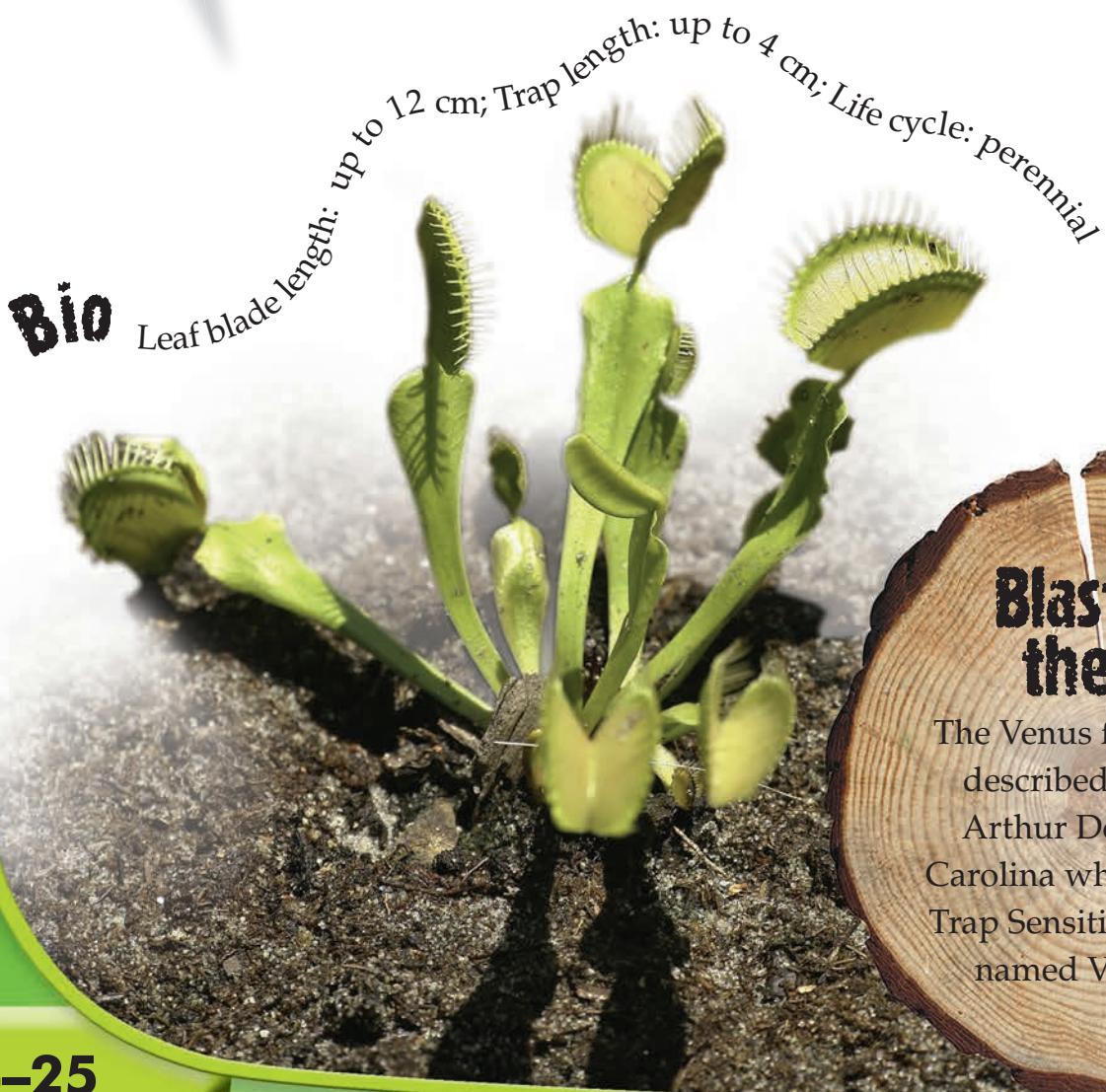
Venus flytrap

I am one of the most unique plants in the plant kingdom. My name is Venus flytrap. I live in North and South Carolina in North America.

Mr Amusing

I am a small herb, though not a very friendly looking one. I am a carnivorous plant, and so I eat animals. My leafstalks end in a two-flapped trap. The outside of the trap is green, the inside is red to attract the insect, and the edges of each flap are lined with 14–20 sharp teeth.

Bio



Leaf blade length: up to 12 cm; Trap length: up to 4 cm; Life cycle: perennial

Blast from the past

The Venus flytrap was first described by Governor Arthur Dobbs of North Carolina who named it "Fly Trap Sensitive". It was later named Venus flytrap.

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How I eat

The inside of the trap is covered with tiny super-sensitive hair. Once an insect is inside my trap, and if it touches one of the hair more than once, the trap closes halfway. If it's a small insect, I don't waste my time and let it free but if it's big enough, I shut my trap fully and digest the insect with the help of juices present inside the trap.



The Venus flytrap lives in poor soil, and gets nutrients from insects.

Dying Venus flytrap

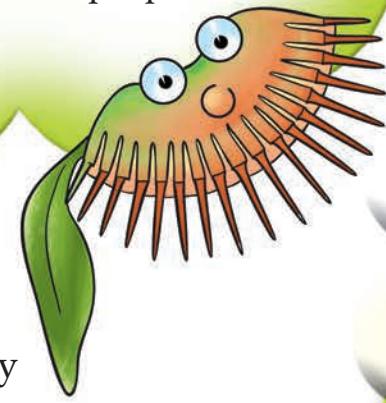
Humans have taken over large portions of my home for their activities, pushing my family towards extinction. Moreover, there are not enough fires in our home, which we need in order to clean it and to drive away rival plants. Also, humans collect my family in large numbers because we are so unusual.



There is a big fine for taking Venus flytraps from their native habitat in the United States.

Did you know?

Venus flytrap-like plants are common in fictional works. They are usually large, capable of digesting a human being. In the 1960s film, *Little Shop of Horrors*, a flytrap-like alien plant lives on human blood and eventually grows large enough to swallow people whole!



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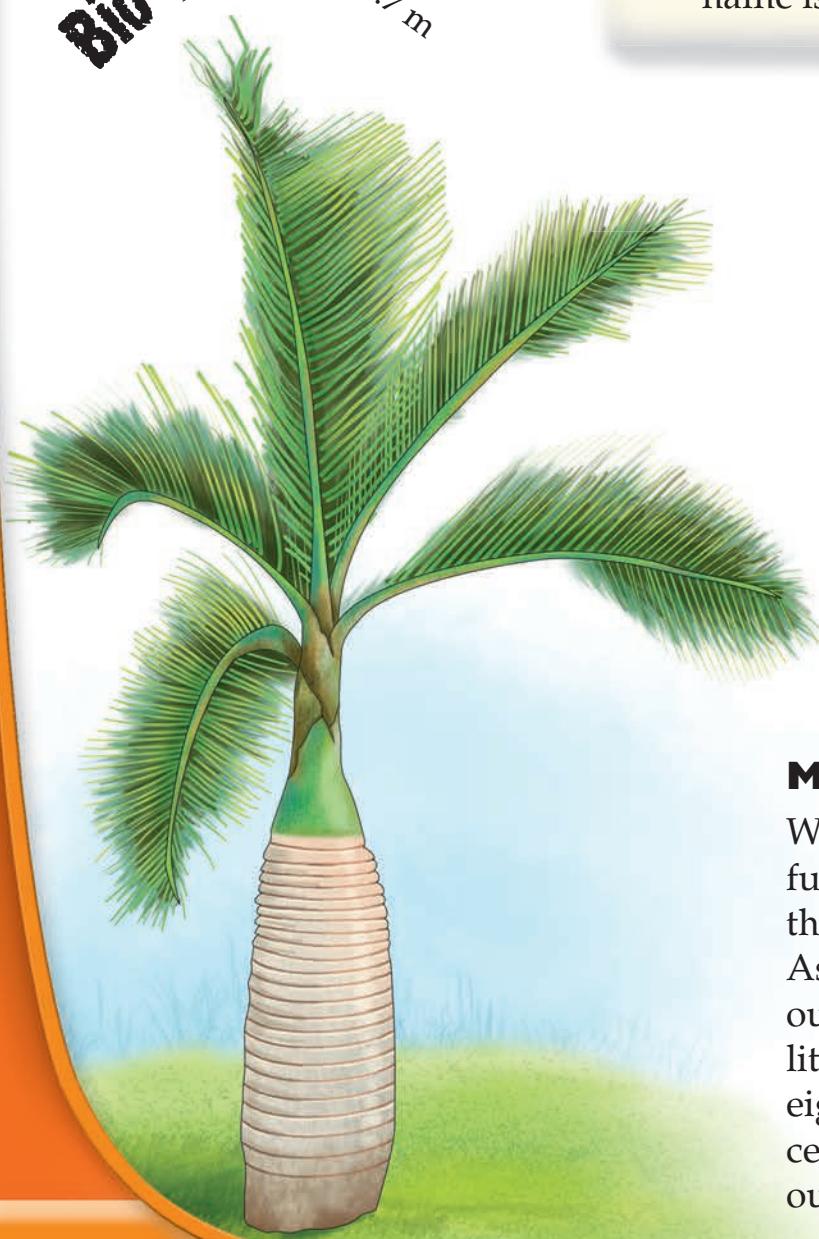
All is not lost

The law in the United States makes it illegal for people to collect members of my family from the wild. Also, humans are trying to stabilize our population by growing us artificially. It is most important, however, to save my home because that is the only place in the world where I can comfortably live.

Round Island bottle palm tree

Bio

Height: 3.1–3.7 m



I am the bottle palm from Round Island, and along with my four brothers, I live on the Mascarene Islands in the Indian Ocean. My name is Round Island bottle palm.

Blast from the past

The Round Island bottle palm belongs to the large family of about 2,600 species called *Arecaceae*, the first fossil records of which date back to 80 million years ago.

My bottle

When I am a child, people find me funny, because my trunk is swollen at the base, making me look like a bottle. As I grow up, my trunk straightens out and as I get older, it becomes a little conical. On the top, I have four to eight leaves shaped like arches, with a central midrib and leaflets branching out of it on both sides.

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My life

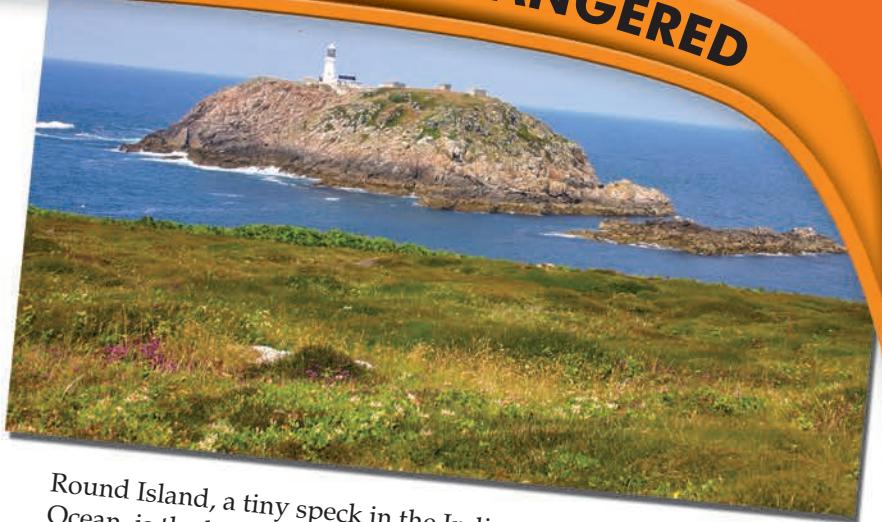
I live in the lowland palm Savannahs. I am the happiest when I have plenty of moisture where I live and some shade. I can even handle the harsh Sun as long as I have adequate water. I bear small white flowers on my crown. Some of these flowers turn into small, round fruits after some time.



Overgrazing by rabbits and goats almost wiped out the bottom palm from Round Island.

Save the bottle palm

Round Island is now a managed reserve area and my family is being replanted there. Some of my family are being artificially grown in other tropical regions of the world as well. Considering we like to live only on Round Island, it is important that the conservation efforts be continued until our population has stabilized.



Round Island, a tiny speck in the Indian Ocean, is the home of the bottom palm tree.

Endangered palm

My small home was damaged when goats and rabbits were introduced here in the nineteenth century. The animals overgrazed the island, which led to massive soil erosion. In 1987, all goats and rabbits were removed but by then there were only seven individuals of my family left here.



Did you know?

Some believe that the Round Island bottle palm's swollen trunk stores water, but that's just a myth. It's just a regular little trunk.

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***Acridocarpus orientalis* A. Juss.**

Small and tiny

I am a small kind of species, with about 30 small trees and climbers from Africa, Madagascar, India, and New Caledonia. Most of my relatives come from Africa.

BIO Height: up to 200 cm; Life cycle: perennial



Blast from the past

This species was originally described to be found in the Jebel Akhdar and Musandam mountains of Northern Oman.

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My yellow flowers

You can call me a large shrub or a small evergreen tree. I have conspicuous, large leathery leaves, which grow at alternating points along the central stem. And my yellow flowers are a lovely sight. The five yellow petals of my flowers have fringed edges and they are not jointed to each other.

Plant with seed

The single seed of my plant are contained within my winged fruit, which resembles a sycamore. The seed is found at the base of the slightly hairy wings.

Distribution

In the UAE, my existence is only known from Jebel Hafit. But you can easily find me in the foothills and slopes of the Jebel Akhdar and Musandam mountains of Northern Oman. My population on Jebel Hafeet comprises around 6-7 plants at the head of Wadi Tarabat, where shady conditions prevail for part of the day.

Use me in myriad ways

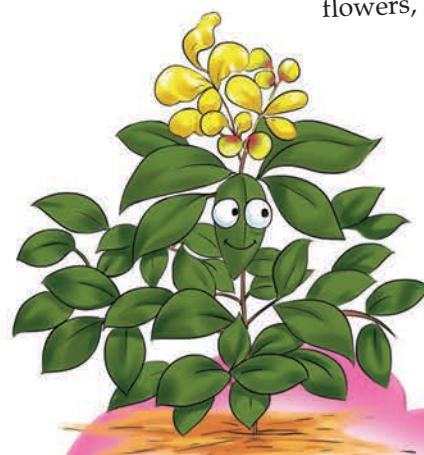
My leaves and stems are used to make a yellow-coloured dye. My new soft growth is pounded to a paste and applied to the udders of livestock suffering from inflammation. A mixture of my crushed leaves, if drunk, heals internal swelling. It treats external swelling, if its juice is squeezed over and around the wound. The oil of my seed is massaged on the forehead to relieve headache.

Tough times ahead

Considering my poor population and my status, there is very little evidence of regenerating me naturally in the wild. Maybe a better understanding of my germination characteristics will help humankind in future.



A branch with flower buds, flowers, and winged fruits.



Did you know?

Oriental cherry, or *Acridocarpus orientalis*, is a source of yellow dye in Northern Oman.

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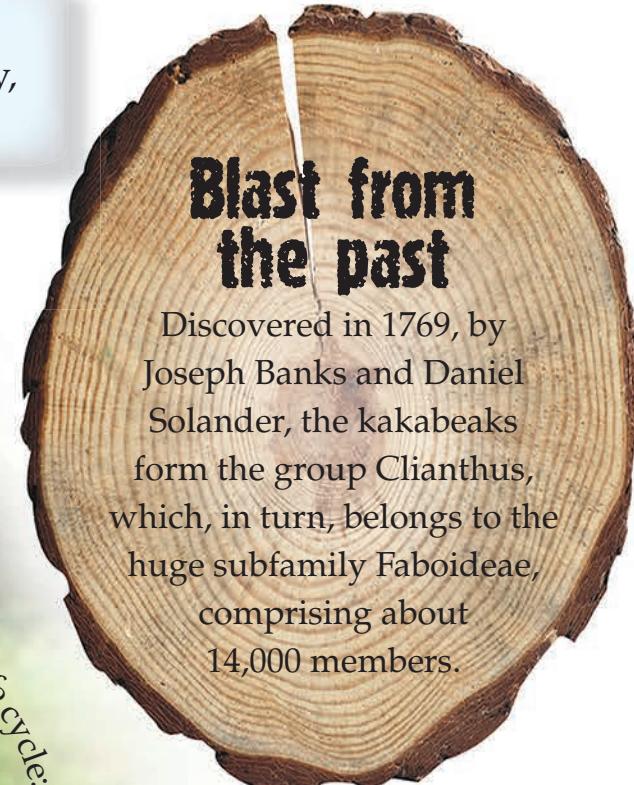
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Kakabeak

Parrot's beak

The Maoris of New Zealand call the parrot "kaka". My striking red, clustered flowers resemble the beak of a parrot, and that's why I am called kakabeak. I am a woody shrub from the pea family, and my long leaves are made up of smaller opposing leaflets; my flowers are followed by large dangling pea pods.

My brother and I are New Zealanders. I live in certain areas between Northland to Hawkes Bay, North Island.



Blast from the past

Discovered in 1769, by Joseph Banks and Daniel Solander, the kakabeaks form the group *Clianthus*, which, in turn, belongs to the huge subfamily Faboideae, comprising about 14,000 members.

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Maximus

My brother maximus and I are not very different, although his family is doing better than mine. The small difference between us is that whilst I have matt, grey-green, narrow leaves, maximus has glossy, green, and broad leaves. His flowers are a bit bigger than mine. Perhaps, that's why he is called "King Kaka".

Did you know?

The scientific name of kakabeak is *Clianthus puniceus*, derived from Greek words *kleos*, meaning "glory", *anthos* meaning "flower", and *puniceus*, meaning "reddish-purple".



Lost glory

There are varied reasons why my family is dying, with less than two hundred of us left in the wild. We grow best on undisturbed sites, which is a rarity now, especially with competing plants like Mexican daisies around. Animals such as goats, pigs, and rats, introduced from outside, have damaged our population heavily. Now, the possibility of our survival seems very bleak.



The Maori cultivate ornamental kakabeak plants to feed captive birds.



Only about 200 kakabeak plants survive in the wild in the Hawkes Bay area.

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Hold on glory pea

Most of my home falls within the Te Urewera National Park, where we were protected until the deer there started eating us. Now, a recovery plan has been chalked out to help stabilize our population with the assistance of the locals, by educating them and encouraging them to save us. It is very crucial now to see this plan through continuously, so that my family can recover.

Ashoka tree

Blast from the past

It is said that

Lord Buddha was born under an Ashoka tree.

Saraca asoca is my formal name but I am better known by the name ayurveda has given me, Ashoka, which means “sorrowless”. I live in India and Sri Lanka.



Height: Up to 10 m; Life cycle: perennial

Sacred tree

I am a small, evergreen tree considered sacred throughout my homeland. I am from the pea family and bear leaves through all seasons, each leaf being a foot long. My trunk is straight and made of reddish brown wood covered by blackish bark, and my branches spread in all directions, forming a beautiful crown. My flowers are orange to scarlet developing into deep red, and they smell very good.

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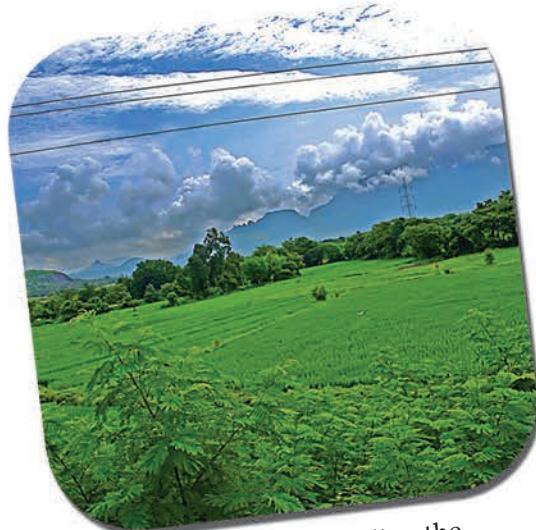


Did you know?

The Ashoka tree is from the Caesalpiniaceae subfamily, which, in turn, is from the family Fabaceae, one of the largest flowering plant families, with some 10,000 members.



The bark and flowers of the Ashoka tree are used for medicinal purposes.



Medicinal plants, including the Ashoka tree, have been overexploited in the Western Ghats.

Friendly herb

I am much appreciated by humans for my medicinal qualities. My seeds bring relief to those suffering from ailments like arthritis; my crushed flowers and leaves give relief from skin diseases; and my bark is used as medicine for some diseases that affect women.

Ashoka in danger

I help humans in so many ways, but they have overexploited my family. Ninety per cent of the herbs used in traditional medicine are taken from wild plants instead of being artificially grown. Moreover, our home is also being destroyed to make way for human development.

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Let's help Ashoka

The World Conservation Union list now considers my family threatened. In order to protect us, the Forest Department of the state of Karnataka, India, has launched a special 5-year conservation programme. This is being planned for all my family in the Western Ghats. Perhaps, the same needs to be done for the rest of my family, too.

Pau brasil

Blast from the past

Pau brasil is from the group Caesalpinia, which belongs to the family Fabaceae. Fossil records show that its members lived in North America more than 65 million years ago.

Mr Spike

I have blood-red shiny heartwood covered by patchy and flaky dark brown bark. My leaves branch out into small leathery leaflets, and my flower stalks branch into 15–40 yellow, strongly perfumed flowers, each with a red blotch in the centre. My branches, leaves, and fruits are all covered with small thorns.

Bio

Length: 5–15 m; Life cycle: perennial

I am a rare but famous tree – famous because the country where I live got its name from me. My name is pau brasil, and I am from Brazil.



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My home

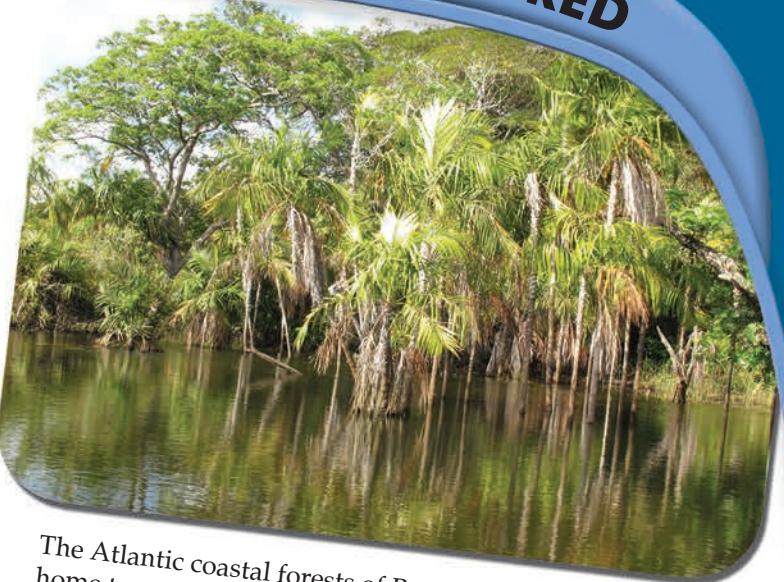
Humans extract a red dye from my wood. Since trade started in the 1500s, the only country where I lived was given the name ‘Terra de Brasil’ and finally, Brazil. I live in the eastern part of Brazil, in the Atlantic coastal forests. Today, humans are testing extracts from my body to see if they can find a cure for cancer from it.



The timber of the pau brasil tree is prized by makers of musical instruments.

Rescuing pau brasil

The fact that I am the national tree of Brazil does get me attention. Some of my family live in reserves in Bahia and Pernambuco. The organization Fauna and Flora International is running campaigns to help protect me, along with some other hardwood trees. I am grateful to the organizations that are educating people about me, so that they can help save me.



The Atlantic coastal forests of Brazil are home to many important and rare plants.

Pau in danger

Humans killed my family to make red dye in such vast numbers that by the nineteenth century very few of us remained. Today, we are felled to make bows for musical instruments like the violin. The demand for these expensive bows affects us severely. Moreover, 70–80 per cent of our wood is simply wasted while making these bows.

Did you know?

In Portuguese, the language spoken in Brazil, *pau* means “wood”, and *brasil* is said to have come from *brasa*, which means “ember”.



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'Olulu palm

I am from Hawaii. Hawaiians call me and my brother 'olulu. My real name is *Brighamia insignis* and my brother's is *Brighamia rockii*.



Bio

Length: 1–2 m; Life cycle: perennial

Blast from the past

'Olulu palm is a Hawaiian lobelioid, the largest plant group in any island archipelago, with about 116 members. Their ancestors arrived on the Hawaiian islands millions of years ago.



Cabbage on a stick

I look like a cabbage on a stick. I have a thick stem, which is swollen at the base. My top is crowned with a dense bunch of fleshy, spoon-shaped, shiny, and leathery leaves. I bear clusters of yellow flowers, shaped like trumpets, which smell little like honeysuckle.

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Rockii and I

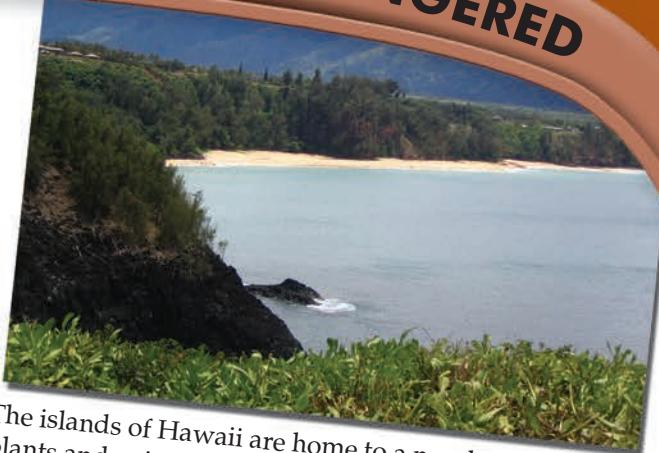
I live on the Island of Kaua'i and my brother lives on the Molokai Island. We live in areas with little soil, in salty environments of sea cliffs, and on steep volcanic slopes. The only difference between rockii and me is the colour of our flowers – his are white and mine are cream to yellow. My flower stalk, too, is slightly shorter than his.

Dying 'olulu

Today, only seven members of my family live in the wild and my brother's family isn't doing too well either. It's because of competition from new plants that have been introduced into my home. More importantly, no more baby 'olulus are being born in the wild because the moth that helped spread our seeds once has become extremely rare.

'Olulu come back

The World Conservation Union considers me critically endangered. In an effort to save me, botanists have climbed difficult cliffs, where I live, and with their own hands helped spread my seeds, so more 'olulus can grow. My family is also being grown artificially. If these efforts are continued in full swing, then my family and I may still have a chance of survival.



The islands of Hawaii are home to a number of fascinating plants and animals, many of which are at risk.



Moths usually pollinate pale, nocturnal flowers. The 'olulu palm's sole pollinator, a long-tongued moth, is now extremely rare, and may already be extinct.

Did you know?

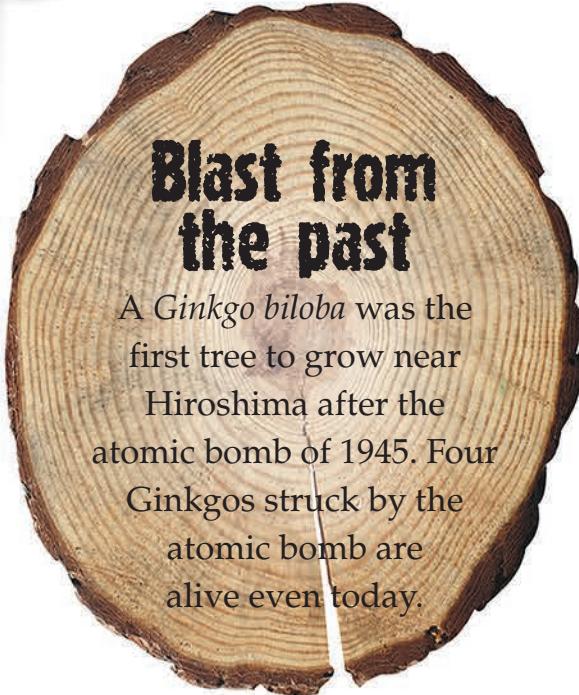
'Olulus are being mass produced by tissue culture in Holland and being sold to the general public to save them from extinction.



Ginkgo biloba

Blast from the past

A *Ginkgo biloba* was the first tree to grow near Hiroshima after the atomic bomb of 1945. Four Ginkgos struck by the atomic bomb are alive even today.



I am a tree renowned worldwide for my medicinal properties and for my resilient nature. My name is *Ginkgo biloba* and I am from China and Japan.

BIO Length: 30–40 m; Life cycle: perennial



Mr Duck Foot

I am a tall tree, some of us reach up to 50 metres. I have deep roots and the ability to withstand strong winds and snow. I have erratic branches and a deeply cracked brown bark. My branches have greenish-yellow leaves that turn golden in autumn. These have two or more lobes, and they look like a duck's foot.

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Wonder tree

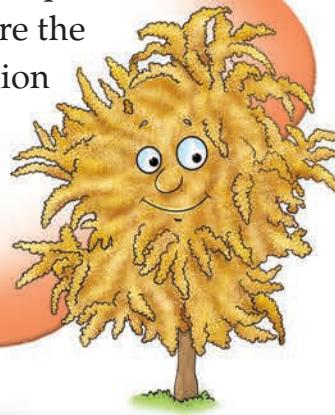
Scientists consider me a living bridge between higher plants like the flowering plants and conifers and lower plants like mosses and ferns. I have many medicinal qualities. In Chinese medicine, my seeds are used to treat ailments such as asthma and fever. Western medicine uses extract of my leaves to treat many ailments, including Alzheimer's disease.

Biloba no more

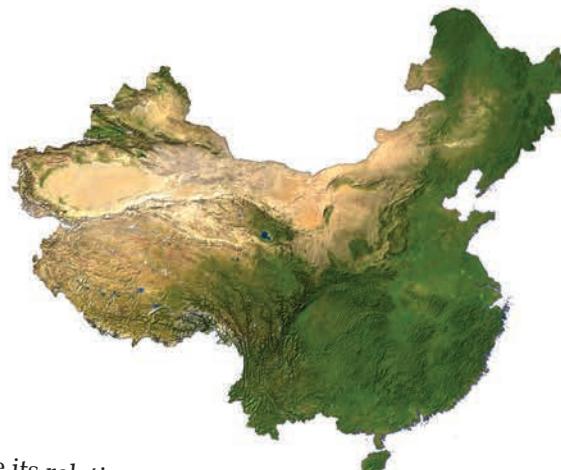
Some say that wild members of my family still live in south-western China. We are a family of very strong, tough trees, but today, most of my population in the wild is gone because humans wanted our wood and leaves or because they took over our home.

Did you know?

Ginkgo biloba is a "living fossil" because it is the only living member of the group Ginkoales, which has been living on this planet from the time before the dinosaurs, 270 million years ago.



The ferns of *Ginkgo biloba* grow well in the litter under trees.



While its relatives became extinct in other parts of the world, *Ginkgo biloba* survived in China, from where it was again introduced to the rest of the world as an ornamental plant.

In memory of Biloba

The World Conservation Union considers my family endangered. Even though most of my family members now live in farms and gardens grown by humans, we are still felled extensively to meet the demand of the medicine market. If we are not replanted at the same rate as we are cut, the hundreds of millions of years of our life on this planet might end in the near future.

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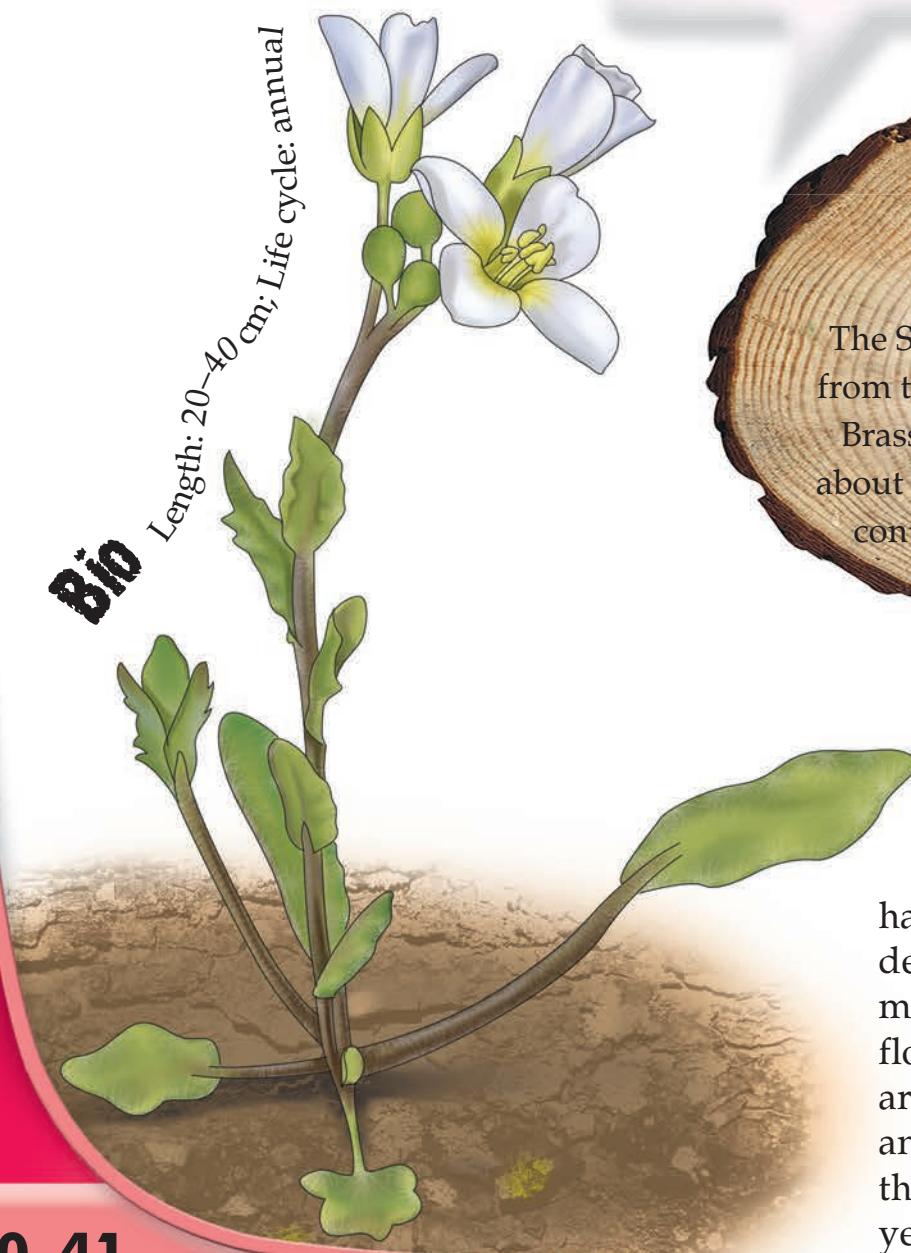
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Spring creek bladderpod

I am an herbaceous plant from Central Basin in Tennessee, United States. My name is Spring Creek bladderpod.



Blast from the past

The Spring Creek bladderpod is from the group Lesquerella of the Brassicaceae family, which has about 3,700 members living on all continents except Antarctica.

Mr Bladderpod

I've been given this funny name because of my fruit, which is inflated and rounded, smooth or slightly hairy on the outside but densely haired on the inside; my stem is hairy too. My flowers have four petals that are white to lavender in colour and yellow at the base, making the flower look as if it has a yellow centre.

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Life cycle

Baby plants or saplings in my family are born from seeds in September or October. They spend the winter as a small bunch of leaves and develop fully only in spring. They flower in March or April and then bear fruits. The fruits split open in late April or May, the parent plant dies, and the seeds fall to the ground, where they lie until autumn, when they become saplings.

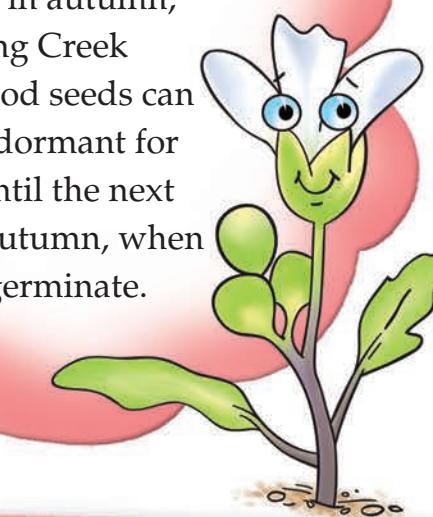
Farewell bladderpod?

My home is very small and humans are taking over even that for commercial, residential, and industrial purposes. My home is also being used to grow other crops. Moreover, there are new plants in my home, which are competitive and I am not strong enough to fight them. There are also domestic animals that eat me.

Did you know?

If conditions are not suitable in autumn,

Spring Creek bladderpod seeds can remain dormant for years until the next suitable autumn, when they germinate.



The Spring Creek bladderpod is confined to a small area in Tennessee's Central Basin.



The Spring Creek bladderpod is losing its habitat to agriculture and industry.

There is still hope

The World Conservation Union protects me, but no stringent laws in United States do the same because I live on private property owned by humans. The government has contacted these landowners, three of whom have agreed to protect me. I wish the rest of them would do the same and save the four meagre groups of my family left on the planet.

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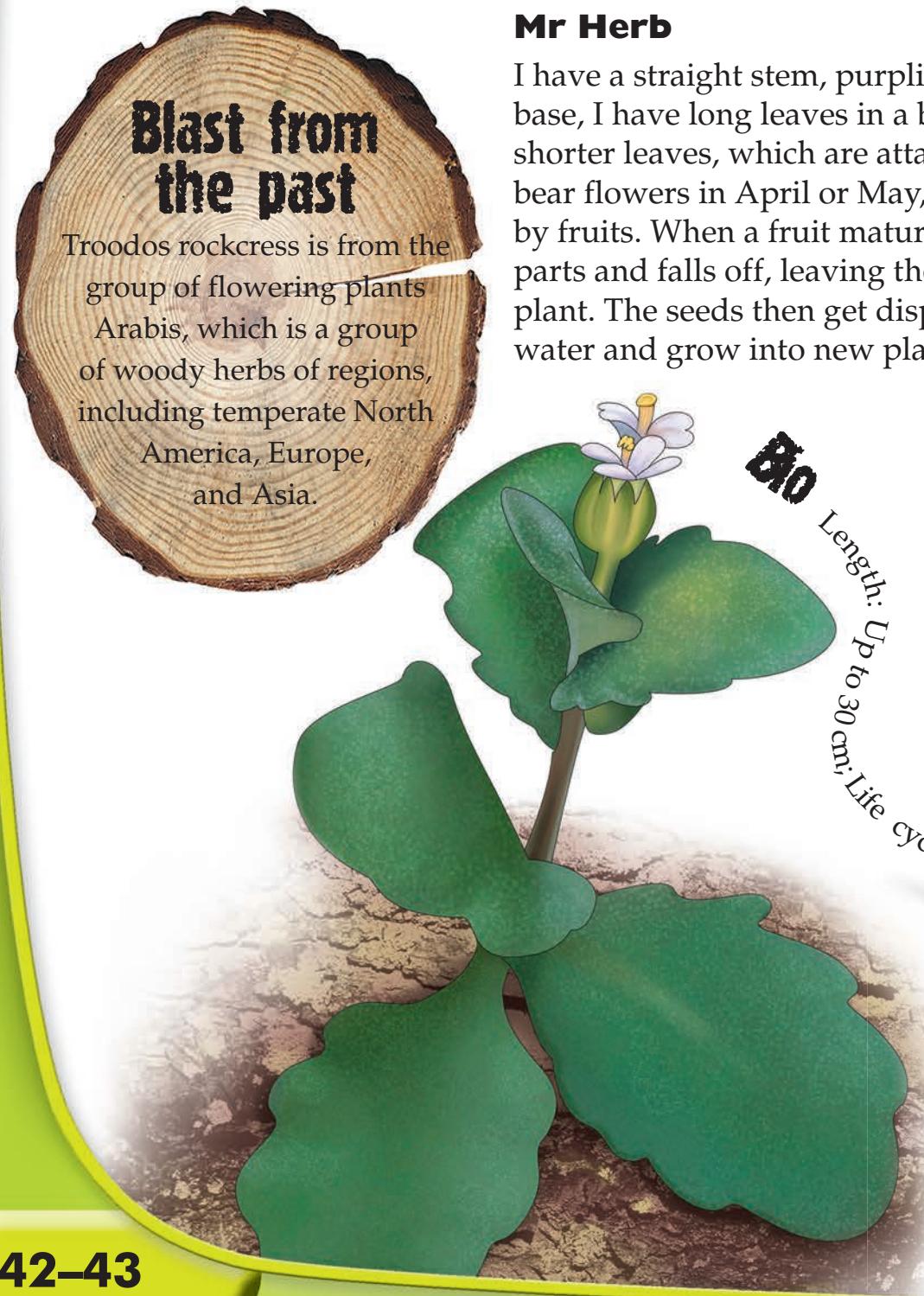
Troodos rockcress

Blast from the past

Troodos rockcress is from the group of flowering plants *Arabis*, which is a group of woody herbs of regions, including temperate North America, Europe, and Asia.

Mr Herb

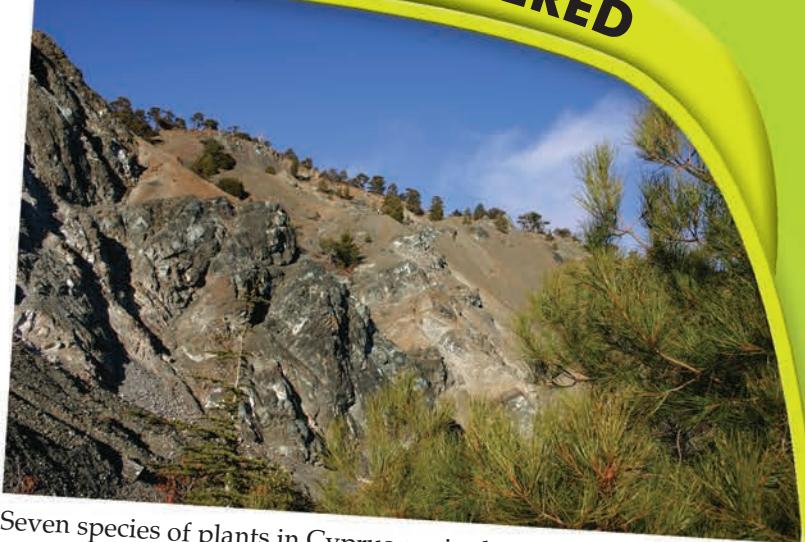
I have a straight stem, purplish in colour. At the base, I have long leaves in a bunch, and on top are shorter leaves, which are attached to my stem. I bear flowers in April or May, which are followed by fruits. When a fruit matures, it splits into two parts and falls off, leaving the seeds behind on the plant. The seeds then get dispersed by wind or water and grow into new plants.


BIO

Length: Up to 30 cm; Life cycle: annual/biennial

I am from the Mediterranean island Cyprus. I am a small flowering herb, and my name is Troodos rockcress.

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Seven species of plants in Cyprus are in danger of extinction. One of these is the Troodos rockcress.



The main threats to the Troodos rockcress are military activities in the area and the construction of an antenna.

Did you know?

The flora of Troodos Mountain, the home of the Troodos rockcress, was described by Aristotle as, "...many and different herbal species useful in medical art, which if I try to describe separately, time will not be enough".



Support Troodos rockcress

I receive protection from the Bern Convention and the European Community Habitats Directive. My entire family lives in the Troodos National Forest Park and Paphos State Forest. However, of the three groups, only one lives in a nature reserve. It would be fantastic if the homes of the other two groups could be declared national reserves as well.



Fighting for the flowers

The World Conservation Union, or the IUCN as it is popularly known, is the world's largest organization that works for the protection of nature and natural resources. The headquarters of the IUCN are in Switzerland. The IUCN prepares lists of threatened plants and animals every year. Scientists at the IUCN study the current population of the species as well as where it is found. The organization then tries to help countries develop ways and means to conserve these dying creatures. The IUCN categorizes species as follows.

Extinct: If the last individual of a species is believed to have died, the species is considered extinct. The Yangtze River dolphin, or Baiji, was officially declared extinct in 2007.

Extinct in the Wild: A species is thought to be extinct in the wild if it can no longer reproduce on its own. Cuttings of such plant species have to be used to produce them, and animals have to be bred in zoos or sanctuaries.

Critically Endangered: Any species is thought to be critically endangered if data suggests that it might become extinct in the wild in the next ten years. This means that its population has reduced significantly, and it will no longer be found in the regions where it used to be. Animals like the gorilla, gharial, rattlesnake, shark, flying fox bat, fox, a large number of trees, and a few species of fish, frogs, parrots, toads as well as corals have been declared as critically endangered.

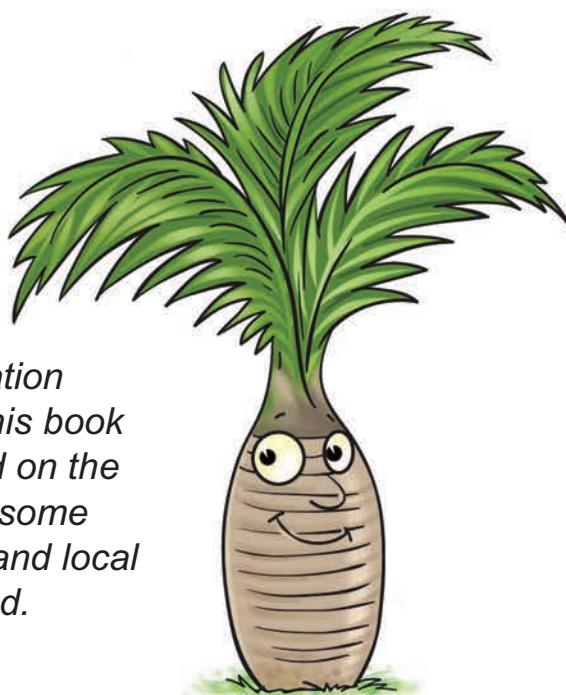
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Endangered: Animals like the gazelle, Egyptian vulture, parakeet, blunt-nosed leopard lizard, the Hawaiian finch, green sphinx moth, sawfish, a few species of owls, frogs like the African reed frog, and the Slender Loris are listed as endangered. The survival of these animals is in extreme threat in the next ten years.

Vulnerable: The IUCN groups the animals that face a threat but can be conserved in the near future as vulnerable. This group includes the white-headed vulture, the alligator lizard, the lemur, the shark ray, the butterflyfish, the common hippopotamus, the giant gecko, and a few crocodile species. These animals might soon be included in the endangered or critically endangered categories if steps are not taken immediately to protect them.

Near Threatened: Species that are not vulnerable, endangered or critically endangered but might fall into any of those categories soon are classified as near threatened.

Least Concern: Species that are widely found in plentiful numbers are classified under least concern.



Note: The conservation status provided in this book are not solely based on the IUCN Red List. For some creatures, national and local data have been used.

Glossary

bark: the outer layer or stem and roots of woody plants like trees

coniferous: any tree or shrub bearing cones

cones: an organ on plants, which bears seeds or pollen

deciduous: a tree or shrub from which the leaves fall seasonally

disperse: to scatter, to distribute

evergreen: a plant that has leaves all year round

fibrous: having, consisting of or resembling fibres, which are threads of tissues

furrowed: wrinkled

heartwood: wood that has died and become resistant to decay

herb: a plant that is valued for qualities such as medicinal properties, flavor, and scent

leaflet: a part of a leaf, may look like an entire leaf but isn't one

leafstalk: the stalk supporting a leaf

midrib: the central vein of a leaf

regenerate: forming again

seedpod: a pouch like form on a plant with seeds inside

shrub: a low woody perennial plant usually having several major stems

tubular: shaped like a tube

tapering: gradually narrowing towards a point

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THIS IS A GREEN BOOK



About the Environment Agency – Abu Dhabi (EAD)

Established in 1996, the Environment Agency – Abu Dhabi (EAD) is committed to protecting and enhancing air quality, groundwater as well as the biodiversity of our desert and marine ecosystem. By partnering with other government entities, the private sector, NGOs and global environmental agencies, we embrace international best practice, innovation and hard work to institute effective policy measures. We seek to raise environmental awareness, facilitate sustainable development and ensure environmental issues remain one of the top priorities of our national agenda.

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Life in the PLANT KINGDOM

Today, one out of every eight plants in the world faces the risk of extinction, with the United States leading the world with the most number of species identified as threatened with extinction. Learn about some of the most endangered plant species in the world, why they are dying out, and what can be done to save them.

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ISBN 978-9948-20-720-7

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