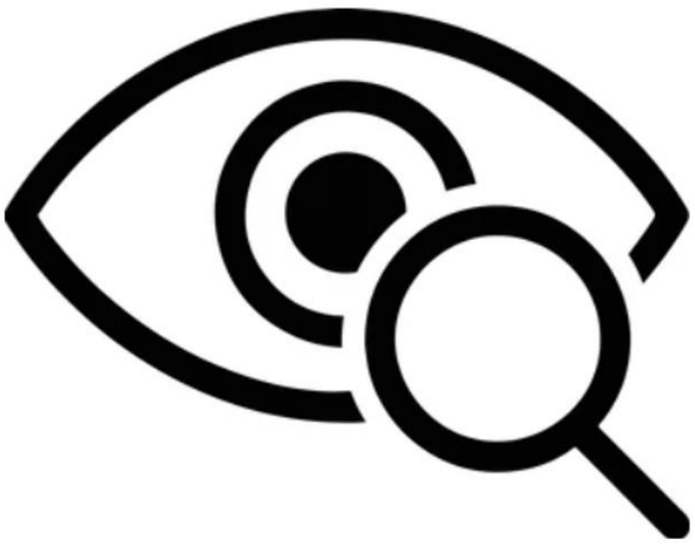
ROOM GUIDE · LARGE PRINT

Room 6

Land biodiversity

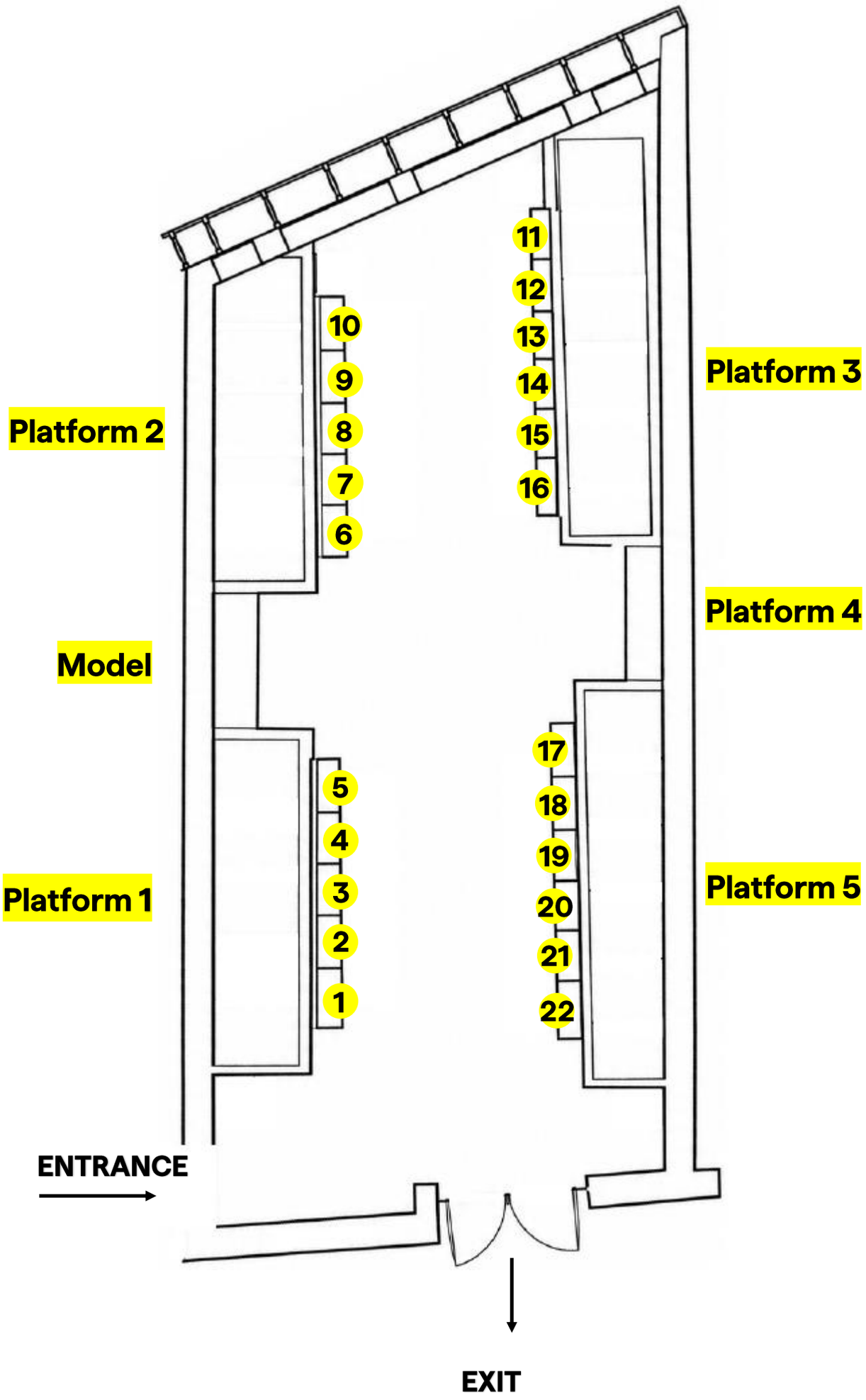


Deserts of fog, sand and salt

The adventure of survival

Atacama’s biodiversity thrives between the world’s driest desert and fertile valleys linking the mountains to the sea. From the foggy coast to high-Andean salt flats and lagoons, life adapts to each extreme landscape.

Room 6 plan


11
12
13
14
15
16
10
9
8
7
6
Platform 3
Platform 2
Platform 4
Model
17
18
19
20
21
22
5
4
3
2
1
Platform 5
Platform 1
ENTRANCE
EXIT

Platform 1

1. The coastal strip

Where land meets the sea

Atacama's nearly 300 km of coastline support a rich diversity of species. Across cliffs, plains and bays, dense fog known as *camanchaca* moistens the coastal desert and provides vital water for life.

- Its name comes from the Aymara word *kamanchaka*, meaning darkness.

2. Tiny, mighty drops

Pure life

Camanchaca is made of tiny water droplets. Too light to fall, they condense on plants and rocks, providing a vital water source in one of the driest regions on Earth.

Biological crust

Thanks to the *camanchaca*, a thin layer of microscopic life forms on the soil of *Pan de Azúcar* National Park. It fertilises the ground, captures carbon and releases oxygen.

Harvesting fog

People living in the desert have also found ways to obtain water in this arid environment. Atacama pioneered fog catchers, structures that capture and collect mist.

3. Xerophytic plants

Quenching thirst

As the day advances, the fog disappears and the sun reaches full intensity, reducing humidity to a minimum. Plants use specialised strategies to capture, store and conserve water.

- Plants with specialised water-saving adaptations are called xerophytes, from the Greek *xero* (dry) and *phyton* (plant).

Adaptations: the art of desert survival

- **Roots.** They may spread near the surface to absorb moisture, grow deep to reach groundwater, or become thick and fleshy to store water.

- **Seeds.** Some remain dormant and germinate after occasional rain. Others germinate only in exceptionally wet years, forming seed banks.
- **Leaves.** They use different strategies to protect against UV radiation and capture and conserve water. Some are small or hairy; others are succulent, modified into spines or coated in wax.
- **Stems.** In cacti and other succulents, fleshy stems store water, while waxes can protect against UV radiation and moisture loss. In shrubs, stems may be upright to capture more light or compact to reduce sun exposure.

Fungi in the desert?

Although more common in humid ecosystems, some fungi live in arid environments, producing and gradually releasing many spores to increase their chances of germinating under the right conditions.

4. A diverse family

Spiny by nature

Cacti are iconic desert plants, found from the coast to the high mountains in many shapes and sizes.

- Fifty-six cactus species have been identified in Atacama, more than half of them endemic —found nowhere else.

Long live the Copiapoa

This cactus group is endemic to northern Chile and grows only in coastal areas reached by *camanchaca*. Of the 32 known species, more than half occur in Atacama. Some grow up to a meter tall, while others remain underground or barely emerge above the surface.

- Today, nearly 80% of Copiapoa species are threatened with extinction, mainly due to illegal collection and climate change.

5. Give and take

A vital relationship

In nature, organisms depend on one another to survive, each helping maintain ecosystem balance. In harsh environments such as deserts, these interactions become especially important.

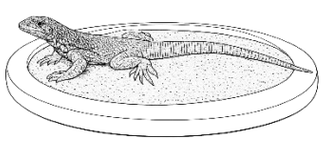
Symbiosis

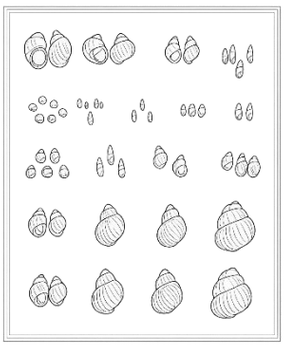
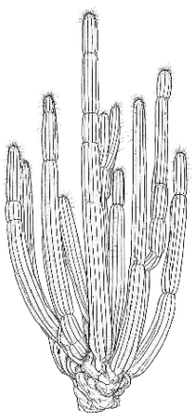
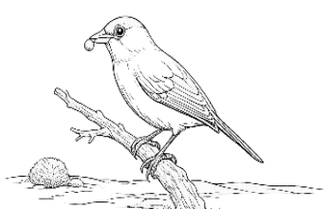
A close, long-term relationship between two different species in which at least one benefits.

Examples include:

- **Commensalism**. One species benefits without affecting the other. Some spiders, such as *Philisca* sp., build webs near dung beetle (*Megathopa villosa*) dung balls, catching insects attracted by the smell.
- **Parasitism**. One species benefits while harming the other. *Tristerix aphyllus* grows on coastal desert cacti, taking water and nutrients and affecting their photosynthesis and reproduction.
- **Mutualism**. Both species benefit. Lichens combine an alga that produces sugars through photosynthesis with a fungus that provides nutrients, moisture and protection.

Featured collections

	**Atacama runner** | *Microlophus atacamensis* Replica | RM.1.28 It lives along the coast and is one of the few reptiles to enter the intertidal zone,

	where it feeds on marine invertebrates and may even eat members of its own species.
	**Collection of land-snail shells** Donated by Ricardo Catalán Garrido | RM.2A.33 Atacama has Chile's greatest diversity of land snails, with 41 species described to date.
	**Copao cactus** | *Eulychnia breviflora* Replica | RM.1.25 Tall columnar cacti and their dense spines protect hawks and other birds that nest beyond the reach of many predators.
	**Diuca** | *Diuca diuca crassirostris* Illustration | RM.1.81 This local subspecies has a longer, thicker and heavier beak than other diucas, allowing it to crack hard desert seeds.

Model

Below ground

A land of opportunity

To escape predators and intense sun, insects and spiders shelter in cool burrows, while plants and seeds survive and reproduce below ground.

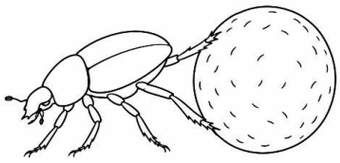
Night excursion

After sunset, cooler temperatures allow some mice and spiders to feed under cover of darkness, away from predators.

Life on hold

Some seeds, such as *huille*, can remain dormant for up to ten years until rain “wakes” them. Their bulbs store water and nutrients during drought and also feed *cururos* and *guanacos*.

Featured collection

	**Dung beetle**	*Megathopa villosa* To incubate its eggs and feed its larvae, this beetle forms balls of dung and buries them.

Platform 2

6. Flowering desert

A spectacle of colour

At times, rain transforms the arid desert into an explosion of life. This happens when *El Niño* alters sea temperatures off Chile, bringing unusually heavy rainfall.

Unique

This phenomenon also occurs in arid regions of Australia, the United States and South Africa, where it happens annually. In Chile, its irregular occurrence makes it exceptional.

Flowers defying aridity

For the desert to bloom, autumn and winter rainfall must exceed 20 mm in a region that receives less than 2 mm a year. When this happens, hundreds of wildflower species cover the landscape, triggering a brief ecological cycle alongside local animals.

7. Embroidered fields

The awakening of flowers

Beneath the surface, thousands of seeds, bulbs, tubers and rhizomes of geophytes —plants adapted to survive underground— lie dormant until the rains arrive. They then germinate, flower and reproduce rapidly, covering the desert in colour within weeks.

8. Carnival days

More than flowers!

Rain turns desert life into a feast. Abundant food boosts reproduction, pollination, soil fertility and seed dispersal — all vital in these fragile ecosystems.

Travelling pollen

Most plants depend on animal pollinators to reproduce, and insects play a key role in the flowering desert.

What is pollination?

1. Flowering plants attract pollinators with colours, scents and shapes.

2. While feeding on nectar, insects and birds brush against the stamens and become covered in pollen.
3. On the next flower, they deposit pollen on the stigma, enabling fertilisation and the formation of fruit and seeds.

9. Small but numerous

When the desert blooms, arthropods —including insects and spiders— reproduce rapidly. They help maintain ecological balance by decomposing organic matter, dispersing pollen and feeding reptiles, birds and other animals.

- More than 1,200 arthropod species have been identified in Atacama, with over 65% endemism.

Main arthropod groups

- Crustaceans. Five or more pairs of legs and two pairs of antennae, such as woodlice.
- Insects. Three pairs of legs and one pair of antennae, including ants, butterflies and beetles.

- Arachnids. Four pairs of legs and no antennae, such as spiders and scorpions.
- Myriapods. Ten or more pairs of legs and one pair of antennae, such as centipedes and millipedes.

A unique beetle

Darwin's *balita* beetle (*Ectinogonia superba*) lives only on the Atacama coast. It feeds on Copiapoa pollen and petals, pollinating the cacti as it moves between flowers.

10. Desert *vaquitas*

Painted bodies

These beetles live mainly along the coast between Antofagasta and Valparaíso. Forty-two species have been described in Chile, over 30% of them endemic to Atacama. The black-and-white patterns on their hard wing cases — elytra— are like fingerprints: each is unique.

- Guacolda Island, in southern Atacama, was home to a small beetle known as the island or Guacolda vaquita — *Praocis (Orthogonoderus) insularis*. Its dune habitat was destroyed when the island was artificially joined to the

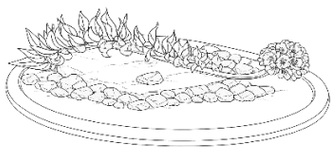
mainland. With no records for over thirty years, it is considered extinct.

Time to explore

Years when the desert blooms are crucial for understanding these ecosystems. The seemingly lifeless landscape “awakens”, allowing researchers to collect data and specimens.

Enrique Gigoux (1863–1951), a botanist and naturalist from Copiapó, studied Atacama’s flora, fauna and geology and created a regional herbarium now held at Harvard University.

Featured collections

	**Red *garra de león***	*Leontochir ovallei* Replica	RM.1.36 This endangered species has a restricted range, and its tubers are eaten by guanacos and introduced animals.
	Guanaco	*Lama guanicoe* Replica	RM.1.38

	Desert sower. *Guanacos* range across Atacama, moving between the mountains and coast. They eat flowers and fruit, dispersing seeds in their droppings and helping the flowering desert bloom.
	Yellow *añañuca* herbarium specimen with bulb	*Zephyranthes bagnoldii* Donated by the University of La Serena Herbarium	RM.2B.10

Platform 3

11. Coastal wetlands

Where waters meet

Where the sea meets a river, estuaries form: ecosystems rich in nutrients and minerals. These conditions support high biodiversity, providing food, breeding grounds and shelter for many species.

- **Their role in the ecosystem**

Their waterlogged soils and abundant vegetation capture more CO_2 than many other environments, making them key allies against climate change.

12. Welcome!

A stop along the way

Coastal wetlands are essential stopovers for migratory birds, where they rest and regain energy before continuing their journeys. Each year, birds arrive after travelling for weeks or even months from as far away as Alaska, Brazil and Patagonia.

14. Transverse valleys

From the Andes to the Pacific

Moving south through Chile, transverse valleys first appear in Atacama. These fertile corridors extend between the Copiapó and Aconcagua rivers. Their waterways link the mountains to the sea, sometimes underground, creating fertile oases for biodiversity.

- In northern Atacama, the Salado River is too salty to support a cultivable valley. During the Spanish conquest, it was nicknamed the “deceptive” or “lying river”: in the desert, its water seemed like a gift, but it was undrinkable.

Chañar (_Geoffroea decorticans_), a desert ally

The Copiapó Valley has one of Chile’s largest chañar populations. This native tree is highly adapted to arid climates, provides shelter for many species, and its fruit has long been used as food and medicine.

15. Fertile lands

A shared home

Since the earliest settlements, the Huasco and Copiapó valleys have offered favourable conditions for farming. Agriculture expanded during the colonial period with crops such as grapes and olives, now part of Atacama's regional identity.

- Valley ecosystems are threatened by intensive agriculture, mining and population growth.

16. Sea of dunes

A moving landscape

The Copiapó Valley contains Chile's largest dune field. Where *camanchaca* reaches the dunes, plants such as air plants and *cachos de cabra* help stabilise the sand. Above 800 m, however, wind constantly reshapes them.

- Sandboarding, rallying and motocross threaten this geological heritage and the species that live there.
- This sea of dunes covers 335 km^2, about fifteen times the urban area of Copiapó.

- At 1,643 m, Cerro Medanoso is considered Chile's highest dune and one of the most impressive in South America.

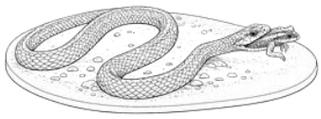
Expert feet

- *Lycinus* sp. spider

  Its long legs keep it away from sand that can reach 40°C.
- Dune *vaquita* | *Praocis (Mesopraocis) arenicola*. Its claw-like limbs help it grip wind-blown sand.

Featured collections

	American oystercatcher	*Haematopus palliatus* Replica	RM.1.49 Many species —including snowy plovers, oystercatchers and seedsnipes— lay their eggs in sand or low vegetation. Their nests are vulnerable to vehicles, unsupervised pets and people leaving marked paths.

	**Short-tailed snake and Atacama toad |** *Galvarinus chilensis* *Rhinella atacamensis* Replica | RM.1.50 In one bite! Unlike many animals, snakes have flexible jaws that allow them to swallow prey whole, even when it is wider than their mouth.
	Many-coloured Rush Tyrant | *Tachuris rubrigastra* Replica | RM.1.47
	River shrimp | *Cryphiops caementarius* Donated by the Ecological Entomology Laboratory, University of La Serena | RM.2A.45 Decades ago, they were an important resource in the Huasco Valley, but overexploitation and reduced river flow drastically decreased their population.
	***Yaca* |** *Thylamys elegans* Replica | RM.1.55

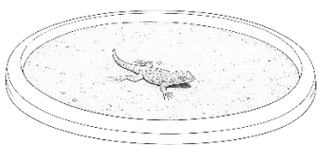
Platform 4

Inland

A world under an extreme sun

Away from the coast and valley oases, the Atacama Desert extends north from Copiapó as the driest non-polar region on Earth. Conditions are severe: less than 5 mm of rain a year, 360 days of sunshine and sharp temperature changes between day and night. Yet life persists.

Featured collections

	**Covered-ear lizard** | *Liolaemus adituvelatus* Replica | RM.1.60 This lizard has scales that protect its ears from wind and sand.
	Hornby's Storm petrel | *Hydrobates hornbyi* Replica | RM.1.61 This bird spends most of its life at sea, breeding only in desert sands up to 100 km inland.

Platform 5

17. Towards the summit

Life at the limit

Towards the mountains, the land rises steeply through slopes and deep ravines. With altitude come low air pressure, intense solar radiation and extreme temperature changes between day and night, creating harsh conditions for life.

Among mountains

The Domeyko, Claudio Gay and Andes ranges shape the climate and create unique microhabitats.

- The Claudio Gay Range is found only in Atacama.
- *Ojos del Salado*, at 6,891 m above sea level, is the world's highest active volcano.

18. High-altitude oases

Refuges for life

In the high Andes, life gathers around peat bogs, wetlands, lagoons, rivers and salt flats. Differences in pH, salinity and temperature shape the organisms that live in each environment.

High-Andean lagoons are fed by groundwater and surface water. Some hold water year-round, while others are seasonal.

- ***Santa Rosa*** Lagoon is a Ramsar site, protected for its global ecological importance. Together with *Negro Francisco* Lagoon, it forms part of *Nevado Tres Cruces* National Park.
- **Salt flats** form where water evaporates rapidly, concentrating salts such as borates, chlorides, nitrates and sulphates, as at *Pedernales* Salt Flat.

Land of flamingos

Comunity life

High-Andean lagoons and salt flats are home to three of the world's six flamingo species. Chilean, Andean and James's flamingos come here to breed and build mud nests. Soon after hatching, chicks gather in "nurseries" supervised by adults.

19. Adapted to survive

Species across the kingdoms of life have developed adaptations to survive high-altitude conditions.

- **Cold**

  Unlike many egg-laying lizards, the Andean lizard (*Liolaemus andinus*) carries its offspring inside its body and gives birth in summer. It is microendemic, found only at Laguna Verde.
- **Salinity**

  The salt-tolerant *jume* (*Lycium humile*) regulates excess sodium and reduces water loss, helping prevent dehydration.
- **Low atmospheric pressure**

  Some rodents, such as the Andean mouse (*Abrothrix andinus*), absorb more iron from food, increasing the blood's capacity to carry oxygen.
- **High solar radiation**

  The intense orange colour of the lichenised fungus *Lichenomphalia altoandina* may help reflect solar radiation and protect its cells.
- **Fragile soils**

  Some animals, like the *suri* or Andean rhea (*Rhea pennata tarapacensis*), have broad, soft soles that keep them from sinking into boggy high-Andean peatlands.

20. The roof of the Americas

The “Route of the Six-Thousanders”

With sixteen mountains over 6,000 m high, Atacama has some of the highest peaks in the Americas and the world’s second-highest concentration of high mountains after the Himalayas.

- The *Maricunga* salt-flat basin —Chile’s southernmost— contains one of the country’s largest permafrost fields.

Glaciers, high-mountain treasures

Above 5,200 m, glaciers and permafrost fields —a mix of ice, soil and rock— remain frozen for most of the year. These freshwater reserves are vital, feeding wetlands and rivers during thaw periods in one of the driest regions on Earth.

Microbial environment

Research on glacier bacteria explores how they survive extreme conditions and their potential applications in medicine and biotechnology.

21 - 22. Mammals uphill

Easy at altitude

The mountains are home to mammals with adaptations that help them cope with aridity, intense sunlight and low oxygen. Camelids, canids, felids and rodents coexist here in a fragile balance.

- **Culpeo fox** | *Lycalopex culpaeus*

  An opportunistic predator, it eats fruit, rodents, lizards, insects and other foods. It may also hunt flamingos trapped in ice on frozen lagoons and salt flats.
- **Andean cat** | *Leopardus jacobita*

  Known as the “ghost of the Andes” for its elusive nature, it wraps its thick, furry tail around its body like a blanket to conserve heat while resting.
- ***Vicuña*** | *Vicugna vicugna*

  Chile’s smallest camelid prefers high altitudes. Its coat protects it from extreme cold, while sharp incisors cut grasses rather than pull them out, helping preserve vegetation.

- **Puma** | *Puma concolor*

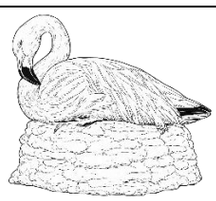
  The top predator in the high-altitude food web. Cubs are born with dark spots that provide camouflage; these fade at around six months, which fade at around six months. By 12–18 months, they are independent.
- **Short-tailed chinchilla** | Chinchilla chinchilla

  Its excellent night vision, hearing and dense fur help it survive the cold. When water is scarce, it gets moisture from plants and conserves it through efficient kidneys.
- **Yellow-rumped Leaf-eared mouse** | *Phyllotis xanthopygus*

  The world's highest-dwelling mammal. Its metabolism favours carbohydrates, which require less oxygen than proteins and fats. It has been recorded on Llullaillaco volcano at 6,739 m.
- ***Vizcacha*** | *Lagidium viscacia*

  Chile's largest rodent is active by day and lives in family groups. Its dense insulating fur protects it from intense cold and large temperature changes between day and night.

Featured collections

	Medicinal herbarium RM.2B.26 Medicinal plants grow among rocks and soils in the foothills, including *pichiromero*, used as an antiseptic and diuretic; *quinchamalí*, for liver, gallbladder and joint ailments; and *bailahuén*, for digestion.
	Llareta | *Azorella madrepórica* Replica | RM.1.66 Species like this protect other plants by trapping their seeds and helping them grow in harsh environments. They can also live for over 300 years, making them some of Chile's longest-lived organisms.
	**Chilean flamingo** | *Phoenicopterus chilensis* Replica | RM.1.68

Script, curatorship and coordination

Exhibitions Department

Subdirección Nacional de Museos

Museo Regional de Atacama

Atacama Region,

January 2026

MUSEO
REGIONAL
DE
ATACAMA